BAY AREA WATER SUPPLY AND CONSERVATION AGENCY
BOARD OF DIRECTORS MEETING

March 11, 2022

Correspondence and media coverage of interest between February 23, 2022 and March 9, 2022

Media Coverage

Drought:

Date: March 4, 2022
Source: San Francisco Chronicle
Article: California rain map: Below-normal winter rainfall signals continued drought

Date: March 2, 2022
Source: San Jose Mercury News
Editorial: California is failing to prepare for droughts

Date: March 1, 2022
Source: Sacramento Bee
Article: Drought cost California's ag industry $1.1 billion last year, UC Merced researchers say

Date: February 28, 2022
Source: San Jose Mercury News
Article: Sierra Nevada snowpack disappearing after driest January-February in recorded history, third year of California drought all but inevitable

Date: February 24, 2022
Source: Courthouse News Services
Article: Drought conditions worsen in California

Date: February 24, 2022
Source: ABC10
Article: Drought Monitor shows some changes after weeks of steady conditions

Water Supply Conditions:

Date: March 9, 2022
Source: Sierra Sun Times
Article: 2022 Water Year Looks Dismal as Snowpack Melts, California Farm Bureau Reports

Date: March 1, 2022
Source: Sacramento Bee
Article: 'Moving toward extremes': California drought outlook is bleak after dry start to 2022

Date: March 1, 2022
Source: California Department of Water Resources
Article: Statewide Snowpack Falls Well Below Average Following Consecutive Dry Months

Date: February 24, 2022
Source: Water World
Article: Calif. launches website to track local water conditions

Date: February 23, 2022
Source: KCRA
Article: Concern for the Delta region's water supply grows as Sierra snowpack shrinks

Water Supply Management:

Date: March 3, 2022
Source: KSEE
Article: New Snow Survey technology could change how we manage water resources

Date: March 3, 2022
Source: KCRA
Article: Central California famers contend with zero percent water from Bureau of Reclamation

Date: February 28, 2022
Source: Capital Press
Article: Zero water allocation leaves Central Valley Project farmers with few options

Date: February 24, 2022
Source: Civil Engineering Source
Article: How can information about atmospheric rivers optimize reservoir operations?

Date: February 23, 2022
Source: Maven News
Article: Press Release from Bureau of Reclamation: Reclamation Outlines Initial 2022 Water Allocations For Central Valley Project Contractors

Water Infrastructure:

Date: March 3, 2022
Source: USDA
Article: Press Release: President Biden and USDA Invest More Than $166.5 Million in Infrastructure to Protect American Communities

Climate Change:

Date: March 4, 2022
Source: Los Angeles Times
Article: 'We need to do all we can': Five key takeaways from the U.N. climate report

Date: February 23, 2022
Source: KQED
Article: Why Environmental Justice Is Crucial in Climate Resilience: Just Look at New Sea Level Rise Predictions

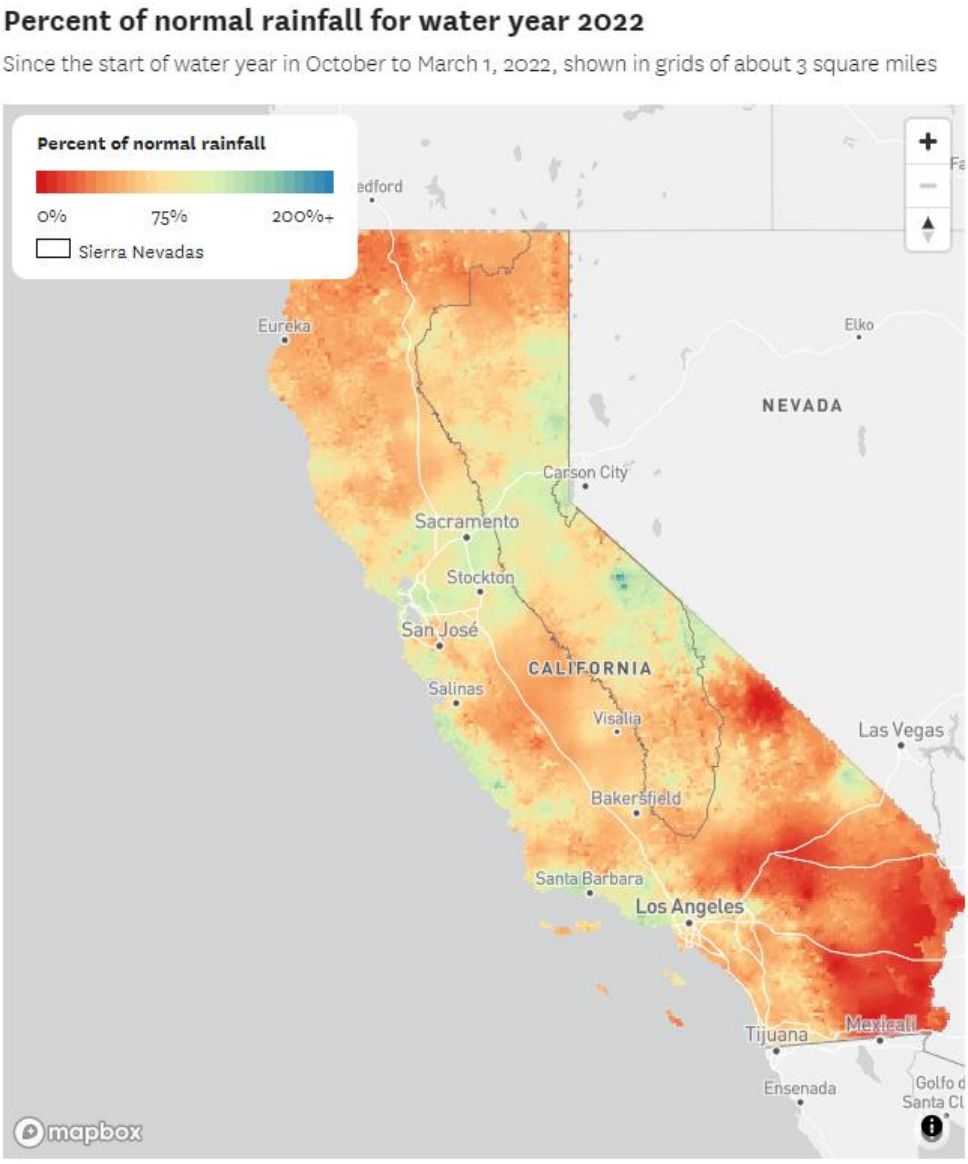
Water Conservation:

Date: March 1, 2022
Source: Soil Science Society of America
Article: BLOG: How can homeowners recycle grey water?

Water Quality:

Date: February 28, 2022
Source: Waste 360
Article: Press Release: California Takes Decisive Action to Reduce Microplastics Pollution

California rain map: Below-normal winter rainfall signals continued drought
San Francisco Chronicle | March 4, 2022 | Yoohyun Jung



Map: Yoohyun Jung / The Chronicle | Source: National Weather Service

California remains thirsty, with many parts of the state recording below-normal levels of rain, according to National Weather Service (NWS) data.

The map above shows how the precipitation from Oct. 1, 2021 to March 1, 2022 compares with the normal amount of rainfall that happens during this period. The data is based on multi-sensor estimates by the weather agency and shown in grids that are about 3 square miles in size.

In the Bay Area, San Francisco and San Jose recorded particularly low levels of precipitation for January and February, said Matt Mehle, an NWS meteorologist. “We started off really well in the beginning of the year,” he said. But there has been little rain since then.

Rainfall during the winter is important because that’s typically when California sees the most precipitation and helps experts gauge the impact of drought later in the year. Experts also keep an eye on precipitation and snowpack levels in the Sierra Nevadas, shown in the map above, which produces much of the state’s water supply.

While some rain is headed toward California in the coming days, he said it’s unlikely that the Bay Area would see major drought relief as a result. “It’s not really going to put a dent [in it],” he added. The Santa Cruz mountains and Big Sur could get a major downpour, with more than half an inch of rain predicted for the duration of the coming storm, Mehle also said.

Long-range forecast models aren’t showing much promise for significant rain in the weeks ahead, the meteorologist said. “Drought will start to creep back into people’s concerns,” he said.

Much of the state remains in some level of drought. The latest U.S. Drought Monitor data shows nearly 70% of the state is in severe or worse drought. “It’s going to be an interesting summer to see how it all plays out,” Mehle said.

# # #

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Editorial: California is failing to prepare for droughts
San Jose Mercury News | March 2, 2022 | Editorial Boards

Bare patches of earth are visible near the base of a Sierra-at-Tahoe chair lift as the state's drought continues on Feb. 11. (Karl Mondon/Bay Area News Group)

Climate change isn't a problem for the future. It's here, and California isn't remotely prepared to deal with the consequences.

The state's latest snowpack report makes that clear. The Sierra Nevada snowpack provides nearly one-third of California's water supply. On Tuesday it was at 63% of its historical average for that date. That's despite the heavy storms in October and December. The months of January and February were the driest in the state's recorded history, meaning Californians are facing a third consecutive year of severe drought.

A study published Feb. 14 notes that the past two decades ranks as the driest 22-year period in at least 1,200 years in the American West. .

"Here we are 22 years into a bad drought, and because of climate change we are now surpassing the severity of megadroughts that have always been thought of as the worst-case scenarios," said Park Williams, an associate professor of geography at UCLA and lead author of the study.

The state Department of Water Resources acknowledged the need for action during a Sept. 14 presentation to the California Water Commission, saying California should “expect by mid-2050s a 50% chance in any year to experience conditions like the 2012-2016 drought or worse.”

Yet the state is doing far too little to address this reality.

California’s water system is designed for a climate that no longer exists. Day by day, month by month, year by year, we are not keeping pace with climate change. The state’s failure to address this fundamental crisis threatens our urban and agricultural future.

“If we don’t change course and start making smart investments, we’re going to be even worse off 10 years from now,” says Doug Obegi, an attorney with the Natural Resources Defense Council.

Yes, Gov. Gavin Newsom and the Legislature allocated $5.2 billion over three years to deal with the drought. And he is seeking an additional $750 million more for water conservation programs, financial assistance for water agencies and grants for farmers to modify their operations. But that’s a drop in the bucket to what’s needed to fundamentally address California’s challenges.

The Bay Area is woefully behind its Southern California neighbors when it comes to water conservation. It’s time for the region’s leaders to push for additional large-scale water recycling and storm water capture efforts at a scale large enough to meet our long-term needs.

But California can’t hope to solve its water woes until it addresses its Big Ag issue. Farmers use about 75% of California’s available water supply, much of it on almond and pistachio orchards that cannot be fallowed in dry years and for crops that are mostly sent overseas to India and China.

The situation holds many parallels to the oil industry. California’s farmers are seeking to maintain the status quo, resisting inevitable change in order to cash in on highly profitable crops for as long as possible. If Big Ag isn’t interested in adapting to the realities of climate change, Newsom and the Legislature need to take steps to help growers, landowners, farmworkers and the communities they live in move toward a more sustainable future.

It’s time we acknowledged the degree of our water challenges. Serious, lingering droughts are the new norm for California.

# # #

Drought cost California's ag industry $1.1 billion last year, UC Merced researchers say
Sacramento Bee | March 1, 2022 | SunStar Staff

Watermelons are harvested from farmland near the intersections of Green Sands Avenue and Gurr Road in Atwater, Calif., on Thursday, Aug. 6, 2020. ANDREW KUHN

A new report led by UC Merced researchers estimates California's drought cost the state's agriculture sector about $1.1 billion and nearly 8,750 full- and part-time jobs last year.

The Economic Impacts of the 2021 Drought on California Agriculture Preliminary Report, which was released Thursday, analyzes the impacts of last year's drought in the Central Valley, the Russian River Basin and northern intermountain valley areas, according to a university news release.

The report also states once the effects on other economic sectors are considered, total impacts are estimated at $1.7 billion and 14,634 full- and part-time jobs lost. TOP VIDEOS WATCH MORE × Neighbor recounts the night of the deadly Sacramento-area church shooting

Several regions in the Sacramento Valley, the west side of the San Joaquin Valley, Tulare County and Kern County were the most affected, according to the release.

"In comparison with the 2012-16 drought, conditions were much worse for the Sacramento Valley and the Russian River Basin, yet the statewide impacts have not been as severe as in 2015 — the deepest point in the last drought," said School of Engineering Professor Josué Medellín-Azuara, in the release.

"Should dry conditions persist throughout 2022, a higher tier of adaptation measures may come into play to reduce economic impacts on agriculture and communities that host thousands of households relying on agriculture for a living," he added.

MULTIPLE FACTORS CONSIDERED

The researchers used surveys, reviews of hydrological information and remote sensing data gathered from the affected areas and compared them to average conditions, as well as to the 2012-16 drought, the release said.

The report identifies at least additional 395,000 acres of idled land — roughly 385,000 acres in the Central Valley alone with respect to pre-drought conditions due to drought-related water cutbacks.

Other drought-affected areas include the Russian River Basin and intermountain agricultural areas in Siskiyou, Shasta and Modoc counties.

The crops most significantly affected by increased fallowing include rice in the Sacramento Valley, cotton in the San Joaquin Valley, and grain and field crops statewide, the release said.

The report also highlights strong commodity prices that have helped mitigate some economic costs of the 2021 drought. Milk prices rose because of global demand, raising revenues and offsetting some of the drought-related effects of higher production costs.

The dairy sector also explored alternatives to hay and winter grains that, in some cases, increased cow milk productivity., According to the release, the beef cattle sector also had to adapt to scarce winter pastures and higher forage prices, but the state's beef cow herd increased, as did its share of the national cow herd, leading to potential revenue gains.

While Californians are familiar with drought, the 2020-21 water years were the second driest two years on record. Although precipitation deficits were widespread, drought conditions were more severe in the Sacramento Valley and the North Coast regions.

A lack of atmospheric rivers and a below-average snowpack depleted most reservoirs and aquifers in 2021, the report states.

"This has been a fast-paced drought and it shows how climate change increases the challenges we face in managing water in California," researcher and co-author Alvar Escriva-Bou, an engineering and policy expert at the Public Policy Institute of California, said in the release.

"Sadly, we are going to see more and more droughts like this, so we need better tools to anticipate and minimize the socio-economic impacts."

But drought is not only defined by the water supply, the researchers wrote. Warmer temperatures and already-dry conditions increased crop irrigation demands and widened the gap between water supply and irrigation needs.

"Warming has impacted seasonal water availability, namely through reducing spring snowmelt runoff and through increasing atmospheric thirst," said Professor John Abatzoglou, climate expert and co-author in the report.

"These factors in concert have intensified drought severity and impacts in the state and increased the need for actionable solutions to cope with drought."

The drought hit during the early implementation of Sustainable Groundwater Management Act (SGMA) sustainability plans.

The act is designed to avoid the undesirable consequences of unsustainable groundwater use. Groundwater sustainability plans for critically overdrafted basins were submitted in 2020 and plans in other priority basins are due early this year.

These plans remain in progress throughout the state for these and other priority basins. California's increasingly variable supply of surface water and overdrafted groundwater aquifers present serious challenges for meeting societal needs, the report points out.

Funded by a $1.5 million research grant from the California Department of Food and Agriculture, Medellín-Azuara, Abatzoglou, Professor Joshua Viers and Escriva-Bou have worked since last fall to develop this economic analysis, along with decision-support tools for the agriculture industry during droughts. Other authors include UC Merced Environmental Systems graduate students Spencer Cole and José M. Rodríguez-Flores and Professor Daniel A. Sumner from UC Davis.

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Sierra Nevada snowpack disappearing after driest January-February in recorded history, third year of California drought all but inevitable

Snowpack down to 64% with no major storms on horizon as winter rainy season has only 1 month left

San Jose Mercury News | February 28, 2022 | Paul Rogers

Through trees scorched by last summer's Caldor Fire, Lake Tahoe glistens in a view from Highway 50 on Echo Summit, Friday, Feb. 11, 2022. After the driest January and February in recorded history, the Sierra Nevada snowpack — which provides nearly one-third of California's water supply — on Monday was 64% of its historical average for that date, based on automatic sensors spread out over hundreds of miles. (Karl Mondon/Bay Area News Group)

Get ready for more brown lawns, high fire danger and water restrictions this summer.

California's severe drought, which seemed to be retreating after soaking storms in October and December, is now all but certain to continue into a third year after the driest January and February in recorded history.

"We were so far above normal early in the winter," said Jan Null, a meteorologist with Golden Gate Weather Services in Half Moon Bay. "But the rainfall season has just flat-lined. It has died."

On Tuesday, officials from the State Department of Water Resources are scheduled to take a monthly snowpack reading in a media event at Phillips Station, near Sierra-at-Tahoe ski area. Statewide, they already know the news.

The Sierra Nevada snowpack — which provides nearly one-third of California's water supply — on Monday was 64% of its historical average for that date, based on automatic sensors spread out over

hundreds of miles. That's nearly the same as last year on March 1, when it was 61%, and is nothing less than a massive collapse from the 168% of normal it was on New Year's Day.

Nobody alive today has seen weather in Northern California this dry during what historically are two of the wettest months each year.

In January and February, the 8-Station Northern Sierra Index, a collection of key weather stations near major reservoirs such as Shasta and Oroville in Northern California, received only 1.74 inches of precipitation. That's 10% of average — and the all-time lowest amount since records began in 1921.

Similarly, downtown San Francisco received just .65 inches of rain over the past two months — less than the diameter of a dime, and the lowest level since weather records began there in 1849 during the Gold Rush. San Jose had just .01 inches in January and February, an amount that's equal to the thickness of a fingernail.

"We're already in a third year of drought," said Null, a former lead forecaster with the National Weather Service. "Even if we get normal amounts of rain in March, the drought will continue at least until the next rainy season. The fire season is going to start early."

The trend has been a major letdown for farmers and city water managers.

"In December we were hopeful," said Rick Callender, CEO of the Santa Clara Valley Water District, which serves 2 million people in and around San Jose. "But we need more than hope right now. We need rain."

Last summer, the district declared a drought emergency and asked residents to cut water use 15% compared to 2019 levels. So far, residents have cut by just 8% between July and December. Callender said the agency's board will study more drought measures, including expanding conservation initiatives to pay people to replace lawns with water-efficient landscaping and providing rebates for low-flow toilets and other water-saving appliances.

Among the options, if the situation worsens, could be banning all lawn watering in Santa Clara County, seven days a week. The Marin Municipal Water District took that step last fall as its reservoirs were projected to run dry by the summer of 2022 but then rescinded it when atmospheric river storms in December that focused on Marin County boosted their levels. On Monday, those reservoirs were 93% full.

The Santa Clara Valley Water District's 10 reservoirs were just 26% full, in part because the largest, Anderson, near Morgan Hill, is drained for federally-mandated earthquake repairs to its 1950s-era dam.

"Reduce your outdoor water use, if not cut it back entirely," Callender said. "It's time to put buckets back in the showers. They never should have been taken out."

Other water agencies around the Bay Area are in less dire straits, because they have more water in storage. But they are also closely monitoring the situation and could tighten existing calls for voluntary conservation if the situation worsens.

What caused the rainfall bust of 2022?

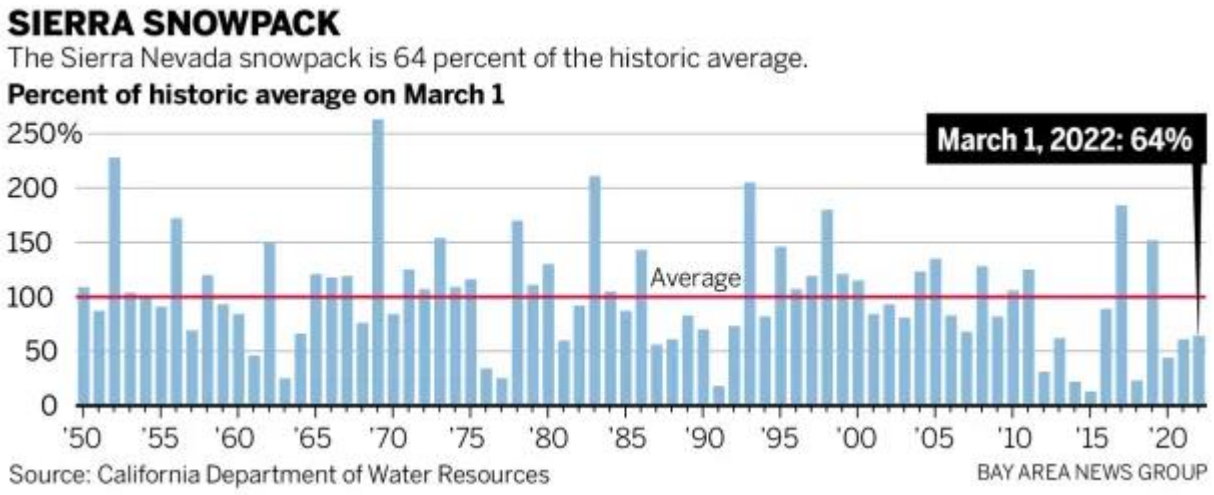
A persistent ridge of high pressure air off California. The ridge has pushed storms moving in from the Pacific Ocean north to Oregon, Washington, British Columbia and Alaska.

As the Earth's climate continues to warm, California and the West are seeing "precipitation whiplash," said Daniel Swain, a climate scientist at UCLA.

Dry years are becoming more dry, with hotter temperatures, more extreme drought and fire risk, and Sierra snows are melting and evaporating earlier. Wet years, like 2017, are becoming wetter, because warmer temperatures cause more evaporation into big atmospheric river storms.

"All of this is consistent with climate model predictions that California's precipitation will experience increasingly wild swings between wet and dry in a warming climate," Swain said.

California's water system, which was largely built between the 1930s and 1970s, is designed for a climate that no longer exists, experts say.



"Climate has already shifted things," said Jeffrey Mount, a professor emeritus at UC Davis and senior fellow at the Public Policy Institute of California's water center. "We have built an entire water system around conditions that existed 75 years ago. But the world is changing."

The solution, he said, is for state, federal and local leaders to expand conservation and water recycling programs and to build more groundwater storage banks, off-stream reservoirs and stormwater capture projects.

"We need to do a better job of harvesting and storing water in the wet periods," Mount said.

A light rain, about one-tenth of an inch, is forecast for the Bay Area on Wednesday night into Thursday. But after that, 10 more dry days are on the horizon.

“I would love nothing more than to be surprised by a March Miracle,” Mount said. “But miracles don’t happen very often.”

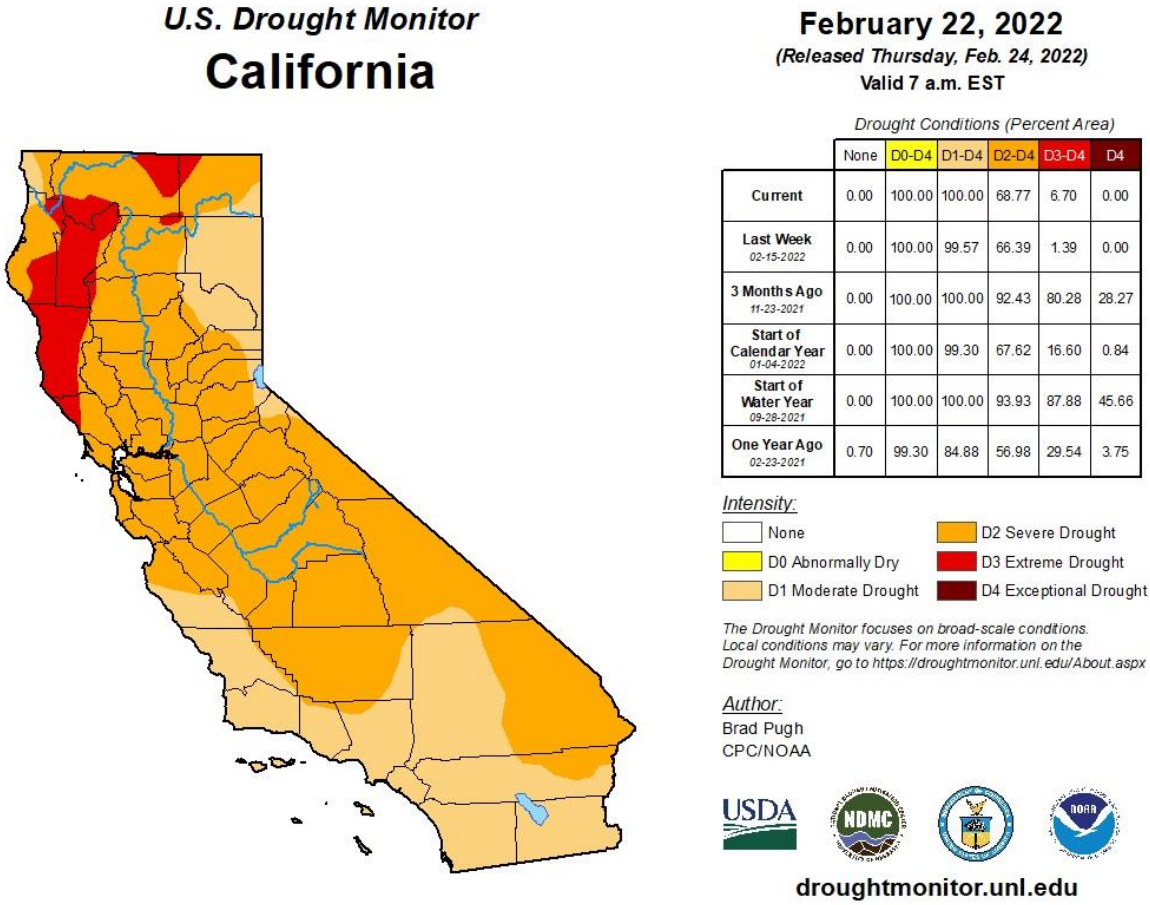
Guadalupe Reservoir is seen on Feb. 28, 2022, in South San Jose. Following the driest January and February in the Bay Area in recorded history, Guadalupe Reservoir in South San Jose near Los Gatos was just 39% full on Monday Feb. 28, 2022, according to the Santa Clara Valley Water District. (Dai Sugano/Bay Area News Group)

# # #

Drought conditions worsen in California

Unless a March miracle occurs — and meteorologists don't see one coming — a third consecutive year of drought is in the cards for the Golden State

Courthouse News Services | February 24, 2022 | Matthew Renda



Every square inch of California is in some level of drought, according to this infographic by the U.S. Drought Monitor.

(CN) — The two large storms that broadsided California in October and December brought optimism that the dry weather that has plagued the state would be relegated to the past.

But after a dry January and February, that optimism has been replaced with a sense of gloom.

On Thursday, the U.S. Drought Monitor released its weekly report showing that 68% of California is in severe drought and 100% of the state is suffering from abnormally dry conditions.

The authors of the report said 37 million Californians are living in areas severely impacted by drought.

Thursday's news comes on the heels of an announcement by the U.S. Bureau of Reclamation that the federally managed water system will not deliver any water to California's main agricultural region due to the lack of water.

"It's devastating to the agricultural economy and to those people that rely on it," said Ernest Conant, regional director for the U.S. Bureau of Reclamation. "But unfortunately we can't make it rain."

The Central Valley Water Project takes water that runs off from the snowpack in the Sierra Nevada and transfers it via a series of pumps and canals to farms in the Central Valley, where the soil is fertile but precipitation scant.

But as California enters year three of below-average rain and snowfall, those deliveries have stopped occurring, forcing some farmers to pull their orchards or let their fields go fallow.

Last year, as California suffered a second consecutive winter of cloudless skies and little rain, the bureau began by delivering 5% of historical water deliveries but ended the year by stopping all deliveries. This year, even the 5% is off the table.

"Last year was a very bad year. This year could turn out to be worse," Conant said.

While the water year begins in October in California, it is the lack of precipitation in the calendar year that is perplexing water officials in the state.

"2022 year-to-date precipitation averages less than 25% of normal throughout much of California and the Great Basin," the drought monitor report states.

The Sierra snowpack, which provides California with much of its water for agricultural purposes, is about 75% of normal heading into the pivotal March 1 reading slated for next week.

The report further mentioned if the faucet stays turned off for March, many territories in California and Nevada will be downgraded to more severe drought categories.

The lack of water has also been particularly deleterious for native populations in California riverways.

Thousands of young salmon died in the Klamath River due to the lack of cold water running into the watershed from melting snow.

The Westlands Water District, which covers a major agricultural region near Fresno, Calif. released a statement this week expressing disappointment that no water deliveries will reach farmers in their region.

"The district is disappointed with the allocation but is aware that hydrologic conditions, including low CVP reservoir storage conditions at the beginning of the water year and record low precipitation in January and February, and Reclamation's obligation to meet delta water quality and outflow standards imposed by the State Water Resources Control Board, prevent Reclamation from making water available under the district's contract," the district said in a release.

More than 200,000 acres of farmland in the district has been fallowed, meaning thousands of acres worth of food crops will go unplanted.

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Drought Monitor shows some changes after weeks of steady conditions

The northwest coast is now back into the extreme drought category with precipitation deficits growing.

ABC10 | February 24, 2022 | Monica Woods

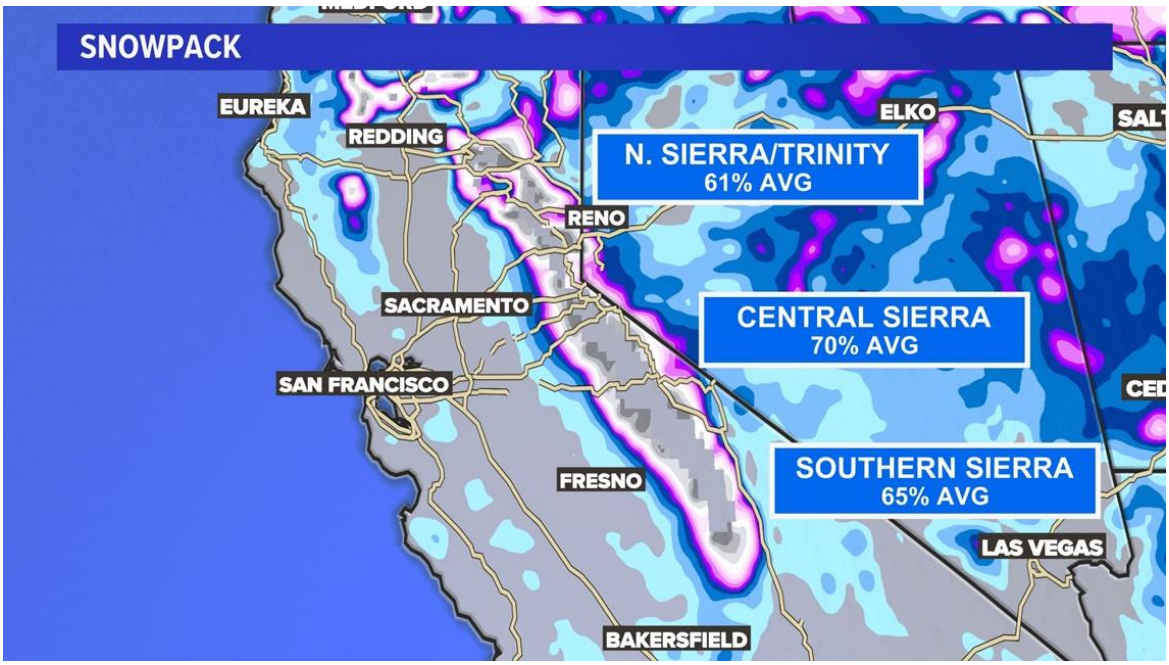
SACRAMENTO, Calif. — The U.S. Drought Monitor shows parts of California dipping back into bigger drought conditions. This is after weeks of no changes being marked for California.

The northwest coast is now back into the extreme drought category with precipitation deficits growing.

After a huge start to what is typically the wettest time of year for the state, the precipitation pipeline shut down in January and it never regained strength through February. And now the window is closing on the rainy season, the tail end delivering very little rain and snow.

The gains from big storms in October and December have now dried up and many places are seeing below normal precipitation totals.

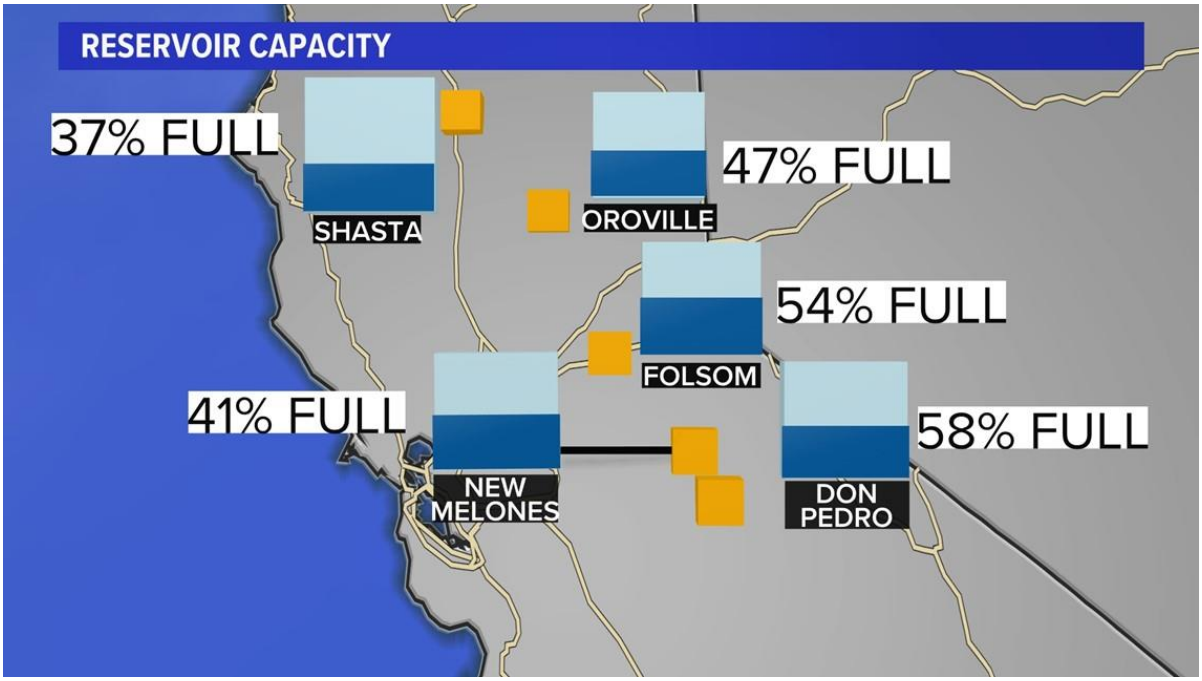
The snowpack has dropped to about 60-70% of normal for the Sierra which provides a third of the water to the state during the dry season. During the spring the snow melts and runs downhill to fill area reservoirs to provide water to the state.



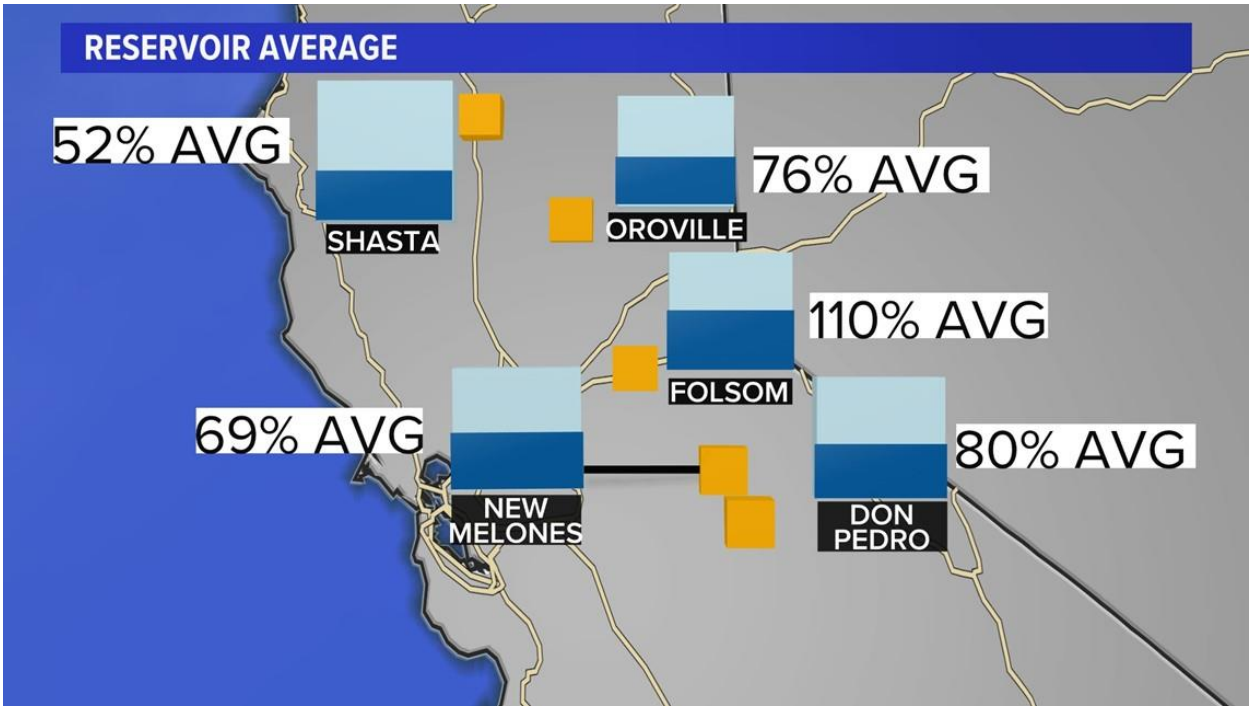
Credit: KXTV

Some releases are happening right now as part of regulations set forth by flood control and environmental rules. Due to maintenance on a power plant, the Bureau of Reclamation says the water is being diverted from those plants to the Folsom Auxiliary spillway and the Nimbus Dam.

Folsom Reservoir is still above average for this time of year, but many of the other major reservoirs are below average and have plenty of capacity for incoming snowmelt.



Credit: KXTV



Credit: KXTV

Apr. 1 has traditionally been the point when snowfall transitions to snowmelt. Last year, warm temperatures led to big evaporation rates and less water coming from the Sierra snowpack, so there's still some uncertainty about how much water will actually make it into area reservoirs.

The next snow survey conducted by the California Department of Water Resources is Tuesday, Mar. 1 which will give another marker for how the state is doing for water content heading toward the dry time of year.

# # #

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2022 Water Year Looks Dismal as Snowpack Melts, California Farm Bureau Reports
Sierra Sun Times | March 9, 2022 | Christine Souza

Image of the March 1, 2022 snow survey at Phillips Station. Credit: DWR

March 9, 2022 - The optimism spurred by heavy snowstorms in December has melted away, and the 2022 water year is now looking bleak.

After facing the driest recorded January and February in state history, California Department of Water Resources reported that statewide, the snowpack stood at 63% of average for the date last week after conducting the agency's third manual snow survey of the year.

"That is not enough to fill up our reservoirs," said Sean de Guzman, manager of the DWR Snow Surveys and Water Supply Forecasting Unit.

He said, "It's safe to say we'll end this year dry and extend this drought a third year."

With only one month left in California's wet season, DWR Director Karla Nemeth said in a statement, "Californians should plan for a third year of drought conditions."

"A significantly below-average snowpack, combined with already low reservoir levels," Nemeth said, "make it critical that all Californians step up and conserve water every day to help the state meet the challenges of severe drought."

A third consecutive drought year means farmers, water managers and state officials must figure out how to move forward and plan for the state's water future.

Those themes were amplified last week at a Sacramento conference—"Water for a Sustainable California." It was held by the California Irrigation Institute to focus attention on agricultural and urban water management.

"This year is probably going to be the worst year ever," said conference speaker Thad Bettner, general manager of Glenn-Colusa Irrigation District. "It's been a brutal year for California all around."

Glenn-Colusa Irrigation District, a Sacramento River settlement contractor with the U.S. Bureau of Reclamation, received an initial water allocation of 75%.

Bettner said, "There are conversations happening right now about what this year will shape up like, but it's going to be pretty tough."

As part of a conference panel discussion on water sustainability, Bettner described how farmers and the district have partnered with others to help fish populations and stretch water use.

State Water Resources Control Board Chair E. Joaquin Esquivel talked about broad water issues facing the state, including water rights, storage and balancing groundwater supplies as required by the Sustainable Groundwater Management Act.

In a summary of his remarks, provided by the state water board, Esquivel discussed imposing water curtailments in critical watersheds to preserve supplies for cities and limiting the amount that water-rights holders may be able to divert this year.

Last year, the state board adopted emergency curtailments for several watersheds, including the Sacramento-San Joaquin Delta, due to severe drought conditions. That action halted 2021 water diversions for 10,300 water rights on the Sacramento-San Joaquin Delta and denied surface-water deliveries for some 4,500 farms.

California Irrigation Institute President Chase Hurley said Esquivel's remarks signaled potential emergency actions again this water year. He said water rights will also be a topic of discussion for the board.

"You can tell that water rights is something that Joaquin and the board are really thinking about," said Hurley, managing partner of Water & Land Solutions and former general manager of San Luis Canal Company in Dos Palos.

Hurley expressed added concern about how the Bay-Delta Water Quality Control Plan would require diversion flows for fish in three San Joaquin River tributaries. "It (altering water rights) is

a scary proposition, especially if the state board is able to pull 40-50% of your water and leave it in the river," he said.

A look at water rights may stem from recommendations released last month by water law and policy leaders that form the Planning and Conservation League.

Citing hotter summers and the disappearing rain and snowpack, the league released recommendations to update California water laws to address drought and climate change. In its report, the group said California's current system of water laws is "ill-equipped to respond to modern water shortages."

It said the water picture must be reassessed to safeguard the health, safety and livelihoods of the state's 40 million residents, support the economy and protect imperiled ecosystems.

Bettner, meanwhile, called for protecting existing water rights.

"We strongly support our water-rights system and that our infrastructure, agreements, operations, etc., are built on that system.

"While some may want to change it or toss it out, our water-rights system and water code provide for flexibility to manage, in changing hydrologic conditions, environment and infrastructure. What we need is our water-rights system to be implemented to its fullest extent versus cherry picking sections we agree or disagree with."

To achieve a more sustainable water supply in the state, Dorene D'Adamo, vice chair of the state water board, suggested that there be more collaboration and partnerships to turn problems into solutions.

"There is concern throughout the valley of seeing as much as 800,000 acres potentially going out of production as a result of implementation of SGMA," D'Adamo said. "There is tremendous concern wherever you go in the valley of what this is going to mean for the transfer market, what's it going to mean if you have ongoing surface water challenges, so really looking for partnerships there, expanding groundwater recharge and being more creative with rescheduling water deliveries."

Fourth-generation Kern County farmer Bret Sill grows almonds, walnuts, row crops, alfalfa and wheat. He said, "We've been trying to work sustainably for many generations."

Over the years, his family added recycled water to irrigate some crops and employed new technology such as moisture probes to reduce water use.

He has also worked with a company to automate irrigation among other investments in new technology.

"We are looking at what we can do to be more sustainable in our practices not only by increasing soil fertility, but by increasing water retention and carbon sequestration," Sill said. "My goal is to reduce our reliance on synthetic inputs. We are conserving water, we are conserving energy and trying to be more sustainable for the future."

# # #

(Christine Souza is an assistant editor of Ag Alert. She may be contacted at csouza@cfbf.com.)

‘Moving toward extremes’: California drought outlook is bleak after dry start to 2022
Sacramento Bee | March 1, 2022 | Michael McGough

Sean de Guzman, left, snow survey manager with the California Department of Water Resources, measures the snowpack Tuesday, March 1, 2022, at Phillips Station, Calif., near Echo Summit. DWR officials said California âs drought will continue amid below-average snowpack and reservoir levels. DEPARTMENT OF WATER RESOURCES

Despite mammoth snowstorms in the Sierra Nevada mountains during December, state water officials spoke with very little optimism about California’s snowpack and reservoir levels following a bone-dry January and underwhelming February.

“Without any significant storms on the horizon, it’s safe to say we’ll end this year dry and continue on into the third year of this ongoing drought,” said Sean de Guzman, snow survey manager with the California Department of Water Resources, after Tuesday’s manual survey at Phillips Station near Echo Summit.

The snow-water reading of 16 inches at Phillips marked only 68% of the March 1 average, de Guzman said, and the statewide snowpack level is only 63% of average. TOP VIDEOS WATCH MORE × Russian invades Ukraine: Video shows military wreckage, weapons shipments, a message

The survey results, streamed live on Facebook, revealed a snow depth of 35 inches at Phillips, down from 48.5 inches Feb. 1 and 78.5 inches Jan. 1.

December 2021 marked the snowiest December in recorded history for the central Sierra, beating a record set in 1970 by a wide margin, according to UC Berkeley’s Central Sierra Snow Lab.

But the central Sierra then went an unprecedented 37-day stretch of winter without measurable snowfall at the Donner Summit station.

“The majority of the snowpack that we’re standing on right here today is basically the same snow that fell during December,” de Guzman said.

Sean de Guzman, center, snow survey manager with the California Department of Water Resources, measures the snowpack Tuesday, March 1, 2022, at Phillips Station, Calif., near Echo Summit. DWR officials said Californiaâs drought will continue amid below-average snowpack and reservoir levels. DEPARTMENT OF WATER RESOURCES

Reservoirs throughout the state are only at 73% of their capacity this time of year, according to de Guzman. California’s largest reservoir, Lake Shasta, was just 37% full, which is 52% of its average level on March 1.

“This winter has demonstrated that as the world continues to warm, we’re seeing average conditions become more rare. Precipitation is moving toward extremes,” Jeremy Hill, a hydrology and flood operations manager with the department, said after Tuesday’s survey.

“Even when we get large storms and heavy snowfall early in the season, after a few dry weeks … things go back below normal.”

Hill said this emphasizes the importance of Californians conserving water and preparing for ongoing drought.

It also presents challenges to water and climate scientists trying to predict future conditions.

“Our past forecasting efforts have relied on historical patterns that no longer apply based on our current climate conditions,” Hill said.

There is some light snow in the forecast later this week, but it very likely won’t be enough to offset low totals from the first two months of 2022.

“We are well below normal conditions,” de Guzman said. “Bearing any unforeseen miracle March, which we don’t actually see coming, we’ll end this year below average.”

A final snowpack measurement for the year will take place April 1.

# # #

Statewide Snowpack Falls Well Below Average Following Consecutive Dry Months
California Department of Water Resources | March 1, 2022


March 1, 2022 snow survey at Phillips Station

SACRAMENTO, Calif. – The Department of Water Resources (DWR) today conducted the third snow survey of the season at Phillips Station. Following a January and February that will enter records as the driest documented in state history, the manual survey recorded 35 inches of snow depth and a snow water equivalent of 16 inches, which is 68 percent of average for this location for March. The snow water equivalent measures the amount of water contained in the snowpack and is a key component of DWR's water supply forecast. Statewide, the snowpack is 63 percent of average for this date.

"With only one month left in California's wet season and no major storms in the forecast, Californians should plan for a third year of drought conditions," said DWR Director Karla Nemeth. "A significantly below-average snowpack combined with already low reservoir levels make it critical that all Californians step up and conserve water every day to help the state meet the challenges of severe drought."

Although early season storms helped alleviate some drought impacts, a lack of storms in January and February heightens the need for conservation. The Governor has asked all Californians to cut back water use at least 15 percent compared to 2020 levels. Regionally, the Northern, Central, and Southern Sierra snowpacks are all standing just above 59 percent to 66 percent of average for this date, impacting watersheds across the state.

DWR has increased its efforts to improve climate and runoff forecasting by strengthening its collaborations with partner agencies investing in proven technologies to improve data collection and hydrologic modeling. This includes efforts at the Central Sierra Snow Lab where DWR and its partners regularly test new equipment and sensors to maximize performance when measuring the state's snowpack. Forecast improvements and monitoring enhancements increase the reliability of data used to inform water managers about flood risks, allowing opportunities to create more storage in reservoirs ahead of big storms while also ensuring water supply reliability in periods of dry or drought conditions.

"As the world continues to warm, precipitation is pushing toward extremes. Even when we see large storms producing a lot of snow early in the season, all it takes is a few dry weeks to put us below average," said Jeremy Hill, Manager of DWR's Hydrology and Flood Operations Branch. "This new pattern challenges forecasting efforts that have relied on historical patterns, so DWR has led the charge to adopt new technologies and utilize the best available science to manage

water in real time and use forecasts that give us time to make decisions to get the most benefits and minimize the hazards."

Current water conditions are now available in real time at California Water Watch, a new website launched by DWR. This website will help Californians see their local hydrological conditions, forecasts, and water conditions down to their address or their local watershed. The site presents data from a variety of sources and allows the public to obtain a quick snapshot of local and statewide water conditions.

"With below average precipitation and snowpack up until this point, our latest statewide snowmelt forecasts are only 66 percent of average," said Sean de Guzman, Manager of DWR's Snow Surveys and Water Supply Forecasting Unit. "That is not enough to fill up our reservoirs. Without any significant storms on the horizon, it's safe to say we'll end this year dry and extend this drought a third year."

# # #

Calif. launches website to track local water conditions
Water World | February 24, 2022
As the state continues to grapple with extreme dry conditions, Calif.'s new platform will provide a more enhanced and specialized version of the U.S. Drought Monitor's services.


Photo by Simon Hurry

Calif.'s Department of Water Resources (DWR) has launched a new website, California Water Watch, that helps Californians easily access information on current local and statewide water conditions — down to their own region and even neighborhood.

"The variability of California's climate and current water conditions we are experiencing now make this data more important than ever," said DWR Director Karla Nemeth. "Climate whiplash is our new reality living in this State, and we are innovating and developing new tools like California Water Watch to provide water managers, researchers, and policymakers with the data necessary to make better informed decisions about our limited water supply,"

The website brings together data from DWR and other sources to provide dynamic real-time information on precipitation, temperature, reservoirs, snowpack, groundwater, streamflow, soil moisture, and vegetation conditions. Users can enter an address to see local conditions, including daily precipitation and temperature statistics, for their area and links to water supplier information. The website also allows users to compare data on local conditions by year and by region.

The website was developed in response to Governor Newsom's call for a California-centric version of the U.S. Drought Monitor website in his drought state of emergency proclamation. The website was also recommended in the California Natural Resources Agency's report to the Legislature on lessons learned from the 2012-2016 drought.

California Water Watch also includes precipitation forecast maps and links to other forecasting products, all from one web page. Regular hydroclimate summaries developed by California State Climatologist Mike Anderson will also be posted to the California Water Watch website. These summaries will succinctly describe what current water conditions look like in California and their impacts on the current drought.

California Water Watch is just one of many tools being leveraged and developed by DWR to improve water supply forecasting.

# # #

Concern for the Delta region's water supply grows as Sierra snowpack shrinks
During times of drought, water releases from upstream reservoirs are critical in keeping salt water out of the Delta which supplies drinking water to 25 million people throughout the state.
KCRA | February 23, 2022 | Heather Waldman

FOLSOM, Calif. — After a very rainy, snowy December, water had to be released from Folsom reservoir in order to leave room for additional runoff and snowmelt later in the season.

But even though the storms haven't been coming lately, regular releases are still required in order to meet environmental requirements along the Delta region.

“During these drought conditions it is critical to send water into the Delta in order to push the ocean saltwater back" said Dr. Laurel Larsen, lead scientist with the Delta Stewardship Council. "The main purpose of that is to maintain freshwater near the intakes to the aqueducts that send water to Southern California.”

Larsen says that if saltwater were to inundate those aqueducts, it would take two years to restore them back to freshwater conditions. That would have a significant impact on the wildlife, farmland and drinking water for 25 million Californians.

There is no immediate concern for that kind of scenario, but water managers and conservation groups are taking proactive approaches to ensure the safety of the water supply as droughts intensify and sea levels rise as a result of human-caused climate change.

“There are thousands of acres of wetland restoration that are planned or are underway currently.” Larsen said.

“When wetland restoration is designed carefully and situated in appropriate locations, those marshes can actually keep up with sea level rise."

California's Department of Water Resources has also constructed emergency drought barriers to hold sea water back. One was just built on the West False River last summer.

Whether the wet season picks up or not, additional releases will need to be made to maintain water quality for consumption and for the vast ecosystem that relies on the waterways.

However, earlier this year DWR announced that there would be no water allocated to the State Water Project, which supplies water from the Delta region to 25 million Californians.

# # #

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New Snow Survey technology could change how we manage water resources
KSEE | March 3, 2022 | Justin Sacher

FRESNO COUNTY, Calif. (KSEE) – Results from the latest Sierra Snow survey are not encouraging, which is no surprise.

The State of California established Cooperative Snow Surveys 93 years ago. New technology is getting put to use to better survey mountain snow, provide better forecasts and help eliminate waste.

“Over 260 different snow courses that are measured statewide by different cooperators of the California Cooperative Snow Surveys Program,” California Department of Water Resources Snow Surveys and Water Supply Forecasting Unit Manager Sean de Guzman said.

Each month, the Sierra Nevada Snowpack is measured in the same exact same places using the exact same methods. Standardized tools and consistency allow scientists to use a few measurement points to estimate the overall snowpack and compare different years.

“Our statewide snowpack is 63% of the average based off of our automated snow sensor network,” Guzman said.

Results tend to vary throughout different parts of the Sierra Nevada Mountain range.

“Unfortunately, they reflect what we all know, that this is a very, very dry year. On the Kings River watershed, There are 23 stations that have been reported so far for March 1st and they are showing a snowpack water content of 15.4 inches. Now, that is 68% of what it should be for this time of year,” Kings River Water Association spokesperson Randy McFarland said.

Nearly a century of this carefully-gathered data is the foundation of what we know about snowpack, but there’s a lot more to know.

“Our typical snow surveys occur between about 7500 foot of elevation and about 11,000 foot of elevation. About 20% of our watershed lies above our highest course. So we have no idea what’s up there,” Kings River Water Association Watermaster Steven Haugen said.

For the first time, the Kings River Water Basin is about to get a comprehensive set of snowpack measurements covering every square using an aircraft-mounted laser. The aircraft flies a pattern over the mountains like mowing a lawn.

“The observations that were made from the flight over the watershed showed that there were large bear areas on the southern and eastern slopes. So since none of those were evident in the snow survey, we really expect the actual snowpack water content is somewhat less,” McFarland said.

Each flight produces around a terabyte of data, and results require days of computer processing. Each successful survey is expected to reveal new knowledge.

“That allows us to much better utilize our facilities, our structures, timing of irrigation deliveries, timing of flood releases, and has a whole host of benefits. So it will change water management.”Haugen said.

# # #

Central California farmers contend with zero percent water from Bureau of Reclamation
KCRA | March 3, 2022 | Kay Recede

PATTERSON, Calif. — The Bureau of Reclamation has announced water allocations for California farmers. For farmers south of the Delta, the allocation has been set to zero percent, due to low reservoir storage.

This decision has forced farmers such as Daniel Bays to fallow, meaning leave fields empty due to lack of water.

"The opportunity that is there, the food that it could produce, the jobs that it could provide but because we don't have water – it's just bare dirt," Bays said.

Bays said fallowing the land is an ongoing frustration, especially since this is the second year that he has had to leave some fields empty.

"We've paid assessments to the water district, pay taxes on the ground, have all those expenses, but there's no water that we're receiving back for that," Bays said.

The bureau reported that other areas impacted are; the Sacramento River where farmers there will also get zero percent, the American River will get 25 percent, and in-Delta contractors will get 25 percent.

Some farmers are now left squeezing every last inch of water from other sources.

Bays said they're using recycled and well water, which produces about six inches of water. He says he needs at least 24 inches of water for his crops.

"We deal with what the good Lord gives us in rain and snow, so we're thankful for the little bit we did get," Bays said.

If the drought continues, Bays said he may have to pull out more crops, even older orchards that are still viable.

"We're probably going to fallow a little over a third of our acreage this year and not plant any crops in that open ground," Bays said.

Bays said the zero percent allocation not only affects the crops, but the lack of water also affects the economy.

"A lot of jobs and people and dinner tables that depend on what we grow," Bays said.

# # #

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Zero water allocation leaves Central Valley Project farmers with few options
Capital Press | February 28, 2022 | Sierra Dawn McClain

SACRAMENTO — With California entering its third year of severe drought, the U.S. Bureau of Reclamation announced a zero-water allocation for irrigation districts via the Central Valley Project, a 400-mile-long web of dams, canals and other water facilities.


An irrigation canal near Red Bluff, Calif. The federal Central Valley Project is allocating no water this year.

The decision will impact farmers in 29 counties across the state's major agricultural region, likely prompting growers to plant different crops, fallow acres or tear out vineyards and orchards.

"It's very concerning. Farmers are disappointed, frustrated, angry," said Tricia Stever Blattler, executive director of the Tulare County Farm Bureau.

This year's outlook is even more grim than the last.

In 2021, farmers started with a 5% allocation from the federal government and ended at 0% as the drought intensified.

In a report prepared for the state Department of Food and Agriculture, the University of California-Merced found that last year's drought was responsible for an estimated loss of 8,745 farm-related jobs, $1.2 billion in direct costs and 395,100 acres of cropland left dry and unplanted — an area larger than Los Angeles.

According to Reclamation, this year's allocation was based on current reservoir storage, rainfall and snowpack levels. The agency can change the allocation later this year if conditions change.

"Basically, our region has been bone-dry since the beginning of the year. We got off to a great start with rain in October and snow storms in December, and then it just flattened," said Ernest Conant, Reclamation's regional director.

Farmers with a 0% surface water allocation are grasping for alternatives. But other options will be limited due in part to local agencies taking action under SGMA, the Sustainable Groundwater Management Act.

Passed in 2014, SGMA regulates how California groundwater is managed.

During 2021's drought, many farmers pumped more groundwater. But this year, some groundwater sustainability agencies — local agencies tasked with implementing SGMA — are planning to cap the amount of groundwater farmers can pump.

"There are not many options left," said Blattler in Tulare. "Purchasing water is one of the only options available."

Buying water on the spot market can be difficult, partly because prices are volatile. According to WestWater Research, a market research firm, in March 2020, water was trading hands for about $200 per acre-foot. In June 2021, it hit $1,000 per acre-foot.

Farmers will face difficult decisions, said Blattler, including "when to pull the plug" on a crop.

In contrast to irrigation districts, other contractors will have larger allocations. Drinking and industrial uses, for example, are allocated 25% of their historical use, and California state law requires some water to remain in the system in regions with endangered fish species.

Reclamation can't circumvent the state; the federal agency must comply with California law to protect fish habitat, even if that means delivering no water to farmers.

Environmental nonprofits, including Save California Salmon and The Nature Conservancy, say mandated flows are crucial to protect fish and to keep saltwater from creeping into freshwater rivers, making them unfit for human use.

But many farmers say they are unhappy with how the state manages water.

Jamie Johansson, president of the California Farm Bureau Federation, said in a statement that the zero-water allocation "demonstrates the overdue need for new water storage."

# # #

How can information about atmospheric rivers optimize reservoir operations?
Civil Engineering Source | February 24, 2022 | Jay Landers

In January, the U.S. Army Corps of Engineers began testing a process to determine which reservoirs within its South Pacific Division are possible candidates for the use of forecast-informed reservoir operations. Relying on advancements in weather and hydrologic forecasting to improve reservoir management, FIRO offers a method for optimizing operations. Ultimately, the Corps intends to assess all its reservoirs nationwide to see whether they might make good candidates for FIRO.

AERIAL OF LAKE: Located on the East Fork of the Russian River in California's Mendocino County, Lake Mendocino was the first reservoir to be evaluated for the use of forecast-informed reservoir operations. (Photograph courtesy of Jak Wonderly, Sonoma Water)

Sorely missed water

Typically, reservoirs designed for purposes of flood control and water supply are operated in accordance with guide curves that are designed to ensure adequate storage capacity in advance of flood events and maximize storage for later uses.

In areas with defined wet and dry seasons, these guide curves can call for lower levels of storage before the wet season. By contrast, storage is increased in advance of the dry season.

Unfortunately, this process does not always result in optimal outcomes, as shown by the case of Lake Mendocino nearly a decade ago.

Located approximately 100 mi north of San Francisco on the East Fork of the Russian River in California's Mendocino County, Lake Mendocino is owned and operated by the Corps, which oversees the flood-risk management aspects of the reservoir. Releases from the reservoir for the purposes of water supply or maintaining minimum flows to support fisheries and wildlife are managed by Sonoma Water, the local sponsor for the reservoir.

From October through December 2012, California received record levels of precipitation, says Michael Anderson, Ph.D., P.E., M.ASCE, the state climatologist for the California Department of Water Resources. But when the precipitation stopped, it did so for much longer than expected.

“New Year’s came around and the storms shut off,” Anderson says. “Then we launched into the driest 14-month period in our observed record.”

As the drought persisted, water that had been released from Lake Mendocino in December 2012 was sorely missed, Anderson says. “The question was asked, ‘Can’t we take advantage of (weather) forecasts to try and use that information in our reservoir operations to be more aware of what’s going on?’”

Atmospheric rivers and reservoirs

Before May 2016, water managers at reservoirs overseen by the Corps were not instructed to use weather forecasts as part of efforts to plan future reservoir operations. Instead, water managers were instructed to “operate to the principle of water on the ground,” meaning only measured levels of precipitation and snowpack could be used to guide management actions, says Cary Talbot, Ph.D., P.E., M.ASCE, the chief of the Flood and Storm Protection Division within the Coastal and Hydraulics Laboratory in the U.S. Army Engineer Research and Development Center.

However, the Corps modified its Water Control Management Engineer Regulation in May 2016 to explicitly allow the use of forecasted weather conditions for planning future operations at reservoirs.

Even before taking this action, the Corps had begun working with various partners to examine the viability of using forecasts of the meteorological phenomenon known as atmospheric rivers to guide reservoir management decisions. To date, these efforts have involved reservoirs in the western United States, where the presence or absence of atmospheric rivers tends to drive cycles of floods or droughts.

An atmospheric river is a “river in the sky, but it’s a river of water vapor instead of liquid,” says Marty Ralph, Ph.D., the director of the Center for Western Weather and Water Extremes at the Scripps Institution of Oceanography at the University of California, San Diego. The CW3E is a leader in the study and forecasting of atmospheric rivers.

In terms of their size, atmospheric rivers “tend to be about 10,000 ft deep, 500 mi. wide, and 1,000 or 2,000 mi. long on average,” Ralph says. “They are literally the largest freshwater rivers on earth, but rather than consisting of liquid like terrestrial rivers, they consist of atmospheric water vapor moved by wind.”

Upon making landfall, atmospheric rivers can drop massive quantities of precipitation. On average, atmospheric rivers produce about 30%-50% of precipitation in much of the western

United States, Ralph says. “Here in the West, a few atmospheric rivers each year can make or break the water year in terms of water supply,” Ralph says. “If we don’t get enough of them, we can slide into drought. If we get too many, it can create floods. It really hinges on just a few storms each year.”

Although atmospheric rivers also affect the eastern United States, they are just one of a few different types of storms common to that region, so their overall influence on weather patterns and water cycles there is not as strong.

Forecasts of atmospheric rivers continue to improve, offering a key tool to those operating reservoirs. Compared with standard precipitation forecasts, “we have more accuracy in predicting an atmospheric river,” Ralph says. As a result, water managers relying on atmospheric river forecasts “can get more lead time” in terms of future weather conditions as compared with traditional precipitation forecasts, he says.

Assessing FIRO

Following a major drought in California from 2012 to 2015, Congress directed the Corps “to conduct research into whether or not forecasts specifically of atmospheric rivers could be improved to find a better balance between flood-risk management and water supply and ecosystem benefits,” Talbot says.

In response, the Corps partnered with such entities as the CW3E and the National Weather Service to assess the feasibility of employing the FIRO strategy at various reservoirs located in watersheds that are prone to experiencing the effects of atmospheric rivers. The findings have been extremely positive, Talbot says.

“On paper, it may seem like (the goals of) flood-risk management and water supply are in direct opposition to each other,” Talbot says. “But what we have found in this process is that’s not necessarily true.”

By relying on extremely accurate, reliable forecasts, water managers are better able to increase water availability in reservoirs during periods of good weather and release water in advance of storms that are likely to bring significant amounts of precipitation.

“You can actually improve not just water supply, but you can also improve the flood-risk management aspect of the reservoir as well by using the forecast to inform operators about what they might need to know going forward,” Talbot says.

‘Huge win’

Once again, Lake Mendocino offers a case in point. The reservoir was the subject of the first pilot study of the FIRO process. Conducted by a multiagency steering committee, the study entailed a six-year process that culminated in the release in February 2021 of a final viability assessment of the use of FIRO at Lake Mendocino.

In California, the water year starts on Oct. 1. At Lake Mendocino, the water years 2019 and 2020 differed radically in terms of precipitation. “In 2019, we had a very wet year,” says Jay Jasperse, P.E., the chief engineer and director of groundwater management for Sonoma Water. By contrast, 2020 saw nearly 40% less than average rainfall. “We call it whiplash weather,” Jasperse says.

FULL LAKE: The presence or absence of atmospheric rivers can significantly affect water elevations at many western reservoirs, including Lake Mendocino. Here the lake is shown in February 2019 following a wet winter. (Photograph courtesy of Jak Wonderly, Sonoma Water)

As it happened, the contrasting weather years afforded ideal circumstances for testing FIRO. During the 2019 water year, FIRO was used successfully to manage Lake Mendocino during periods of flooding, Jasperse says. However, the advantages of using FIRO became even more apparent the following year. In water year 2020, reservoir operators using FIRO were able to retain 19% more water in the reservoir than otherwise would have been allowed under the water control manual for Lake Mendocino.

“That’s a huge win right there,” Jasperse says. “I think it pretty much demonstrates the water supply benefits for FIRO.” At the same time, he notes, such water supply benefits also help improve conditions for fisheries and the environment along the Russian River.

PARTIALLY EMPTY LAKE: By January 2020, drought had reduced Lake Mendocino's reservoir's elevation significantly. (Photograph courtesy of Jak Wonderly, Sonoma Water)

Ongoing assessments

Besides Lake Mendocino, FIRO is being assessed at four other reservoirs. Currently, the Corps, the CW3E, and the Orange County Water District are studying its use at Prado Dam in Southern California as a means of improving the management of stormwater captured by the dam.

In Northern California, FIRO is undergoing an evaluation at two reservoirs located above flood-prone areas — the New Bullards Bar Reservoir on the Yuba River and Lake Oroville on the Feather River. Co-led by the CW3E, the Yuba Water Agency, and the California DWR, this assessment is examining FIRO jointly at the two reservoirs because their operations are coordinated to reduce flooding downstream on the Yuba River.

Most recently, the CW3E, the Corps, and Tacoma Public Utilities began planning the evaluation of the viability of using FIRO at the Howard A. Hanson Dam, a flood control structure on the Green River in King County, Washington.

These studies and the completed assessment of FIRO at Lake Mendocino represent "some really exciting developments in the combination of meteorology and hydrology," Anderson says. Such developments are "fantastic examples of collaborative engagement" that enable civil engineers and others "to move forward as we increase our understanding of the world," he notes.

Screening Corps reservoirs

The South Pacific Division of the Corps comprises the Sacramento, California; San Francisco; Los Angeles; and Albuquerque, New Mexico districts. Among the four districts, 74 dams are part of the initial screening test to determine if their reservoirs might make good candidates for FIRO, Talbot says.

Known as Stage A, the initial step of the assessment process entails a “high-level screening stage meant to identify and eliminate reservoirs at which FIRO would not currently be possible for a few basic reasons,” says Elissa Yeates, EIT, the acting chief of the Coastal Engineering Branch at the ERDC’s Coastal and Hydraulics Laboratory.

Such reasons, Yeates notes, could include a reservoir not having a controlled outlet or not having an existing water control plan, which is the section of a reservoir’s water control manual indicating the operational plan for meeting the congressionally designated purposes of a given reservoir.

“Contacts at those districts are evaluating their full portfolios of reservoirs by the shortlist of screening criteria,” Yeates says. In addition to reservoirs owned and operated by the Corps, the initial screening process includes reservoirs associated with so-called Section 7 dams. Although not owned or operated by the Corps, such dams received federal funds for flood control or navigation purposes. As a result, the Corps oversees the development of water control manuals for reservoirs formed by Section 7 dams.

Reservoirs that make it past the stage A screening will undergo further assessment to determine their suitability for the FIRO process. Known as stage B, this second step in the screening process will involve a “more detailed, intensive set of criteria and metrics,” including atmospheric forecast skill, hydraulic and hydrologic parameters, and stakeholder collaboration, Yeates says. Reservoirs then will be assigned a FIRO suitability ranking of high, medium, or low.

“Our plan is for each (South Pacific district) to select a subset of reservoirs that make it through (stage A of the screening process) for deeper consideration with the stage B tool this summer,” Yeates says. The exact criteria and metrics to be used as part of stage B are being developed now, she notes.

Reservoir sites receiving suitability rankings of high or medium then will enter stage C of the screening process. During this stage, which is to be completed sometime this fall, FIRO experts and site stakeholders will discuss the screening process outcomes and decide on next steps.

After testing the three-stage screening process in its South Pacific Division, the Corps intends to broaden its scope considerably, Talbot says. “The idea is that we would eventually take (the process) nationwide and use that on the entire Corps portfolio of dams,” he says.

However, more research remains to be done regarding atmospheric rivers and their effects on reservoirs, Ralph says. “To ensure the greatest potential for FIRO to be found viable at the most reservoirs, it is vital that focused research continue to improve forecasts of the extreme precipitation, the storms that produce them, the runoff they create, and the water resources management tools needed and that these advances make their ways into operations,” Ralph says.

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THIS JUST IN … RECLAMATION OUTLINES INITIAL 2022 WATER ALLOCATIONS FOR CENTRAL VALLEY PROJECT CONTRACTORS

Maven News | February 23, 2022

Press release from the Bureau of Reclamation:

Today, the Bureau of Reclamation announced initial 2022 water supply allocations for Central Valley Project contractors. Allocations are based on an estimate of water available for delivery to CVP water users and reflect current reservoir storages, precipitation, and snowpack in the Central Valley and Sierra Nevada. This year's low allocations are an indicator of the third consecutive dry year California is experiencing and will be updated if conditions warrant.

"We began the 2022 water year with low CVP reservoir storage and some weather whiplash, starting with a record day of Sacramento rainfall in October and snow-packed December storms to a very dry January and February, which are on pace to be the driest on record," said Regional Director Ernest Conant. "Further, the December storms disproportionately played out this year in the headwaters—heavy in the American River Basin and unfortunately light in the upper Sacramento River Basin, which feeds into Shasta Reservoir, the cornerstone of the CVP."

Currently, CVP reservoir storage is below the historic average for this time of year and runoff forecasts predict that overall storage will be limited if substantial spring precipitation does not materialize. California Department of Water Resources' forecast update from Feb. 1 to Feb. 15 shows a total decrease in projected annual inflow to Shasta, Oroville, Folsom, and New Melones reservoirs of 1.2 million acre-feet. Without significant precipitation, this may continue to decrease further.

"Losing over a million acre-feet of projected inflow in two weeks' time is concerning," said Regional Director Conant. "We've got our work cut out for us this year; strengthened collaboration and coordination among agency partners, water and power users, and stakeholders will be instrumental."

Based on current hydrology and forecasting, Reclamation is announcing the following initial CVP water supply allocations:

North-of-Delta Contractors

Sacramento River

- Irrigation water service and repayment contractors north-of-Delta are allocated 0% of their contract total.
- Municipal and industrial water service and repayment contractors north-of-Delta will be provided water for public health and safety needs consistent with the CVP M&I Water Shortage Policy.
- Sacramento River Settlement Contractors' water supply is based upon settlement of claimed senior water rights and the 2022 water year is currently designated as a critical year, as defined in their Settlement Contracts.

American River

- M&I water service and repayment contractors north-of-Delta who are serviced by Folsom Reservoir on the American River are allocated 25% of their historical use.

In-Delta Contractors

- M&I water service and repayment contractors who are serviced directly from the Delta are allocated 25% of their historical use.

South-of-Delta Contractors

- Irrigation water service and repayment contractors south-of-Delta are allocated 0% of their contract total.
- M&I water service and repayment contractors south-of-Delta are allocated 25% of their historical use.
- For San Joaquin River Exchange Contractors and San Joaquin Settlement Contractors, the 2022 water year is currently designated as a critical year, as defined in their contracts.

Wildlife Refuges

- For water supply for wildlife refuges (Level 2), north- and south-of-Delta, the 2022 water year is currently designated as a critical year, as defined in their contracts.

Friant Division Contractors

- Friant Division contractors' water supply is delivered from Millerton Reservoir on the upper San Joaquin River via the Madera and Friant-Kern canals. The first 800,000 acre-feet of available water supply is considered Class 1; Class 2 is considered the next amount of available water supply up to 1.4 million acre-feet. Given the current hydrologic conditions, the Friant Division water supply allocation is 15% of Class 1 and 0% of Class 2.

Water supply allocations for Eastside irrigation and M&I water service and repayment contractors will be announced in May per their contracts.

M&I contractors whose water service and repayment contracts cite the CVP M&I Water Shortage Policy may request a public health and safety adjustment within 30 days of initial allocations consistent with that policy.

As the water year progresses, changes in hydrology and opportunities to deliver additional water will influence future allocations. Reclamation will continue to track hydrology and may adjust basin-specific allocations if conditions warrant an update. Water supply updates are posted on Reclamation California-Great Basin Region's website.

# # #

Press Release
Release No. 0055.22

Release & Contact Info
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President Biden and USDA Invest More Than $166.5 Million in Infrastructure to Protect American Communities

WASHINGTON, March 3, 2022 – President Joe Biden and Agriculture Secretary Tom Vilsack announced that the U.S. Department of Agriculture (USDA) is investing more than $166.5 million in 108 infrastructure projects as part of implementing the Bipartisan Infrastructure Law, also known as the Infrastructure Investment and Jobs Act (IIJA). USDA's Natural Resources Conservation Service (NRCS) is working with local communities in 23 states to invest in new dam and flood prevention projects and in repairs on existing watershed infrastructure, which are all part of USDA's broader national infrastructure investment.

Through this first round of projects the Bipartisan Infrastructure Law is funding, NRCS prioritized projects in communities heavily impacted by drought and other natural disasters as well as historically underserved and limited resource communities.

"The Biden-Harris Administration is committed to building back better, and this starts with our infrastructure," Vilsack said. "Protecting our watersheds and saving lives is paramount. These investments in our watershed programs will provide much needed support for communities to build resilience in the face of climate change. We can extend financial assistance to underserved communities that live in constant fear of flooding, help with the effects of severe weather events, and put systems in place that will ensure a climate resilient future to help communities thrive in the years to come."

Bipartisan Infrastructure Law, signed in November by President Biden, provided $918 million for NRCS watershed programs, which includes the Watershed and Flood Prevention Operations (WFPO) Program, Watershed Rehabilitation Program (REHAB) and Emergency Watershed Protection (EWP) Program. Through NRCS watershed programs, NRCS works with local, eligible sponsors, including state government entities, local municipalities, conservation districts and federally recognized tribal organizations.

REHAB focuses on repairing existing infrastructure, and examples include:

- Athens, Ohio: This investment includes two rehabilitation projects for two dams on Margaret Creek near Athens, Ohio. Funds will enable the Margaret Creek Conservation District to raise the embankment of the Meeks Lake Dam, armor its spillway, and extend its lifespan by at least another 50 years. Meanwhile, for the second project, the Margaret Creek Conservation District will bring the Fox Lake Dam into compliance with Ohio's safety regulations and restore the original flood protection benefits of the structure to last another 50 years or more.

- Añasco, Puerto Rico: This investment focuses on two dams in the the Añasco River Watershed, Site 3 (Daguëy Dam) and Site 2A (Ajies Dam), which help prevent flooding. These structures were able to perform their intent and prevented major flooding to the Añasco valley communities and industries during Hurricane Maria in 2017, but both dams suffered damages. With the funds, the Department of Natural and Environmental Resources (DNER) bring both structures to compliance with current safety criteria and performance standards, extend their lifespan and in turn reduce flood risk to life and property.

Meanwhile, WFPO projects focus on new infrastructure, and examples include:

- Alakanuk, Alaska: Funds will support planning, design, construction, and the removal of damaged property from the floodplain. This work will assist the Alakanuk community with flood damage reduction and mitigation measures.
- Duchesne County, Utah: Funds will support projects that address water use, improve agricultural operations and reduce flood damage throughout the watershed. Specifically, the project will address drought concerns by improving irrigation canals that serve approximately 38,000 acres of cropland and increased flood protection in four communities within the watershed.
- Glacier County, Montana: Funds will be used to help implement a new ag-water management strategy for the St. Mary Canal and address areas of deterioration that need to be repaired. Modernization will help the surrounding agricultural community build towards climate resiliency.

IIJA also provided EWP funds and those funds are available for communities to respond to natural disasters. NRCS will continue to assist communities as it receives disaster requests.

A full list of projects is available on NRCS' Landscape Planning and Watershed Programs webpage.

Implementing the Bipartisan Infrastructure Law

Since the bill was signed into law, NRCS has hosted training webinars focused on educating potential sponsors and historically underserved communities about the funding opportunities provided by the new legislation.

NRCS conducted an assessment of current needs for watershed protection and flood prevention work. This assessment supported the establishment of priorities that focused funding on the most critical and highest priority projects for improving the Nation's land and water resources.

NRCS encourages local sponsors to submit requests for funding through their local NRCS Watershed Program Manager. On March 31, 2022, NRCS will compile any additional request

received and develop a second list of projects to fund. After March 31, 2022, NRCS will continue to review and fund requests as funds are available.

More Information

Since their enactment in 1948, NRCS' watershed programs have designed and built 11,000 dams, constructed water storage structures, flood management systems, bank stabilization, moved towns, redirected stream flows, re-established wildlife habitat and more to save lives and protect watersheds.

USDA touches the lives of all Americans each day in so many positive ways. Under the Biden-Harris Administration, USDA is transforming America's food system with a greater focus on more resilient local and regional food production, fairer markets for all producers, ensuring access to safe, healthy and nutritious food in all communities, building new markets and streams of income for farmers and producers using climate smart food and forestry practices, making historic investments in infrastructure and clean energy capabilities in rural America, and committing to equity across the Department by removing systemic barriers and building a workforce more representative of America. To learn more, visit usda.gov/infrastructure.

# # #

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‘We need to do all we can’: Five key takeaways from the U.N. climate report
Los Angeles Times | March 4, 2022 | Ian James

Felisa Benitez, 86, wipes sweat from her brow while taking a break from cleaning a standing electrical fan outside her Pacoima home in August. The latest U.N. report on climate change focuses in part on protecting vulnerable people.(Genaro Molina / Los Angeles Times)

In the latest United Nations report on climate change, scientists document the stark toll inflicted by global warming through more intense heat waves, droughts, floods and other disasters, and present a dire warning that humanity should act quickly to move away from fossil fuels and cut planet-heating emissions.

The report goes beyond past assessments not only by detailing the latest science but also by focusing on how the world, while reducing emissions, can better adapt to the accelerating effects of climate change to reduce risks and protect especially vulnerable people.

The report by the Intergovernmental Panel on Climate Change, or IPCC, stresses that the threats to people’s health, livelihoods and lives disproportionately affect those who lack resources to weather the blows. In pursuing climate solutions, the report’s authors say, there should be a focus on equity and justice, because the effects are exacerbating inequality and hitting especially hard for low-income people, marginalized communities and developing countries.

The scientists also warn that the natural world, from coral reefs to mountain forests, faces grave threats, but that nature can help in various ways when people design solutions around ecosystems.

Researchers and experts who focus on climate solutions said the IPCC report raises the profile of approaches that hold promise for addressing the crisis at the local level, the national level and around the world. Here are several key takeaways from the report:

A focus on protecting vulnerable people

The scientists say efforts to combat climate change and reduce the risks should involve everyone, including governments, businesses and citizens. And because some people are suffering disproportionately, they wrote, “equity and justice” are vital in decision-making and investment.

“Responses to climate change have to be based on equity and justice to really make a sustainable future for all,” said IPCC Vice Chair Roberto Sánchez-Rodríguez, a professor of environmental studies at Mexico’s Colegio de la Frontera Norte and an emeritus professor at UC Riverside. He said climate change has become “an aggravating factor to already existing development gaps and unfair conditions around the world.”

The report discusses how poverty and the lack of basic infrastructure compound the problems of a warming world for many around the globe. It says an estimated 4 billion people, approximately half the world’s population, already experience severe water scarcity for at least one month a year. Expanding regions of the world are projected to face worsening water stress, and warming is bringing deadlier, more destructive storms and flooding.

Although developing countries are especially threatened, Sánchez-Rodríguez said, low-income communities are also vulnerable within wealthy countries such as the United States.

In California, for example, farmworkers are among those who now cope with more extreme heat while working in the fields.

“If we want to have effective climate change policy, we have to look at those human dimensions, and particularly those equity dimensions, and protecting some of the most vulnerable populations,” said Michael Méndez, an assistant professor of environmental policy and planning at UC Irvine, who said he was pleased to see the report’s stronger focus on equity and environmental justice.

Extreme heat has killed an estimated 3,900 people in California over the last decade, according to an L.A. Times investigation.

One bill that was recently introduced in the California Legislature aims to reduce the dangers of extreme heat by establishing a ranking system for heat waves and creating an early-warning

system. Méndez said he thinks this would be a significant step in helping communities be better prepared by understanding how severe an impending heat wave will be.

Beyond such legislation, Méndez said, “you need to involve the community, those that are first and hardest hit,” in making decisions about policies and implementing solutions. He said this shift, which is needed in California and elsewhere, involves developing solutions with a “strong equity lens.”

An urgent call for action — and every fraction of a degree matters

With the increase in average temperatures of about 1.1 degrees Celsius (2 degrees Fahrenheit) so far, “we are seeing widespread negative impacts on people and ecosystems,” said Diana Liverman, a professor of geography and development at the University of Arizona who was a review editor for a chapter in the report.

“We need to do all we can to reduce emissions so we avoid higher-end warming or tipping points that would have serious impacts,” Liverman said.

The scientists called for governments, businesses and individuals to take rapid steps to meet the goal of limiting warming to 1.5 degrees Celsius (2.7 degrees Fahrenheit) above preindustrial levels, which they said would substantially reduce the toll for humans and ecosystems. They said exceeding that amount of warming, which appears likely on the current trajectory, would have devastating effects, from harming food production to further intensifying wildfires.

The scientists emphasized that each fraction of a degree matters, and will bring greater risks for people and ecosystems worldwide.

Ani Dasgupta, president and chief executive of the nonprofit World Resources Institute, said the report shows “we still have a narrow pathway to avoid the very worst climate impacts,” and that it’s urgent for the world’s heaviest emitters, including the U.S. and other wealthy G20 countries, to rapidly cut emissions. These countries should also scale up international funding, he said, to help vulnerable countries deal with unavoidable losses and damages.

U.N. officials called for scaling up international funding for adaptation efforts, focusing on aims such as reducing flood risks, improving access to clean water and improving health systems to deal with extreme heat waves.

John Matthews, executive director of the Alliance for Global Water Adaptation, said the IPCC’s embrace of water-related adaptation efforts in the report represents a big shift. Matthews said the work of adaptation should be scaled up at all levels, recognizing that all citizens can be involved in developing solutions and preparing for where the climate is headed.

“It’s going faster than anybody thought that it would,” Matthews said. “And we have to make decisions right now. It’s really time to start owning this as a problem. The IPCC is not going to save us.”

“It’s not a scientific problem anymore,” Matthews added. “Climate change, it’s a daily decision-making problem, it’s an investment problem, it’s a water problem, it’s a city problem. … We need to be the problem-solvers.”

Swift cuts in emissions would prevent the worst effects

The report shows the world needs to act urgently to curb the use of fossil fuels, and it’s not too late to prevent the worst effects, said Michael Mann, director of the Earth System Science Center at Penn State University.

Mann has cited research that was included in an IPCC report last year indicating that if humanity were to cut emissions to zero, temperatures would quickly stop rising.

“Carbon dioxide levels actually start coming down once you stop emitting carbon into the atmosphere,” Mann said in a press briefing ahead of the latest report’s release. “And that’s because natural sinks, particularly the ocean, continue to take carbon out of the atmosphere.”

He said the science “tells us that surface warming stabilizes quickly when emissions go to zero,” and many of the effects, such as wildfires and floods, would likely stabilize.

“That still implies a ‘new normal’ of heightened wildfire and flood risk we must adapt to,” Mann said. The melting of polar ice sheets and sea-level rise will also continue to worsen, he said, and adapting will require far greater efforts, in many areas ultimately retreating from the encroaching seas.

Opportunities abound to quickly move away from fossil fuels, Mann said.

“We have the technology now to decarbonize the vast majority of the power and transportation sectors,” he said. “The obstacles at this point are not technological. They are political.”

Water-related risks are growing

Research shows that as the planet gets warmer, the water cycle is changing. Droughts and floods are becoming more extreme and are projected to keep intensifying as temperatures rise.

Since the 1950s, the IPCC report says, approximately 700 million people around the world are experiencing longer dry spells. About 7% of all disasters worldwide between 1970 and 2019 have been drought-related, but the droughts account for 34% of disaster-related deaths, mostly in Africa.

In many food-producing regions, groundwater levels have declined as wells have drawn heavily on aquifers.

The report says water-related risks are set to increase with each additional degree of warming.

Researchers have found that western North America, from Montana to northern Mexico, has just had its driest 22-year period in more than 1,200 years.

In the southwestern U.S. and northern Mexico, many studies show that droughts are getting longer and more intense, Sánchez-Rodríguez said. “It’s increasing temperature and increasing drought. So the scenario is really dramatic for this part of the world.”

The scientists identify water as a key risk for North America. To deal with worsening water scarcity, Liverman said, the region needs to prioritize “efficiency of water use,” water reuse, and collaborative approaches to water management and allocation, as well as “possibly reallocating water from agriculture to urban uses.”

Kathy Jacobs, director of the University of Arizona’s Center for Climate Adaptation Science and Solutions, said the country needs to be better prepared for the shrinking amounts of runoff feeding streams in the West.

“I’m actually extremely concerned about availability of water for habitat, particularly in the Southwest, where a lot of the biodiversity is linked to riparian areas,” Jacobs said. “There’s no doubt that what’s left of flowing streams in riparian areas are in grave danger, and that means that biodiversity in the Southwest is in some trouble.”

Nature can be harnessed for solutions

The report says safeguarding nature should be a vital part of addressing climate change. Restoring degraded ecosystems and conserving 30% to 50% of the Earth’s lands and waters would boost nature’s ability to absorb and store carbon, the scientists said, while also helping ensure water supplies.

They said adaptation efforts designed around ecosystems can help reduce risks for people and biodiversity. For example, along rivers, healthy upstream forests, floodplains and wetlands reduce flood risk by storing water and slowing the flow.

The researchers said restoring floodplains and wetlands are some of the nature-based solutions that can improve water management. Creating no-build zones can also reduce flood risks by “letting nature take its course,” said Debra Roberts, co-chair of the IPCC Working Group II.

“If we bring nature back into the city, protect our floodplains, have trees along our streets, we can do a great deal to increase our adaptive capacity,” Roberts said. “There’s a real advantage in reconceptualizing our cities, not only as a place of people, but a place of nature.”

The scientists said the work of adapting will need to focus on preparing for the effects to grow more severe.

“We need to soften and slow the blows by cutting greenhouse gas emissions. But we also need to cushion the blows by picking up our efforts to adapt,” said Inger Andersen, executive director of the U.N. Environment Program. She called for dedicating more funding to nature-centered adaptation programs.

“We need to protect and restore wetlands for nature and incorporate wetlands in our cities,” Andersen said. “Humanity has spent centuries treating nature like its worst enemy. The truth is that nature can be our savior. But only if we save it first.”

# # #

Why Environmental Justice Is Crucial in Climate Resilience: Just Look at New Sea Level Rise Predictions

KQED | February 23, 2022 | Ezra David Romero

The county in California most at risk from sea level rise is San Mateo, with nearly 100,000 people — half residents of color — living just three feet above the high-tide line. If climate models prove correct, rising seas threaten billions of dollars of homes and businesses, and hundreds of contaminated sites could harm residents if flooded.

“We’re at ground zero for the state, so it’s our responsibility to act,” said Len Materman, who leads the San Mateo County Flood and Sea Level Rise Resiliency District, or OneShoreline.

Sea levels along the California coastline, including the San Francisco Bay, could rise 7 to 21 inches by the year 2050, depending on how much and how quickly the world's countries manage to cut carbon dioxide emissions. By the end of the century, with little drop in emissions, seas could rise by as much as 6.5 feet, according to a national study released last week. That’s from the climate emergency alone; storms, king tides and sinking land add inches to those estimates.

While the 2050 numbers are a little lower than those in a similar 2017 report, it’s nonetheless distressing news for Black, Latino, Middle Eastern and Asian communities that ring the San Francisco Bay. Places like the Alviso neighborhood in San Jose, Richmond, East Palo Alto, Marin City and Bayview-Hunters Point already flood yearly during king tides or big storms. In most of these places, Bay Area scientists believe rising groundwater could push up legacy contamination in the soil, harming people's health.

“The Bay Area is definitely a hot spot,” said Rachel Morello-Frosch. Frosch is co-leading a UC Berkeley-UCLA project called Toxic Tides, which maps contaminated sites, sea level rise and the communities most at risk.

“When you think about the coast, people think about Malibu, mansions and people living by beaches,” she said. “We want to focus on ... not only knowing about the facilities that are at risk but the communities that live nearby.”

One area of concern is just north of the Golden Gate Bridge. Near Sausalito, tiny Marin City lies adjacent to Highway 101 and the bay, and is the only predominantly Black community in Marin County. Many residents there are the direct descendants of Black people who settled in the city in the 1940s to help build ships for World War II. All these years later, residents are beginning to test for remnants of legacy contamination throughout the community.

During atmospheric rivers in October 2021, heavy rain flooded the single entrance into Marin City with multiple feet of water.

“We had to walk through floodwaters that are filled with toxins from the groundwater that's actually mixing with the sewer water,” said Chinaka Green, a Marin City resident who said she disposed of her wet clothes because of the contaminated water.

Her mother, Terrie Green, director of Marin City Climate Resilience and Health Justice, along with a group of teenage climate activists, are appealing to the state for action on flooding. They say the county won’t invest in the unincorporated area because of the color of residents' skin.

“They want the Black and Brown people out of here,” she said.

And when thinking about multiple feet of sea level rise by the end of the century, Green says that kind of flooding already happens during storms.

“But what attention are we getting?” she said of the lack of long-term planning to protect Marin City from worse flooding.

With communities of color already on the line because of existing inequities, the new federal projections show just how important it is to plan for the full range of projected sea level rise.

“Make no mistake, sea level rise is upon us,” said Nicole LeBoeuf, the National Oceanic and Atmospheric Administration's National Ocean Service director, during a webinar on the updated sea level rise outcomes. “We do recognize that there are communities around our coastlines that are more vulnerable to these kinds of impacts because of their history and being underserved to begin with.”

'Emissions do matter'

The new national report forecasts frequent flooding on the California coastline due to sea level rise of as much as 21 inches by 2050, 6.5 feet by the end of the century, and more than 12 feet by 2150. If emissions continue to escalate, some sea level rise scientists worry these upper limits could become a reality.

“Emissions do matter,” said Susheel Adusumilli, a postdoctoral researcher who studies sea level rise and changes in ice sheets at the Scripps Institution of Oceanography. “If you have high emissions, then it's just going to be a widespread massive impact on communities in coastal areas.”

The report, led by the NOAA, NASA, the U.S. Geological Survey and other federal agencies, updates federal sea level rise projections from 2017. It underscores how sea level rise brought on by human-caused climate change cannot be ignored and demands an all-hands-on-deck approach to preparing for encroaching seas.

Using data from tide gauges, satellites and computer modeling, the authors were able to project sea level rise with greater certainty up to 2050 than they'd been able to do before, and have extended their projections long into the future. The two leading causes of the rising tides are

directly related to the continued burning of fossil fuels: Seas rise as ice sheets and glaciers melt and because ocean water expands as it warms.

“If we keep emissions down, you start to take some of those very rapid, high-impact sea level processes off the table,” said Ben Hamlington, one of the report's authors and a scientist at NASA’s Jet Propulsion Laboratory in Southern California. “There’s still quite a bit of uncertainty about the melting of the ice sheets. They could really play a big role in those higher-end scenarios here in California.”

What Hamlington says is significant about this update is that tidal gauge observations almost mirror the intermediate levels of sea level rise of nearly 10 inches on the West Coast by 2050. That suggests the intermediate sea level rise projections, rather than the higher ones, may be more accurate for California. But after the mid-century mark, he says, the “uncertainty range blows up.”

Since real-time tidal gauge observations closely track with climate models, Mark Merrifield, director of the Center for Climate Change Impacts and Adaptation at the Scripps Institution, says it's critical to take swift action on climate change.

“If we assume the worst-case scenarios … we're going to be facing a sea level rise problem here that will far outpace what we've been dealing with in the past,” he said. “There's literally no end in sight if we keep going on the same trajectory.”

The 2050 predictions are slightly lower than those of a few years ago, and that’s because science has improved. However, researchers note that it all depends on carbon dioxide emissions and local factors like subsidence, storm surge, waves and groundwater levels.

“In some cases, it's going actually to inundate and flood low-lying zones,” said Merrifield. “Places that have been built on reclaimed land, and the water tables going up with the sea level, are areas that are going to be particularly vulnerable as time goes on.”

'Where was God?'

Low-lying communities around the lip of the San Francisco Bay, like East Palo Alto on the peninsula, are already vulnerable to nuisance flooding from rain, king tides and contaminated groundwater.

East Palo Alto sits within a federally designated flood zone. According to projections, in 10 years or so, up to two-thirds of the land within city limits may regularly flood. By mid-century, those areas could be frequently underwater during high tides. Flooding of that magnitude would stress major flex points for the entire Bay Area, such as Highway 101 and the Dumbarton Bridge. That would burden many residents already dealing with inequities like homelessness, joblessness or poverty.

“If you were to get to know 100 families in East Palo Alto, maybe 50 out of 100 already are right at that point at which savings are so low that ... a flood event ... could be that tipping point,” said Derek Ouyang, a program manager and lecturer at the Stanford Future Bay Initiative, who works with community leaders in the city.

For some in East Palo Alto, flooding and climate change are threatening their homes for a second time. Climate refugees here from the Pacific Islands have already fled rising seas, only to face similar threats in a new country several thousand miles away. Appollonia Grey 'Uhilamoelangi of Samoa, known as Mama Dee in her East Palo Alto community, founded 'Anamatangi Polynesian Voices as a bridge between the city and its Polynesian residents.

“The last two floods over here, the question is, where was God?” she said. “Don't get me wrong, I believe in prayers. But I lived through so many disasters.”

Residents in East Palo Alto — and commuters across the Dumbarton Bridge — will be protected, in part, once a new, high levee is built, separating a portion of the city from a creek nearby that connects to the bay.

Creating flood protection for existing communities like East Palo Alto is essential because the new federal report found that moderate flooding, which already happens during king tides or storms, will likely arise 10 times more often by mid-century than it does today.

'We're not prepared'

While sea level rise predictions have become more definitive up to 2050, Zack Wasserman, chair of the San Francisco Bay Conservation and Development Commission, or BCDC, says the forecasts only confirm what the agency already knows: A slow-moving disaster is coming.

“The difference in potential damage between 7 feet and 10 feet [past the year 2100] has some significance, but today, we're not prepared for either,” he said of the more extreme climate models.

Wasserman says the slight adjustment in the near term gives BCDC a little more time to prepare and involve more agencies, cities and counties into a Bay Area-wide plan.

“This report just demonstrates the need for us to continue our efforts and, to some extent, to accelerate our efforts,” he said.

Jessica Fain, director of planning for the agency, says she’s glad the projections extend to 2150. This allows her team to plan even further into the future, which is vital because the state agency is spearheading a regional sea level rise adaptation plan, called Bay Adapt.

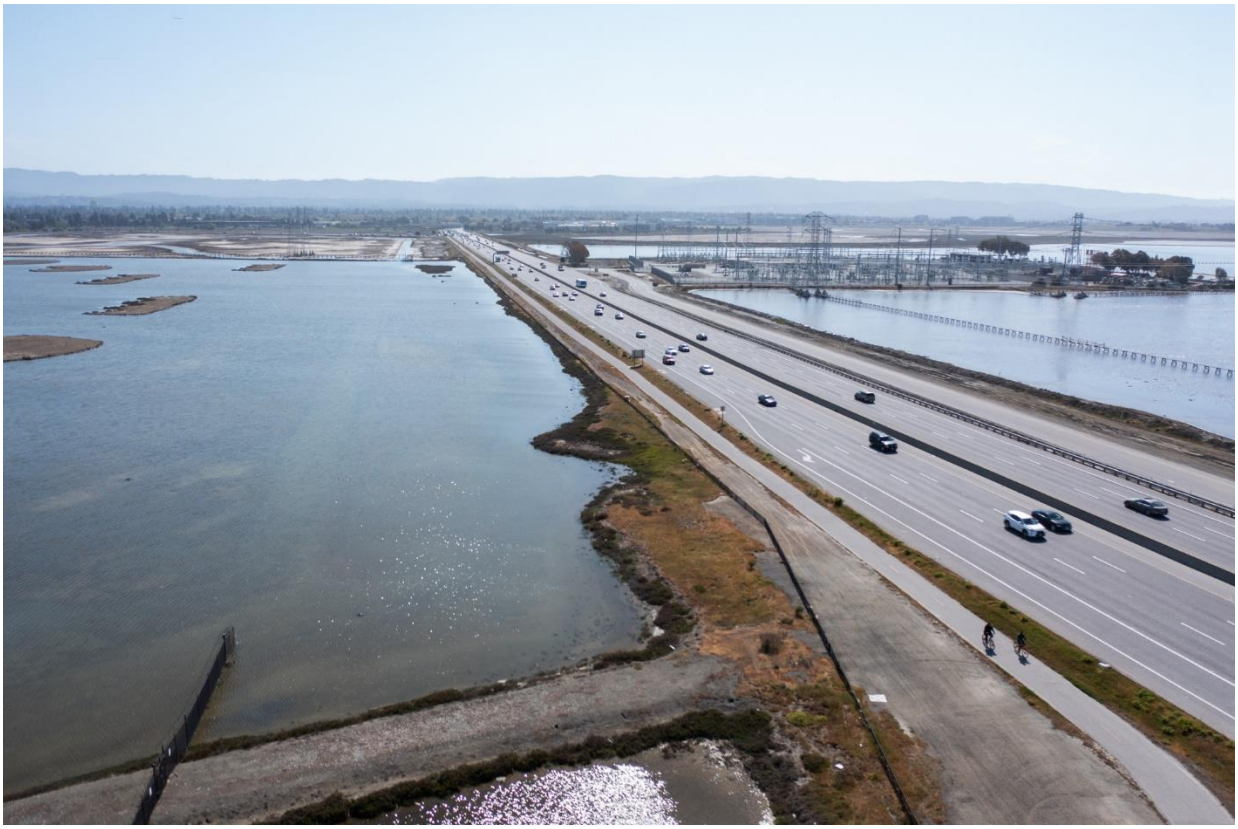
“It’s 70 years away, the lifetime of a person who was born today,” she said. “So, having these further-out numbers to think about is really valuable.”

Planning with confidence

California sea level planners are taking the new update seriously. Kelsey Ducklow, a coastal resilience coordinator at the California Coastal Commission, says it will likely take a year to incorporate the recent federal data into the state's climate plans.

"Having more confidence in what the sea level rise impacts are going to be over the next 30 years gives more confidence about the actions that we can take," Ducklow said of the more secure levels of sea level rise projected by 2050.

A four-lane highway with water on either side and hazy blue sky above and mirroring in the plane of water.



The Dumbarton Bridge near the East Palo Alto shoreline and other Bay Area infrastructure are at major risk of flooding as sea level rise accelerates. (JJ Harris/Techboogie/KQED)

But she admits that any projects in play in California — highways, homes, buildings — have life spans beyond the 2050 time frame and are why it's essential to plan for the more extreme projections after mid-century.

Susheel Adusumilli, from the Scripps Institution, is collecting data to rework the state's 2018 sea level rise guidance. He says rising tides could be worse for some regions of California, like Foster City in San Mateo County, where he says the land is sinking.

He also says that the California update, to come in 2023, needs to detail how Black, Middle Eastern, Latino and Asian communities will suffer economically because of rising tides.

“California's a rich state, and if California adapts to sea level rise in an equitable way … it will be heard around the world,” he said.

An aggressive approach

Sea level rise planners in San Mateo County are readying the entire shoreline — from East Palo Alto to Brisbane — for 10 feet of extra water above today’s high tide.

This level of protection goes well above the new federal predictions.

“It's an aggressive number so that in this century, we’re not going to see overtopping if we pick that number,” said Materman of OneShoreline.

To protect the hundreds of thousands of people, tech giants and infrastructure from San Mateo County that support the entire Bay Area, Materman says choosing not to be conservative when planning for rising tides is a no-brainer.

“Forty years from now, I don't want people to look back on our agency and say, ‘Oh, you trusted a report back in 2022, which under-assumed what the damage would be. So, now we have to go in and raise everything,’” he said. “That's not what we're about.”

# # #

BLOG: How can homeowners recycle grey water?
Soil Science Society Of America | March 1, 2022 | Joseph Ferrer, Greywater Corps

Here in California – and in many parts of the world – water scarcity is a way of life. Thankfully, most of the water that we use indoors can be safely reused for outdoor irrigation and toilet flushing. This is called grey water.

Grey water is used water from sinks, showers and washing machines. It makes up the majority of household wastewater. It has small amounts of chemicals from soaps and shampoos, but these are manageable during reuse. Surrounding soils absorb some of these chemicals, and plants can use others for food.

This yard in California is watered with greywater from showers, laundry, and bathroom sinks. Reuse of water in this safe way helps the homeowners enjoy some shade and green space. Credit: Greywater Corps

Waste from toilets, kitchen sinks and dishwashers is considered black water. Black water needs special processing, usually from a wastewater treatment plant, to be safe.

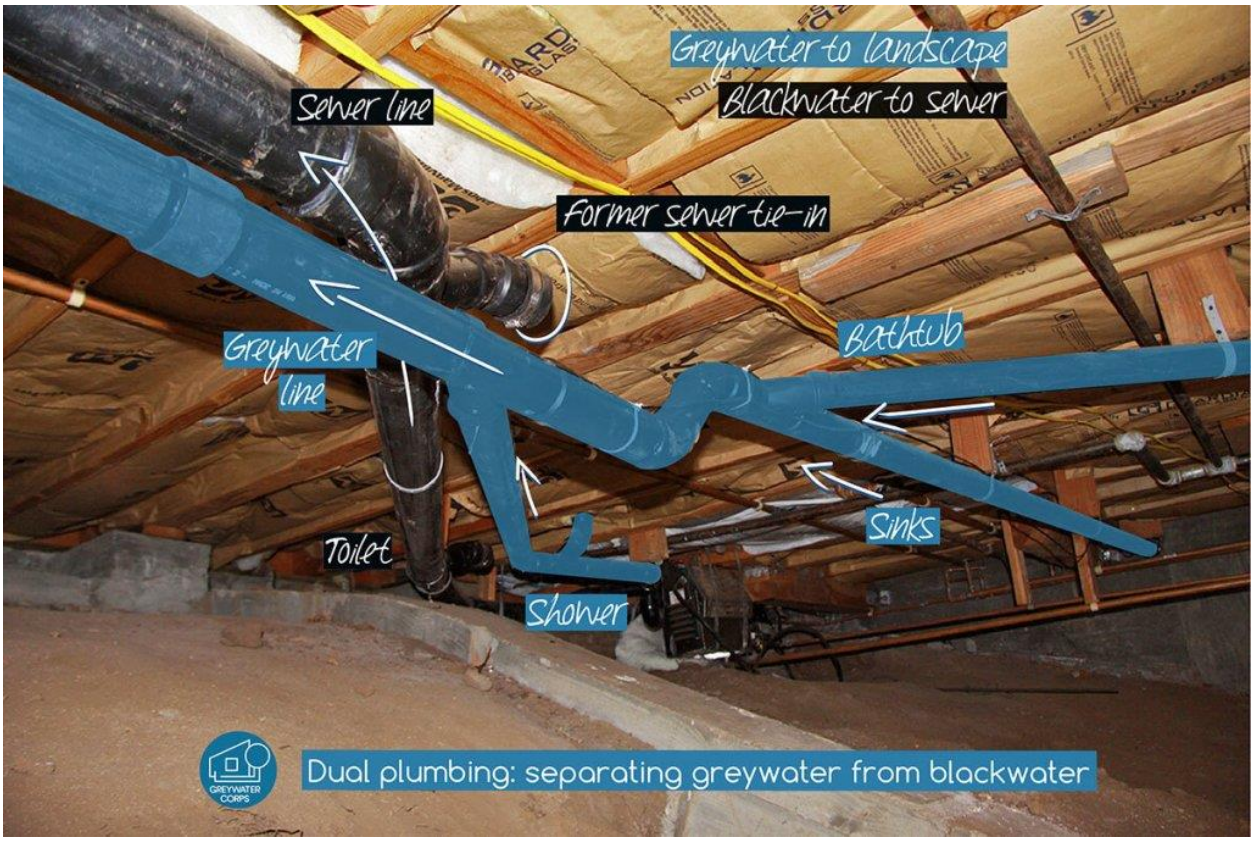
At Greywater Corps we specialize in grey water systems for irrigation. Most of our projects involve retrofitting single family homes to separate grey water from black water. We then set up systems to reuse that greywater to feed plants outside.

First, we get in the crawlspace under the house and modify the plumbing to separate grey water from black water. From there we install four types of systems, three of which use untreated, raw greywater, meaning no filters and very low maintenance. They are:

Laundry to landscape (L2L): this type of system uses the washing machine's internal pump to move greywater. It can irrigate across level terrain or downhill.

Branched drain (BD): this system uses gravity flow directly from plumbing fixtures to move gray water. It can only irrigate downhill.

Pumped system (PS): pumped systems use a motorized pump to move greywater. They can irrigate uphill.



Staff from Greywater Corps goes into the crawl space under homes. There, they divert water from sinks, showers and washing machines into the grey water collection system outdoors. Credit: Greywater Corps

Untreated grey water is released in trenches 8 to 12 inches deep, filled with woodchip mulch. These trenches, called mulch basins, allow grey water to percolate laterally through the mulch

without ever reaching the surface. Gray water is released inside valve boxes embedded in the mulch and filters out to the landscape from there.

Grey water is not ideally suited for lawns or other water-intensive landscaping, but it can be applied to a wide range of landscape designs and plant palettes, from verdant tropical reveries to riparian habitats shaded by sycamores, to edible gardens bursting with fruit. In low water gardens, grey water can be applied to key plants like fruit trees, shade trees and perennials. Grey water systems generate large amounts of water and discharge it all at once, so they are best paired with larger plants that can absorb it.

After diverting water from sinks, showers and washing machines, the water flows into a yard with tubing and trenches. Mulch is used to hold the water, which can then soak out into the surrounding soil to provide water for plants. Credit: Greywater Corps

We also install advanced systems that use varying levels of treatment to clean grey water for applications such as drip line irrigation. These systems come with greater costs and maintenance, but also allow much greater flexibility and enhanced capabilities.

While most of our projects involve single family homes, we have also built systems at apartment buildings, schools, universities, hotels and more. Every building can find its own strategies to best manage this precious resource we call grey water.

# # #

For more information visit our website www.greywatercorps.com.

PRESS RELEASE

California Takes Decisive Action to Reduce Microplastics Pollution
Waste 360 | February 28, 2022

SACRAMENTO, Calif. -- In response to increasing concern about pervasive and persistent pollution caused by microplastics, the California Ocean Protection Council yesterday approved the first comprehensive microplastics strategy in the nation. This leading-edge Statewide Microplastics Strategy identifies early actions and research priorities to reduce microplastic pollution in California's marine environment. Worldwide, an estimated 11 million metric tons of plastic enter the ocean each year. Without any intervention, this amount is anticipated to triple by 2040. Over time, plastics break down in aquatic environments into pieces of ever-decreasing size, with those less than 5 mm in size known as "microplastics," which are easily ingested by ocean life, causing harm such as tissue inflammation, impaired growth, developmental abnormalities, and reproductive complications.

Microplastics have also been found in human stool, lung, and placenta samples, and within soils and plants. Research in California has identified tire and road wear, synthetic textiles, cigarette filters and single-use plastic foodware as among the top sources of microplastics in California bay and ocean waters, sediment, and fish tissue. Precautionary management of microplastic pollution and upstream source reduction are the most effective response to this crisis.

"Microplastics are poisoning the ocean, both across the planet and off the California coast," said California Natural Resources Secretary Wade Crowfoot. "We must take action, and this strategy shows us how. By reducing pollution at its source, we safeguard the health of our rivers, wetlands, and oceans, and protect all the people and nature that depend on these waters."

"Some solutions, like stormwater infiltration projects and better compliance with nurdle discharge prohibitions, can reduce microplastics immediately," said OPC Executive Director, Mark Gold. "But we cannot dramatically reduce microplastic pollution without leadership from the textile industry and tire manufacturers to produce consumer products that don't add to the growing problem."

This Statewide Microplastic Strategy provides a multi-year roadmap for California to take a national and global leadership role in managing microplastics pollution by utilizing a two-track approach to manage microplastic pollution.

The first track lists 22 immediate, "no regrets" actions and multi-benefit solutions to reduce and manage microplastic pollution:

Solutions

- Pollution Prevention: Eliminate plastic waste at the source (products or materials from which microplastics originate).

- Pathway Interventions: Intervene within specific pathways (stormwater runoff, wastewater, aerial deposition) that mobilize microplastics into California waters.
- Outreach & Education: Engage and inform the public and industries of microplastic sources, impacts, and solutions.

The second track outlines a 13-point comprehensive research strategy to enhance the scientific understanding of microplastics in California and inform future action:

Science to Inform Future Action

- Monitoring: Standardize a statewide monitoring approach. Understand and identify trends of microplastic pollution statewide.
- Risk Thresholds & Assessment: Improve understanding of impacts to aquatic life and human health.
- Sources & Pathways Prioritization: Identify and prioritize future management solutions based on local data.
- Evaluating New Solutions: Develop and implement future pollution prevention and pathway intervention solutions.

BACKGROUND

Microplastics are considered pervasive and persistent global pollutants, with microplastics increasingly observed even in remote environments. The California Legislature recognized the need for a comprehensive plan to address this environmental challenge with the adoption of Senate Bill 1263 (Portantino) in 2018, requiring the California Ocean Protection Council (OPC) to adopt a statewide research strategy and identify early actions to reduce microplastic pollution in California's marine environment. The Statewide Microplastics Strategy was released for public comment beginning on December 21, 2021, with the comment period ending January 21, 2022. OPC received over 120 written comments from nearly 160 individuals, organizations, agencies, businesses, and other entities. The final Statewide Microplastics Strategy was revised based on the public comment received to clarify the timeline of specific recommendations, to provide additional guidance for implementation of specific recommendations and to elevate equity and public transparency during the implementation of the final Strategy.

ABOUT THE CALIFORNIA OCEAN PROTECTION COUNCIL

The California Ocean Protection Council (OPC) ensures that California maintains healthy, resilient, and productive ocean and coastal ecosystems for the benefit of current and future generations. The OPC is committed to basing its decisions and actions on the best available science and to promoting the use of science among all entities involved in the management of ocean resources. OPC was created by the California Ocean Protection Act (COPA), which was signed into law in 2004 by Governor Arnold Schwarzenegger.

# # #

BAY AREA WATER SUPPLY AND CONSERVATION AGENCY
BOARD OF DIRECTORS MEETING

March 15, 2022

Correspondence and media coverage of interest between March 11, 2022 and March 15, 2022

Correspondence

From: Dave Warner
To: Chair Larsson and Members of the BAWSCA Board and Nicole Sandkulla, CEO/General Manager
Date: March 11, 2022
Subject: CDFW Fish Passage Chart

Media Coverage

Drought:

Date: March 15, 2022
Source: Bay Area News Group
Editorial: California drought: Californians fail to hit water conservation targets by wide margin — is it disaster fatigue?

Date: March 14, 2022
Source: Paso Robles Daily News
Article: Governor increases funding for drought emergency

Water Supply Conditions:

Date: March 15, 2022
Source: Bay Area News Group
Article: Rain arrives in the Bay Area, with another storm to come this weekend

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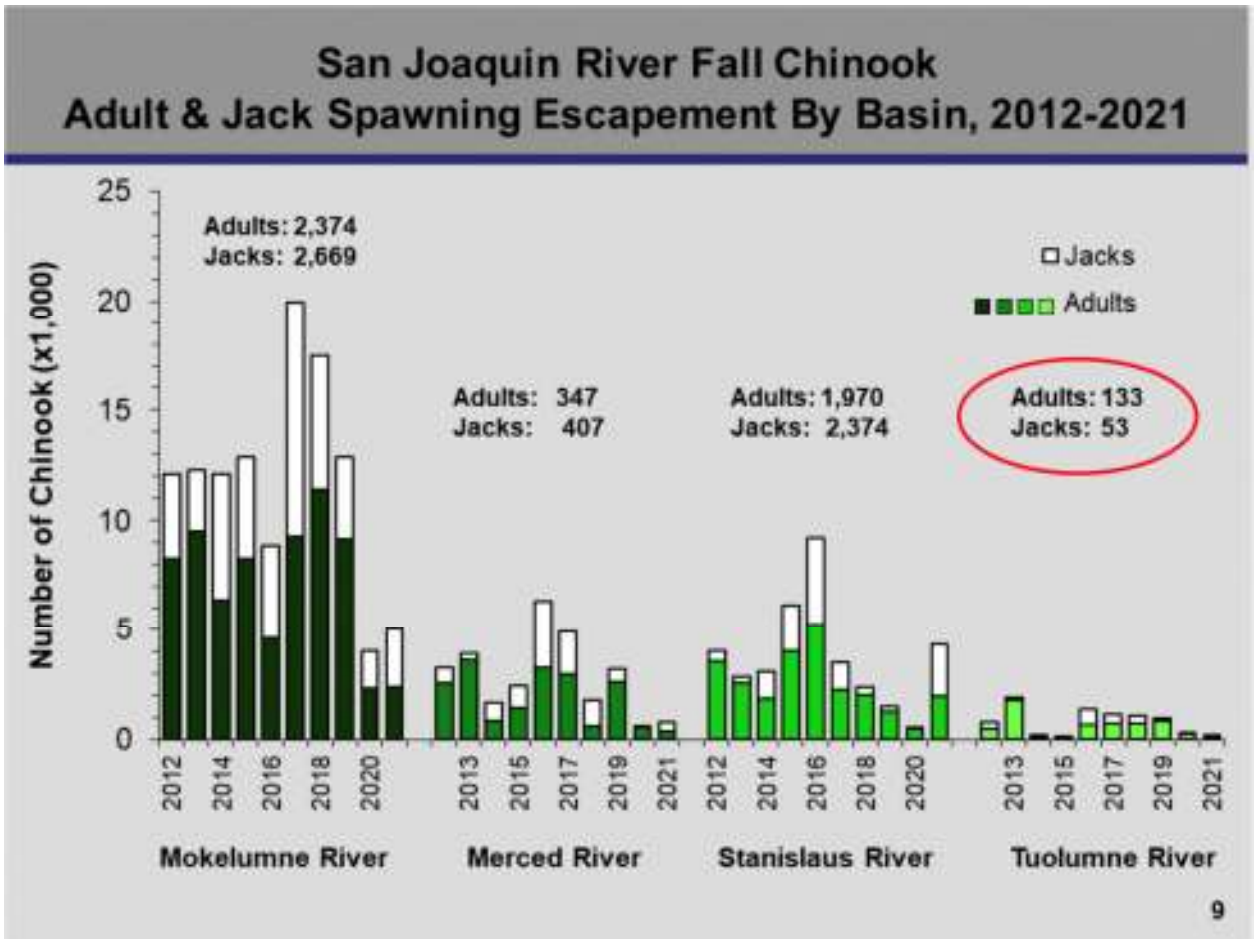
March 11, 2022

Board Chair Gustav Larsson, Board members and CEO Nicole Sandkulla,
Bay Area Water Supply and Conservation Agency
155 Bovet Road, Suite 650
San Mateo, CA 94402
Via email

Re: CDFW Fish Passage Chart

Dear Board Chair Larsson, Board members and CEO Sandkulla,

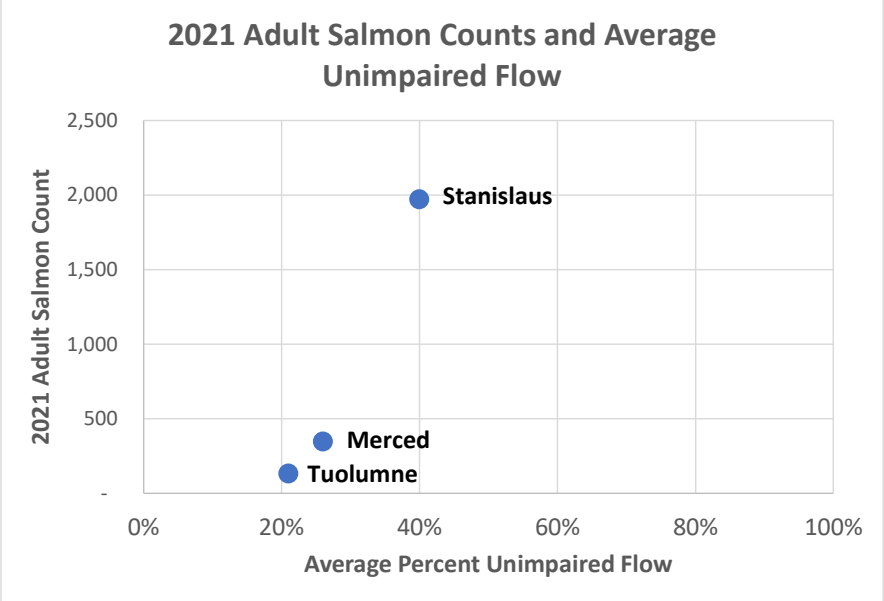
Thank you for listening to my public comment and taking time with my chart regarding Tuolumne fish passage at your January 20th Board meeting. Another fish passage chart (shown here) was presented by the California Department of Fish and Wildlife (CDFW) at their March 2nd salmon informational meeting.



This chart compares the salmon counts for the Mokelumne, Merced, Stanislaus and Tuolumne Rivers. In my view the Mokelumne river data may not be comparable because that river has a fish hatchery while the others don't. But the other three rivers are a good comparison amongst each other.

Three takeaways are:

1) The Tuolumne salmon are in bad shape.
2) Average unimpaired flows may be a reason for the differences between the Merced, Stanislaus and Tuolumne. The chart below plots the average unimpaired flow for the Stanislaus, Merced and Tuolumne (40%, 26% and 21% respectively) against the 2021 adult salmon counts. Correlation is not causal but there appears to be a strong relationship between unimpaired flow and salmon counts. As you can see from the chart, the Stanislaus has substantially higher unimpaired flows and substantially more salmon. The Tuolumne is at the opposite end, with much lower flows and much lower salmon counts.



3) In terms of why do we care and relating this small bit of data to the TRVA: As you know the TRVA doesn't increase flows much, which from the above chart indicates the TRVA is a relatively risky strategy for bringing salmon counts to the levels claimed.

One other note. The fish counts on the CDFW charts are lower than the Fishbio counts that I used for my January 20th chart. However, the relative differences between the Stanislaus and the Tuolumne still hold. I chose the Fishbio data for the earlier charts because they provided daily reporting. Fishbio uses a weir to count incoming salmon while CDFW does carcass surveys to determine successful spawners. I am not qualified to say if one data set is better than the other. Unfortunately, either set of data indicates that the Tuolumne salmon are in trouble.

Kind regards,

Dave Warner

California drought: Californians fail to hit water conservation targets by wide margin — is it disaster fatigue?

Gov. Gavin Newsom asked in July for 15% reduction in water use, but residents have cut by just 6.4%

Bay Area News Group | March 15, 2022 | Paul Rogers

Guadalupe Reservoir is seen on Feb. 28, 2022, in South San Jose. Following the driest January and February in the Bay Area in recorded history, Guadalupe Reservoir in South San Jose near Los Gatos was just 36% full on March 15, 2022, according to the Santa Clara Valley Water District. (Dai Sugano/Bay Area News Group)

As California's severe drought worsens, with reservoir levels falling and the Sierra Nevada snow pack shrinking, the state's residents — particularly in Southern California — are failing by a large margin to hit voluntary water conservation targets set by Gov. Gavin Newsom.

Last July, Newsom declared a drought emergency and asked Californians to cut urban water use 15% compared to 2020 levels.

But in January, they did the opposite, increasing water use 2.6% compared to January 2020, according to new data released Tuesday by the State Water Resources Control Board.

Cumulatively, from July to January, Californians reduced urban water use statewide by 6.4% — less than half of Newsom's target, compared to the same time period in 2020.

“There’s a lot of untapped potential,” said Charlotte Ely, a conservation supervisor with the State Water Resources Control Board. “There’s a lot more that we can do. We can get there. We will get there. These numbers are a good wake-up call that we need to buckle up and get going.”

With wildfires, the pandemic, and now a war in Europe, the public has spent the past two years immersed in crises. Some experts say that has made it more difficult for people to realize the severity of California’s drought.

“People are just not paying attention that much,” said Newsha Ajami, a hydrologist and research director with Lawrence Berkeley National Laboratory. “Drought is a topic, but it is not the topic. The public is not getting the message. This is a serious drought. Our reservoirs and groundwater basins are still below normal. And our water system is under so much stress. People should be taking out their lawns and watering landscaping no more than one day a week.”

Progress towards 15% cumulative savings

Region	July	August	September	October	November	December	January	Cumulative
Central Coast	-2.8%	-5.2%	-3.9%	-11.8%	-12.2%	-15.8%	3.7%	-6.9%
Colorado River	0.1%	-5.5%	-4.0%	-9.0%	-1.4%	-5.8%	19.0%	-2.4%
North Coast	-15.1%	-18.3%	-13.0%	-23.4%	-24.2%	-8.4%	0.3%	-14.9%
North Lahontan	0.0%	-5.2%	-13.1%	-25.1%	-16.8%	-9.9%	6.0%	-9.4%
Sacramento River	-0.6%	-7.9%	-3.4%	-18.7%	-27.0%	-13.3%	6.3%	-9.0%
San Francisco Bay	-9.1%	-9.8%	-7.5%	-16.9%	-19.7%	-12.8%	-1.4%	-11.0%
San Joaquin River	-0.7%	-3.5%	0.9%	-13.0%	-17.9%	-11.9%	7.1%	-5.3%
South Coast	-0.2%	-3.1%	-4.2%	-12.2%	0.7%	-18.3%	1.8%	-5.1%
South Lahontan	1.8%	-4.2%	-5.5%	-13.7%	-0.1%	-4.5%	9.0%	-3.1%
Tulare Lake	-1.6%	-3.5%	2.3%	-7.2%	-9.7%	-12.2%	-0.2%	-4.7%
Statewide	-1.8%	-4.9%	-3.9%	-13.3%	-7.1%	-15.6%	2.6%	-6.4%

Last July, Gov. Gavin Newsom declared a drought emergency and asked residents to cut water use 15% compared to 2020. Since then, they have cut by only 6.4%. (Source: State Water Resources Control Board)

Across the state, most cities and local water districts have asked — not ordered — customers to conserve water, and to limit the number of days they irrigate landscaping. Agencies have increased conservation incentives, like offering rebates to people who buy water-efficient appliances.

But in many communities, including most Bay Area cities, there are no consequences for missing water targets, and no enforcement of existing rules for those who waste water.

The central question now with a long, hot summer looming is whether Newsom will shift his water conservation call from voluntary to mandatory, with financial penalties for cities and water districts that fail to hit the targets.

On Monday, Newsom announced $8 million in new state funding for a public outreach campaign to boost conservation. But his office has not announced new funding for water storage projects, or said whether conservation rules will become mandatory.

During California's last drought, from 2012 to 2016, former Gov. Jerry Brown at first issued a voluntary call for conservation. But when Californians failed to meet his targets and the drought worsened, Brown issued a 25% mandatory urban water use rule, with targets and fines for agencies that failed to meet them. Some water agencies complained, because local water agencies make less money when they sell less water, unless they raise water rates. But Brown achieved the conservation target.

California's current drought is now moving into a third year. After a rainy October and December, January and February were the driest combined first two months of a year since records began in 1921.

The Sierra Nevada snowpack — the source of nearly one-third of California's drinking water — hit 168% of normal on New Year's Day, boosting hopes that the drought was ending. But with almost no rain and snow since then, those hopes were dashed: On Tuesday the snowpack was just 58% of its historical average, with winter nearly over.

Conditions in 2020, 2021 and 2022 are drier and hotter than conditions during the peak of California's last drought, which was considered the most severe in the state's history back to 1850.

"We're on pace to outdo the driest three years of that drought — 2013, 2014 and 2015," said Michael Anderson, state climatologist with the California Department of Water Resources.

Water use numbers released Tuesday show that Northern California residents continue to conserve more water than Southern California residents.

Cumulatively, from July 2021 to January 2022, Bay Area residents reduced water use by 11% compared with July 2020 to January 2021. But residents of the "South Coast" area, which includes Los Angeles, San Diego and Orange County, reduced use by less than half that, 5.1%.

Droughts always have been a part of California's weather. Climate change is making them worse, scientists say, with hotter temperatures that melt snowpack more quickly, increase fire risk and dry out soil and vegetation.

"We're beginning to see the progression that you would see with climate change," Anderson said.

A study published last month by scientists at UCLA and other universities found that the past 22 years in California and the American West have been the driest 22-year period of any in the

past 1,200 years, based on an analysis of tree rings. Conditions weren't drier and hotter in 800 A.D., the researchers said, it's only that tree ring records only accurately go back that far.

Meanwhile, reservoir levels across much of California remain below average and are falling with little rain to fill them.

California's largest reservoir, Shasta Lake, near Redding, was 38% full Tuesday, and its second largest, Lake Oroville, in Butte County, was 46% full.

The U.S. Drought Monitor, a weekly federal report, said Thursday that despite December rains that helped reduce drought severity, 87% of California remains in a severe drought, including all of the Bay Area. And 13% of the state — including Mendocino County, and parts of Inyo and San Bernardino — are mired in extreme drought.

Since nobody knows how many more years this drought will last, it's common sense to save water, Ajami said.

"If you weren't sure you were going to have a job next year, you wouldn't spend all your money this year," she said. "You would be much more thoughtful. Water is the same thing."

# # #

Governor increases funding for drought emergency
Palo Robles Daily News | March 14, 2022

– After California recorded its driest January and February in more than 100 years of records in the Sierra Nevada, Governor Gavin Newsom's administration announced this week that it is spending an additional $22.5 million to respond to the immediate drought emergency.

The additional $22.5 million allocation includes more funding for the Department of Water Resources, State Water Resources Control Board, and the California Department of Food and Agriculture.

More than a third of the money – $8.25 million – will be used to increase outreach efforts to educate Californians on water conservation measures and practices.

"These investments continue to provide crucial drought support to communities impacted around the state," wrote Chief Deputy Finance Director Erika Li in a letter to Legislative budget and appropriations leaders.

The funds requested are part of a comprehensive effort by the Newsom Administration to increase water conservation. Earlier this month, the state launched new video ads to encourage Californians to reduce outdoor watering.

On March 1, the survey of the state's snowpack showed levels were dropping sharply after robust storms in December. Current snowpack readings are about one-third below average. The Department of Water Resources is analyzing the latest snowpack data and has indicated it may revise its current forecast for State Water Project deliveries in 2022.

With the infusion of additional state budget funds, the Save Our Water campaign is gearing up to reach Californians with water-saving tips via social media and other digital advertising, geo-targeting counties with high water use. The campaign also is securing partnerships with retailers and other organizations to urge Californians to reduce water use in the immediate term and also make permanent changes to landscaping to build resilience in the long term.

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Rain arrives in the Bay Area, with another storm to come this weekend
A storm is headed to the region on Saturday
Bay Area News Group | March 15, 2022 | Summer Lin

Bay Area residents woke up to a wet commute Tuesday morning after the second storm this week brought light showers across the region.

While the storm didn't put a dent in the drought, two more systems could bring more rain this week, with one forecast for Saturday expected to be the wettest of this week's series.

As of 10 a.m., 24-hour precipitation totals included: 0.56 inches at Upper Coyote Creek, 0.43 inches at Mill Valley at Mount Tamalpais, 0.19 inches in downtown San Francisco, 0.18 inches in Oakland, 0.17 inches at Mount Diablo and 0.12 inches at Scott Creek, according to the National Weather Service. There wasn't any measurable rain in San Jose and most of the South Bay.

The storm will weaken and dissipate as it drifts southward, with dry conditions in the forecast for the rest of Tuesday. Temperatures are expected to be in the 60s and lower 70s into the afternoon.

Another system could douse the Sonoma coast Thursday morning, leaving the rest of the Bay Area dry as the storm passes north. The next chance for widespread precipitation is on Saturday, with a light-to-moderate rainfall to blanket the North Bay hills, Santa Cruz Mountains and the Santa Lucia range in 0.50 to 0.75 inches of rain while the rest of the region could get 0.25 to 0.50 inches, with lighter amounts in the South Bay due to the rain shadow effect. The showers are expected to peter out by Saturday night.

"Overall the storm system that we're anticipating this coming week is relatively week a little bit stronger than what we had moving in today but not expected to produce substantial rainfall across the region but beneficial nonetheless especially the dry conditions we've been getting since the beginning of the calendar year. any rainfall we're getting is beneficial but not expecting anything substantial. not expecting inches of rain

A high pressure ridge was stopping any storms from reaching the Bay Area, but has been pushed eastward with the most recent storm. The weather pattern has resulted in the driest January and February in the state's recorded history, with San Francisco getting .65 of an inch of rain and San Jose receiving 0.01 of an inch in what would usually be the wettest time period.

"The pattern along the west coast has been replaced by a troughing pattern so we're seeing storm systems moving south that were really shoved into the Pacific Northwest the past couple of months," said NWS forecaster Roger Gass. "We're expecting that to continue through the upcoming storm system Saturday but rigid high pressure is expected to build back in the region after the Saturday storm over the eastern Pacific and potentially keep dry conditions across the region early next week."

There could be another chance for rain later next week, but there's still a "lot of uncertainty" in how the pattern is going to develop, according to Gass.

Massive atmospheric river storms in October and December raised hopes of putting an end to California's drought by filling the statewide Sierra Nevada snowpack to 168% of normal on New Year's Day, marking the 21st wettest December on record for San Francisco. By Friday, the Sierra snowpack dropped down to 60% of historical averages for that date, according to the California Department of Water Resources.

"The rainfall that we're getting currently and are expecting to occur on Saturday isn't really gonna do much in the way of helping the ongoing drought conditions," Gass said. "That's on a larger scale with reservoirs and those kind of things not getting the beneficial runoff they'd usually get from a stronger system."

Fuels and vegetation have also dried out over the past few months, igniting wildfires across the state. More substantial storms would need to douse the region in order to make a big difference.

"It's beneficial in the fact that the rain's wetting the ground and the soil, so that's temporary reprieve from the dry conditions we've had in January and February," Gass continued. "But those wet conditions are only temporarily helping the situation."

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