BAY AREA WATER SUPPLY AND CONSERVATION AGENCY BOARD POLICY COMMITTEE MEETING

October 8, 2021

Correspondence and media coverage of interest between September 20, 2021 and October 7, 2021

Correspondence

From:	Los Vaqueros Expansion Project - Partners
Date:	October 7, 2021
Subject:	Joint Press Release: Los Vaqueros Reservoir Joint Powers Authority Formed
From:	Los Vaqueros Reservoir Expansion Project
To:	Stakeholders
Date:	September 24, 2021
Subject:	Monthly Report

FromJohn WeedTo:San Francisco Public Utilities CommissionDate:September 20, 2021Subject:Comments on SFPUC Hearing of 17 September 2021 on Alternative Water Supply Planning

Media Coverage

Drought/Water Supply Conditions:

Date: Source: Article:	October 6, 2021 City of San Jose Press Release: Mayor of San José, State Leaders Urge Residents To Conserve Water in Historic Drought
Date:	October 4, 2021
Source:	San Francisco Chronicle
Article:	S.F. saw just 9 inches of rain this 'water year.' Here's how that compares to normal
Date:	October 3, 2021
Source:	California Department of Water Resources
Article:	Monthly Reservoir Report for October 1 st , Including Current Reservoir and Water Conditions
Date:	September 30, 2021
Source:	Los Angeles Times
Article:	California will consider mandatory water restrictions if dryness continues this winter
Date:	September 28, 2021
Source:	San Francisco Estuary Institute
Article:	Historical drought' likely to persist in Calif. and Nev.
Date:	September 24, 2021
Source:	NBC Bay Area
Article:	Here's How California's Drought Is Impacting Bay Area Reservoirs

Water Management:

Date:	October 4, 2021
Source:	SF Gate
Article:	Why Southern California is generally better prepared for drought than Northern California
Date: Source: Article:	October 4, 2021 KPIX Drought Emergency EBMUD to Draw 11 Billion Gallons From Sacramento River to Supplement Supplies
Date:	October 4, 2021
Source:	San Joaquin Valley Sun
Article:	Calif. regulators buckle up for the potential of 0% water allocation for 2022
Date:	September 30, 2021
Source:	San Francisco Gate
Article:	This is how much rain California needs to get out of the drought
Date:	September 29, 2021
Source:	Fitch Ratings
Article:	California Drought May Pressure Water Utilities' Margins

Water Conservation:

Date:	September 27, 2021
Source:	San Francisco Chronicle
Article:	Here's how much water Bay Area districts saved in the past year
Date:	September 22, 2021
Source:	SF Gate
Article:	California agency shares graphic with shocking differences in water savings by region
Date:	September 21, 2021
Source:	Bay Area News Group
Article:	Californians falling far short on water conservation as drought worsens

Water Infrastructure:

Date:	September 29, 2021
Source:	California Department of Water Resources
Article:	Temporary Power Generators Now Online to Support California's Electricity Grid
Date:	September 22, 2021
Source:	The Stanford Daily
Article:	Stanford lab builds a water-resilient future, gallons of sewage at a time



News Release For Immediate Release: October 7, 2021

Contacts: see attached statements

Los Vaqueros Reservoir Joint Powers Authority Formed

Brentwood – The Los Vaqueros Reservoir Expansion Project (Project) passed a significant milestone today in officially filing agreements needed to form a Joint Powers Authority. This important milestone puts a group of Local Agency Partners one step closer to Project implementation.

Los Vaqueros Reservoir is an off-stream reservoir that was originally built by Contra Costa Water District (CCWD) in 1998. The original reservoir capacity was 100,000 acre-feet and in 2012, CCWD completed the first phase of expansion to hold 160,000 acre-feet.

Expanding Los Vaqueros to a new capacity of 275,000 acre-feet and adding new conveyance facilities will provide environmental, water supply reliability, operational flexibility, water quality and recreational benefits. Those benefits earned the expansion \$470 million of the \$2.7 billion in water storage investments approved by voters when Proposition 1 passed. The remainder of the project costs will be covered by federal and local partners.

Transforming a local reservoir into a regional facility requires partnerships. Agencies in the Bay Area and Central Valley, serving urban areas, agricultural land and wildlife refuges, have come together to move this expansion forward. A critical step in forming this partnership is the creation of the Los Vaqueros Reservoir Joint Powers Authority (JPA).

The JPA establishes the governance of the Project among the partnering agencies and provides the organizational framework for Project design, construction, operation, maintenance and funding. JPA members will bring perspectives from the agency or agencies they represent and work collaboratively to meet the needs of all agencies involved. The JPA will hold its first official public meeting in mid-November.

Looking forward, the Project team is continuing work to secure the necessary permits, approvals and agreements to begin construction. At this point, construction is scheduled to begin in the winter of 2023.

More information about the JPA is available at www.losvaquerosjpa.com.

LOS VAQUEROS RESERVOIR EXPANSION PROJECT | PARTNER STATEMENTS

Alameda County Water District

Contact: Sharene Gonzalez (510) 668-4208

"The current drought is a stark reminder of the importance of reliable water storage, and Alameda County Water District is proud of our partnership with Contra Costa Water District and other Bay Area and regional stakeholders on this multi-benefit project," said Aziz Akbari, ACWD Board President. "ACWD's participation in the JPA is another example of interagency coordination for the benefit of our customers and our region as we help guide improvements in long-term water supply reliability along with wildlife and environmental benefits as California works to combat climate change."

Bay Area Water Supply and Conservation Agency

Contact: Nicole Sandkulla (650) 349-3000

"The Bay Area Water Supply and Conservation Agency (BAWSCA) is pleased to see continued progress in the Los Vaqueros Expansion Project, including this most recent milestone of the JPA formation," said Nicole Sandkulla, BAWSCA CEO/General Manager. "The project, when in place, will serve to augment the water supply reliability of the San Francisco Regional Water System (System) during times of drought, helping to address the critical needs of the water users in the BAWSCA region that rely on the System to meet a majority of their water supply needs."

Contra Costa Water District

Contact: Jennifer Allen (925) 297-9739

"Contra Costa Water District looks forward to working with all of the partners on the JPA in making financing, construction, and operations decisions for the expansion," said Lisa Borba, CCWD Board President. "As the owner and operator of the system, we know the valuable benefits that Los Vaqueros continues to provide our customers and growing those benefits for a larger region is a smart investment for future generations."

East Bay Municipal Utility District

Contact: Andrea Pook (510) 287-0138

"The Los Vaqueros Reservoir Expansion is not only important for EBMUD, but for the Bay Area and the region as a whole," said John Coleman, EBMUD Ward 2 Director and Los Vaqueros JPA Board Member. "Along with efforts such as water conservation, water recycling, and supplemental supplies, EBMUD will continue to support mutually-beneficial regional reliability efforts to prepare for an uncertain future."

Grassland Water District

Contact: Ellen Wehr (916) 873-2020

"Grassland Water District is pleased to be involved with the formation of California's newest water JPA," said GWD General Manager Ricardo Ortega. "The Los Vaqueros Reservoir Expansion Project is a bright spot for California's water future, and will provide increasingly important ecosystem water supplies for wildlife refuges."

San Francisco Public Utilities Commission

Contact: Betsy Lauppe Rhodes (415) 513-2172

"Regional Cooperation is crucial for a resilient and reliable water future for our customers given the stresses that global climate change and shifting regulations put on our water supplies," said Michael Carlin, Acting General Manager for the San Francisco Public Utilities Commission. "The SFPUC is committed to working with our partners on regional solutions, such as the Los Vaqueros Reservoir Expansion Project."

San Luis & Delta-Mendota Water Authority

Contact: Scott Petersen (209) 597-0232

"California's increasingly variable water cycle - including our current devastating drought conditions continues to reinforce the need to pursue an all of the above approach to increasing water supply reliability for our communities and ecosystems," said Federico Barajas, Executive Director of the San Luis & Delta-Mendota Water Authority. "We know the solutions – increased water storage, improved water conveyance, operations that are responsive to changing conditions – and are pleased to be a partner to advance the next step in making the Los Vaqueros Reservoir Expansion Project a reality."

Santa Clara Valley Water District

Contact: Matt Keller (408) 681-9265

"Our Board is proactively exploring ways to secure enough water to help all our communities in Santa Clara County weather droughts," Valley Water Board Chair Tony Estremera said. "Valley Water looks forward to working with our JPA partners on this important project that could improve the reliability of our region's water supply."

<u>Zone 7</u>

Contact: Alexandra Bradley (925) 454-5000

"For the Zone 7 Board, participation in this project represents a lesson learned from the last drought. Our constituents were clear that they wanted the Agency to pursue additional local storage and this is a key step towards fulfilling that request," noted Angela Ramirez Holmes, Zone 7 Board President. "In addition to local storage, this regional partnership also has the benefit of emergency conveyance which is critical for when there are pumping restrictions in the Delta preventing Zone 7 from accessing State Water Project water. This alternative conveyance will increase the Tri-Valley water system's reliability." (This page was intentionally left blank)



SEPTEMBER 24, 2021

UPCOMING ACTIVITIES

October 1 – Last day to provide signatures for Joint Letter of Support

October 4 – Last day to provide quotes for Joint Press Release

October 6 – File JPA Agreement with the State

October 7 – Issue Joint Press Release

October 7 – Issue Joint Letter of Support to DWR

October 20 – CWC Feasibility Hearing

October TBD – GM meeting

Mid-November TBD – First JPA Board Meeting

November TBD – Cost allocation workshop with LAP staff

UPCOMING LAP BOARD COORDINATION

October TBD – Complete authorizations and execute MPA Amendment No. 3

ADDITIONAL PROJECT INFO

https://www.ccwater.com/lvstudies https://www.usbr.gov/mp/vaqueros/

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

MONTHLY REPORT

FUNDING

Reclamation requested \$50 million for the Project in FY 22 under the WIIN Act. This is in addition to the \$14 million that has already been appropriated in FY21. The total Federal funding request includes the remainder of the maximum federal share of 25 percent of the total project cost (approximately \$160 million).

CCWD is working with Reclamation to develop an assistance agreement for a portion of the federal funding that will be administered by CCWD for preconstruction activities. It is anticipated that the agreement will include approximately \$7 million of federal funding for the Project. Subsequent agreements would be needed to fund construction.

CCWD provided the final form of Amendment No. 3 to the Multiparty Cost Share Agreement (MPA) to the Local Agency Partners (LAPs) for approval and execution. The MPA is intended to be replaced with an Interim Funding Agreement through the Los Vaqueros Reservoir Joint Powers Authority (JPA) once the JPA has been formed and is ready to assume LVE financial management responsibilities.

The following chart provides an overview of the MPA expenditures through August 31, 2021. The in-kind services, funds received, outstanding receivable, and cash on hand are shown through September 16, 2021. All LAPs remain in good standing on progress payments. If MPA Amendment No. 3 is approved, the next invoice would be sent in January 2022.



JPA FORMATION

LAP Board approval of execution of the JPA Agreement was completed on September 14th. CCWD will execute the JPA Agreement last following execution by all LAPs. In early October the JPA Agreement will be filed with the State and a joint press release will be issued. The table below includes a summary of the Directors and Alternates appointed. The first JPA Board meeting is anticipated to be scheduled in mid-November and is required to be held within 60 days of JPA formation.

JPA Member	Approval Date	Director	Alternate		
ACWD	August 12	Director Paul Sethy	Jonathan Wunderlich		
CCWD	April 1	President Lisa Borba	Vice President Ernie Avila		
EBMUD	Sept 14	Director John Coleman	Director Lesa McIntosh		
GWD	Sept 14	Ellen Wehr	Ricardo Ortega		
SFPUC	August 24	General Manager (Michael Carlin Acting)	Assistant General Manager (Steve Ritchie)		
SLDMWA	August 5	Anthea Hansen	Jose Gutierrez		
Valley Water August 24		Director Linda LeZotte	Director John Varella		
Zone 7	August 18	President Angela Ramirez Holmes	Director Sandy Figuers		

CWC FEASIBILITY HEARING

All seven storage projects that received a conditional eligibility award from the California Water Commission (CWC) must meet three criteria prior to January 1, 2022 to remain eligible for funding: 1) draft environmental documents must be complete, 2) the CWC must make a finding that the project is feasible, and will advance the long-term objectives of restoring ecological health and improving water management for beneficial uses of the Delta, and 3) the Director of the Department of Water Resources (DWR) must receive a letter demonstrating support for not less than 75 percent of the non-public benefit cost share of the project (joint letter of support). The joint letter of support is being reviewed by LAPs and would replace the previous support letters from CCWD and the LAPs that were submitted to the CWC in 2017. The target date for the issuance of the letter is October 7. The Phase 2 LVE Project is scheduled for a CWC Feasibility Hearing on October 20. CCWD staff are closely coordinating with CWC staff to ensure the Project meets the statutory requirements and remains eligible for funding.

PERMITTING

Reclamation is continuing review of the aquatic Biological Assessment (BA) per Section 7 of the Federal Endangered Species Act. Additional information is being provided to the U.S. Fish and Wildlife Service (USFWS) related to the terrestrial BA. A USFWS Bald and Golden Eagle Protection Act 'take' permit application was developed and submitted to USFWS. A Historic Properties Treatment Plan and Memorandum of Agreement, to support Section 106 of the National Historic Preservation Act consultation, are being developed. Additional information is being provided to the California Department of Fish and Wildlife (CDFW) related to the Incidental Take Permit application for terrestrial species. CDFW has provided comments on the draft Incidental Take Permit application for aquatic species. A Compensatory Mitigation Plan to support the USFWS and CDFW permits has been submitted to the respective agencies for review. The CDFW Lake and Streambed Alteration Agreement package is being developed. The U.S. Army Corps of Engineers (USACE) and Central Valley Regional Water Quality Control Board (CVRWQCB) continue review of their respective permit packages. The USACE notified the CVRWQC of it's reasonable time period for issuance of a water quality certification by December 31, 2021. The Draft Wetland Mitigation Plan and Aquatic Restoration and Revegetation Plan, required by the USACE and CVRWQCB, are in the final stage of development. A Delta Plan Consistency Package is being prepared.

DESIGN

California Division of Safety of Dams (DSOD) continues their review of the 90% Dam expansion design along with various Technical Memoranda that have been submitted to date. The next meeting of the Technical Review Board is scheduled in October. CCWD entered into a Letter of Agreement with the Western Area Power Authority to support ongoing design activities.

The evaluation of the Transfer-Bethany Pipeline alignment alternatives and coordination with interested parties and landowners are ongoing. Title searches for properties along the pipeline alignment have been completed and development of the preliminary design of the Turn-in to the California Aqueduct at Bethany Reservoir is ongoing. DWR has reviewed the water quality model developed as part of the pump-in proposal. (This page was intentionally left blank)

Lourdes Enriquez

From:	jhweed@aol.com
Sent:	Monday, September 20, 2021 7:57 PM
То:	Commission@sfpuc.org
Cc:	Nicole Sandkulla; ed.stevenson@acwd.com
Subject:	Comments on SFPUC Commission Workshop of 17Sep2021 Alternative Water Supply Planning

20 September 2021

To: San Francisco Public Utilities Commission

CC: Bay Area Water Supply and Conservation Agency Alameda County Water District

From: John H. Weed (as an individual) 510-651-1885, jhweed@aol.com

Subject: Comments on SFPUC Hearing of 17 Sep 2021 on Alternative Water Supply Planning

Thank you for conducting this review of the SFPUC's Alternative Water Supply Planning. I suggest the topic could be restated as Contingency Water Supply Planning. The additional water supplies needed due to Unimpaired Flows are episodic, occurring only during extended droughts. The Planning should also include desalination and additional water reservoir storage options.

Desalination is an appropriate Contingency water supply. Recycled Water is far less useful as a Contingency water source. Desalinated Ocean Water and Recycled Water are nearly equivalent in both cost and greenhouse gas emissions. Desalination of brackish water may be accomplished with even lower financial cost and energy requirements. It is less challenging to have intermittent operation of desalination than recycling. The source water for Desalination is more reliable (potentially inexhaustible) than Recycled Water. In the experience of Dublin San Ramon Services District and San Diego Regional system, conservation resulted in the need to import additional sewage. Following a major seismic event, sewage effluent may not be available. Partially treated Desalinated Water may be put to potential human contact beneficial use, while this is generally not true of Recycled Water. Desalination may be budgeted as a "peaking supply", while Recycled Water is commonly included in the annual base cost of operations.

Additional water storage projects, which should be considered by SFPUC, are the **Del Puerto** Canyon **Reservoir** and the Del Valle Reservoir.

The proposed **83,000-acre foot Del Puerto** Canyon **Reservoir** would be located in **Del Puerto** Canyon in the Coast Range foothills west of Patterson and south of the Sacramento-San Joaquin Delta, just west of I-5 and in relative proximity to the SFPUC Tesla Portal.

Del Valle Reservoir is built and plumbed to the South Bay Aqueduct. Del Valle Reservoir has 67,000acre feet of potential water storage, however a total of only 15,000-acre feet of storage is currently authorized for use by Zone 7 and Alameda County Water District. Recreational facilities operated by the East Bay Regional Park District (EBPRD) occupy the remainder of the Del Valle Reservoir capacity. The Hetch Hetchy Aqueduct runs underneath the Del Valle Reservoir. The SFPUC San Antonio Reservoir is at nearly the same elevation and in close proximity to the Del Valle Reservoir. On a few occasions, water has been released from the South Bay Aqueduct (potentially the Del Valle Reservoir) into the San Antonio Reservoir. Relocation of the modest EBMUD facilities currently in the Reservoir, to a higher elevation could create an additional 52,000-acre feet of operational storage in remarkably short time.

Separate consideration and analysis should be given to SFPUC participation in the Bethany Transfer Pipeline and the Los Vaqueros Reservoir Expansion. Contra Costa Water District has identified three separate participation options to members of the recently created Los Vaqueros Joint Powers Authority. An 8-foot diameter (3,000-cfs) Bethany Transfer Pipeline is proposed to be completed by 2026 prior to the start of construction to the third iteration Los Vaqueros Reservoir, which is scheduled for operation in 2032. The California State Water Plan of the 1970s envisioned a 15,000-cfs Peripheral Canal with the ability to release 6,500-cfs of water to enhance Delta flows, and a Los Vaqueros Reservoir with one-million-acre-feet of storage. The 2002 Bay Delta Record of Decision authorized a 500,000-acre foot Los Vaqueros Reservoir, which could be expanded to one-million-acre-feet with saddle dams. These larger Los Vaqueros Reservoir alternatives would require the removal of the existing dam, although the cost of a new 500,000-acre foot dam would be competitive with the currently proposed project. The envisioned larger Los Vaqueros Reservoirs would allow for coordination with the State Water Project and/or Bureau of Reclamation.

Re-operation of the SFPUC Niles Canyon Aqueduct between the Water Temple in Sunol and the Quarry Lakes in Fremont should be evaluated. This would allow the recharge of the Niles Cone Groundwater Reservoir with far less expensive water than Recycled Water from the Union Sanitary District. It has been estimated that only 30% of recharge water delivered to the Fremont Quarry Pits could be recovered, due to the unconfined nature of the below the Hayward Fault Niles Cone Groundwater Reservoir. There are currently significant restrictions on the use of Alameda Creek as a conveyance to the Quarry Pits for water released from the South Bay Aqueduct.



MAYOR OF SAN JOSÉ, STATE LEADERS URGE RESIDENTS TO CONSERVE WATER IN HISTORIC DROUGHT

City leaders, volunteers take action to combat drought conditions, Mayor proposes city-wide conservation restrictions, San Jose introduces new Scorecard to measure energy and water use for residents

FOR IMMEDIATE RELEASE October 6, 2021

Media Contact:

Rachel Davis, Communications Director/Press Secretary, Office of Mayor Sam Liccardo, 408.712.9149 rachel.davis@sanjoseca.gov

SAN JOSÉ, CA - Today, San José Mayor Sam Liccardo was joined by Wade Crowfoot, California Natural Resources Agency Secretary, Josh Fryday, California Volunteers Chief Service Officer, Magdalena Carrasco, San José City Councilmember (D5), John Tang Vice President of Regulatory Affairs and Government Relations, San Jose Water Company, from San José Conservation Corps, city staff, and San José Resilience Corps to make a renewed call on Californians to conserve water in the midst of yet another period of drought conditions in the state. Mayor Liccardo also announced a proposal to shift to the City's approach to water conservation guidelines consistent with San Jose Water Company conservation measures through a Water Shortage Declaration of 15%, setting an enforceable 2-day week watering limit. If passed, odd-numbered addresses will be able to water Monday and Wednesday; and evennumbered addresses will be able to water Tuesday and Thursday. City staff is also working on revisions to the City's existing Water Efficient Landscape Ordinance (WELO) requiring new developments to only plant drought-tolerant landscape. They are anticipating a council recommendation in the early Spring.

"Worsening air quality, wildfires, and dire conditions for Californians require all of us to make necessary sacrifices to reduce our water use," said San José Mayor Sam Liccardo. "Every small decision we make will bolster our ability to keep our state resilient in the face of climate change."

State and city leaders joined San José's Resilience Corps, volunteers and city staff at Overfelt Park in Alum Rock to plant native, drought-resistant flora on the grounds of the Chinese Community Garden. The addition of plants native to the area translates to a less intensive level of water use and, in turn, savings for San José residents. According to the United States Drought Monitor,100% of Santa Clara County is in extreme drought where water is inadequate for agriculture, wildlife, and urban needs and reservoir capacity is extremely low. "Make no mistake, the worsening drought threatens water supplies in our communities," said Wade Crowfoot, California Natural Resources Secretary. "The good news is that each of us can help conserve precious water supplies. Bay Area residents led the way during the last drought reducing water use, and we need this leadership once again."

San Jose City Council adopted Climate Smart San José in February 2018 which outlines steps and key metrics to help the City reduce not only its carbon, but also its water footprint. Climate Smart San José targets a 6.5% reduction in GHG emissions every year for the next 3 decades, and a 34% reduction in total water consumption by 2040. So far, San José has reduced GHG emissions by about 5% (based on 2017 and 2019 data from the most recent citywide GHG inventory).

One way the City is meeting its goals is through the Building Performance Ordinance that requires energy and water benchmarking and efficiency measures for commercial and multifamily buildings 20,000 square feet and larger. This year San José will introduce a new feature: the BPO Energy & Water Scorecard which will show summary statistics for a property's energy and water usage, using data from its most recently submitted benchmarking report, and compares the property's use to other similar property types in San José that are covered by the ordinance. The Scorecard also includes information on available rebates and incentives that could save building owners money on water or energy efficiency upgrades. Water conservation has never been more needed than this autumn season when ensuring buildings are efficient during this water shortage emergency is one of the most critical, immediate steps San José can take to guarantee its drought resiliency.

"It is more critical than ever that Californians work together to conserve water," said California Chief Service Officer Josh Fryday. "Everyone can be a part of the solution. What you do in and around your home including your water uses, what you plant, and irrigation systems you install can make all the difference in making water conservation a California lifestyle."

On July 8, 2021, California Governor Gavin Newsom extended his previous drought proclamation to include Santa Clara County and on, September 23, signed legislation authorizing more than \$15 billion in state funding for climate resilience which includes \$5.2 billion over three years to support immediate drought response and long-term water resilience. Valley Water, San José's wholesale water provider, remains committed to providing safe, clean water to all residents in Santa Clara County and are taking additional measures to protect our water supplies and conserve this precious resource.

Following Governor Newsom's call to Californians to reduce water use by 15%, San José Municipal Water customers demonstrated their continued commitment to conservation by reducing water use in August 2021 by 28 percent compared to August 2013, before the prior drought. With today's event, state and local leaders renewed the call to residents to ensure all uses of water in and around the home are as efficient as possible. Water-efficiency tips and the complete list of water use rules in effect at all times are available at: www.sjenvironment.org/waterefficiency. Locally, San José Water Company is taking steps both customer-side with increased education on home water conservation as well as internally with a robust water main replacement program with a \$100M budget for pipe construction and tank improvements, efficient response to leaks through the deployment of acoustic sensors, a water main flushing truck that recycles water, and a plan to deploy smart water meters throughout the local service area.

Councilmember Magdalena Carassco, District 5

"These native, drought-resilient plants that were planted today so accurately reflect our East San José community. A community that on a daily basis battles the ramifications of a metaphorical drought of resources and investment. A community that showed resilience through an incredibly devastating pandemic. A community that belongs; a community that is native to this space."

John Tang, San José Water Company, VP of Regulatory Affairs and Government Relations

"SJW has maintained a long tradition of promoting conservation and this effort is now more critical than ever before to a sustainable water future. We are committed to helping customers make smarter choices through our conservation information, water check-ups, and GardenSoft website."

Kerrie Romanow, City of San José Sustainability Officer and Director of the Environmental Services Department

"Our residents have stepped up as they continue to conserve water; however, we still have more to do. One significant way to save water is to minimize outdoor irrigation since it takes up about half of the average water bill. Together, we can save water and increase water supply to continue our quality of life."

Jon Cicirelli, Director of San José Parks, Recreation and Neighborhood Services

"We're doing what's right to maintain healthy parks for a healthy environment and community. With our guiding principles in stewardship and nature, our dedicated park maintenance and operations staff keep our parks safe, healthy, and enjoyable through managing and conserving water thoughtfully, investing in smart irrigation infrastructure, and focusing on native plants."

The press conference can be watched here. Please also visit www.saveourwater.com .

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About the City of San José

With more than one million residents, San José comprises the 10th largest city in the United States, and one of its most diverse cities. San José's transformation into a global innovation center in the heart of Silicon Valley has resulted in the world's greatest concentration of technology talent and development.

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S.F. saw just 9 inches of rain this 'water year.' Here's how that compares to normal San Francisco Chronicle | October 4, 2021 | Kellie Hwang



The lack of rainfall has put the artificial Nicasio Reservoir in Marin County, the area's largest, at its lowest point in many years as drought continues to grip much of the state. Brontë Wittpenn/The Chronicle

The water year has officially come to an end — and once again, the Bay Area has come up dry.

How dry? The region received a little more than a third of normal precipitation from Oct. 1, 2020, to Sept. 30, 2021, according to data from the National Weather Service — a common occurrence for the past several years, which bodes ill for a region already at the worst "exceptional" level on the U.S. Drought Monitor map.

Weather stations in San Francisco recorded 38% of normal rainfall, and Santa Rosa and San Jose each recorded 36% of normal rainfall for the water year, which is defined as Oct. 1 through Sept. 30 of the following year by the U.S. Geological Survey.

A normal water year in San Francisco produces 23.65 inches of rain, but the city only saw 9.04 inches this past season. Santa Rosa received 13.01 inches for the water year, compared to the normal 36.28 inches, and San Jose recorded 5.32 inches, versus a normal 14.9 inches of rain.

Eleanor Dhuyvetter, a meteorologist for the National Weather Service's Bay Area office, said the percentages "don't help with the state of the drought right now."

San Francisco water year

Inches of rain and percentages of normal rainfall for each water year, Oct. 1 through Sept. 30.



Chart: Kellie Hwang - Source: NOAA

Santa Rosa water year

Inches of rain Percent of normal

Inches of rain and percentages of normal rainfall for each water year, Oct. 1 through Sept. 30.



Chart: Kellie Hwang - Source: NOAA

San Jose water year

Inches of rain and percentages of normal rainfall for each water year, Oct. 1 through Sept. 30.



Chart: Kellie Hwang - Source: NOAA

The water year totals collected by the National Weather Service's Western Region are in line with figures released in the summer for the rain year — which, like the water year, measures precipitation, but over a different time period, from July 1 to June 30.

The rain year figures issued three months ago were slightly higher for the Bay Area: San Francisco was at 39% of normal, Santa Rosa was at 38%, and San Jose was at 40%.

Looking back over recent water years, the data shows below-normal percentages for all three Bay Area cities for half or more of the past six years — with the most recent the worst. Last year was slightly better: San Francisco was 49% of normal, Santa Rosa was 53%, and San Jose was 48%. The water year ending in 2017 was the wettest by far: San Francisco recorded 137% of normal, Santa Rosa 166% and San Jose 124%.

The weather service's monthly climate data for Bay Area cities in September showed a few areas were dampened by showers — Santa Rosa was at 107% of normal precipitation for the month, and San Francisco at 70%. By contrast, many cities received no rain for the month — though September in the Bay Area is typically dry, with San Francisco's normal precipitation at 0.1 inches, and Santa Rosa's at 0.14 inches.

LOCATION	AVG HIGH	AVG LOW	AVG MEAN	30-YEAR MEAN	TEMP DEPART	MONTHLY	TOTAL PRECIP	NORMAL PRECIP	PRECIP % NORN
anta Rosa Airport	83.5	49.9	66.7	66.5	+0.2	99/42	0.15"	0.14"	107%
lapa Airport	80.0	50.9	65.4	65.2	+0.2	96/42	т	0.08"	0%
an Francisco City	68.0	55.9	62.0	62.9	-0.9	84/52	0.07"	0.10"	70%
an Francisco Airport	73.4	56.4	64.9	65.3	-0.4	90/53	0.00″	0.07"	0%
Dakland Airport	74.8	56.4	65.6	65.2	+0.4	88/50	т	0.11"	0%
layward Airport	76.8	56.7	66.8	66.9	-0.1	93/52	0.01"	0.10"	10%
oncord Airport	87.7	57.7	72.7	71.1	+1.6	102/52	т	0.07″	0%
ivermore Airport	88.1	55.8	71.9	70.2	+1.7	103/48	т	0.08"	0%
an Jose Airport	82.4	57.8	70.1	69.1	+1.0	93/51	т	0.08"	0%
Vatsonville Airport	74.4	53.3	63.8	64.1	-0.3	<mark>89/</mark> 46	т	0.08″	0%
Nonterey Airport	72.0	56.6	64.3	62.4	+1.9	88/51	0.01″	0.08"	12.5%
alinas Airport	74.3	56.7	65.5	64.2	+1.3	89/49	т	0.05″	0%

"It doesn't say too much," Dhuyvetter said of the September totals. "The normal (for San Francisco) is 0.1 inches, which is not a lot of rain. As far as making a dent in anything, I wouldn't say it helped dramatically."

To put it in perspective, September contributed just 0.2% of the total water year output for San Francisco, and 0.4% of the total for Santa Rosa.

November is usually when the Bay Area sees its first major rainfall for the new season, though sometimes it can come in October. Dhuyvetter said the forecast at the end of the week includes a possibility of rain, but the seasonal changes under way make the extended forecast less reliable.

###

Monthly Reservoir Report for October 1st, Including Current Reservoir and Water Conditions California Department of Water Resources | October 3, 2021 | Robert Shibatani

The 2020-21 Water Year is officially over... and not a moment too soon. It's a year that many of us would like to put behind us and not just because of water.

Water storage and hydrologic conditions across the State continued to decline over this past month. As of yesterday, total north CVP reservoir storage stood at 52% of the 15-year average. Total north CVP storage capacity was only 25.5%. In other words, our north CVP reservoirs are only one-quarter full.

Despite this, and surprisingly, only San Luis and Shasta reservoirs were below 50% of their 15-year averages (e.g., at 15 and 47%, respectively). New Melones, which has maintained uncharacteristically high storage levels throughout these recent years, finished the WY at 66% of its typical 15-year average. Total CVP/SWP reservoir storage was 7.435 MAF (or 48.2% of total reservoir storage capacity).

While the reservoir storage numbers look bad, context is important. Take Folsom Reservoir as an example. Current storage at this reservoir stands at 230 TAF or 23.5% of total reservoir capacity. This storage level represents 53% of the 15-year average of the reservoir's storage for this time of year. Typically, Folsom Reservoir at this time of year holds about 430 TAF in storage, in other words, it is typically less than half full. Current conditions should emphasize, if nothing else, the precarious nature with which Folsom Reservoir must operate given its undersized capacity relative to the size of the draining American River watershed above it. Interestingly, releases from Folsom Dam were reported as 568 cfs yesterday, which is only slightly above the 500 cfs minimum prescribed by D-893 for the lower American River confluence with the Sacramento River after September 15th and notably below the LAR Flow Management Standard proposed minimum. It is not often that releases on this iconic northern California river ever approach those set out in D-893.

Last month we confirmed that despite very low cumulative precipitation levels across the State, conditions were not yet as dire as the driest year on record, Water Year 1977. Over the past 30-days, however, that has changed for some areas of the State. For example, while the American River at Blue Canyon has received almost 84% more precipitation than it did in 1977, Shasta Dam has received about 6% less than it did in 1977. This disparity only reinforces the notion of how spatially variable precipitation across California can be, even during drought conditions. Despite what many believe, precipitation shortfalls are not necessarily universally widespread. While cumulative precipitation levels have been low in some locations, the actual percentages in terms of annual averages are not as grim as some might want you to believe. From Trinity, through the central Sierras, south to Huntington Lake, accumulated precipitation values were below average; but not that far below average. For example, at Trinity, Shasta, Blue Canyon and New Melones, precipitation was 55, 40, 50, and 61% of average, respectively.

There is nothing on the immediate horizon for October, although the depending on which forecast one relies upon, the 2021-2022 WY can look quite different.

CURRENT RESERVOIR CONDITIONS

SELECTED WATER SUPPLY RESERVOIRS

Midnight: October 3, 2021



Updated 10/04/2021 07:48 AM





U.S. Drought Monitor California



September 28, 2021 (Released Thursday, Sep. 30, 2021) Valid 8 a.m. EDT

	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	100.00	93.93	87.88	45.66
Last Week 09-21-2021	0.00	100.00	100.00	93.93	87.88	45.66
3 Month s Ago 06-29-2021	0.00	100.00	100.00	94.73	85.44	33.32
Start of Calendar Year 12-29-2020	0.00	100.00	95.17	74.34	33.75	1. 19
Start of Water Year 09-29-2020	15.35	84.65	67.65	35.62	12.74	0.00
One Year Ago 09-29-2020	15.35	84.65	67.65	35.62	12.74	0.00
Intensity:						

 None
D2 Severe Drought
D0 Abnormally Dry
D3 Extreme Drought D1 Moderate Drought D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

<u>Author:</u> Brian Fuchs National Drought Mitigation Center



###

California will consider mandatory water restrictions if dryness continues this winter Los Angeles Times | September 30, 2021 | Ian James



A boat skims the water at a receding Lake Oroville in June.(Brian van der Brug / Los Angeles Times)

With California's extreme drought persisting and reservoirs declining to new lows, state officials said they will consider imposing mandatory water restrictions if dryness continues this winter.

Gov. Gavin Newsom called on Californians in July to voluntarily reduce water use by 15%, saying state water regulators would track progress toward that target and decide whether additional measures would be necessary.

Natural Resources Secretary Wade Crowfoot said Thursday that bigger steps may be needed if the drought doesn't ease this winter, and turning to statewide mandatory conservation measures will be an option.

"We're going to be watching very closely here in the coming couple few months how that voluntary water conservation goes," Crowfoot said in a call with reporters. "We've achieved 16% water-use reduction since the last drought. So we know that Californians can step up. But the governor has been clear that we need to consider additional actions, and mandatory restrictions, you know, need to be on the table here as, if and when the drought worsens."

Californians in cities and towns across the state reduced water use by 1.8% overall in July as compared with the same month last year. State officials said they'll be watching to see how the water conservation numbers look for August and subsequent months.

Crowfoot said the state has been focusing on supporting cities and water agencies in pursuing "customized approaches" to conservation based on their different drought situations, and has been scaling up California's Save Our Water campaign to get the word out about the need to conserve.

He and other state water officials spoke ahead of the Oct. 1 start of the new water year. California gets much of its rain and mountain snow between November and March, and the next several months will determine whether the state must cope with a third dry winter.

"Heading into this winter, we'll be watching, one, how Californians do on voluntary conservation toward that 15%," Crowfoot said. "There's no set sort of trigger date for considering mandatory conservation, but we'll be watching it closely."

Though California naturally goes through dramatic swings between dry spells and deluges, higher temperatures brought on by climate change are making droughts more intense.

The snowpack this year in the northern Sierra Nevada, which feeds the state's reservoirs, peaked at 72% of average in April, and then rapidly melted during the hottest spring on record. Extreme heat has baked much of the West and left parched soils, which have soaked up a portion of the runoff and left diminished flows in rivers.

"Drought is part of California's natural environment, but is now supercharged by accelerating climate change," Crowfoot said. "Those high temperatures meant that more of our melting snow in the mountains either was absorbed into very dry soils or evaporated into the air."

This second year of drought, he said, has created conditions comparable to the severe drought of 1976-77. There was less precipitation in 1977 than this year. But the amount of runoff in streams and rivers ended up being about the same, state officials say, because of the hotter temperatures.

"Science that we funded five to 10 years ago anticipated the impacts that we're experiencing now being experienced at the end of this century," Crowfoot said. "So we are really working nimbly to adapt to climate change."

The drought has left California reservoirs from Lake Shasta to San Luis Reservoir at some of their lowest levels ever.

Cities and water districts have obtained just 5% of their full water allotments this year from the State Water Project, which delivers water with pumps and canals from the Sacramento-San

Joaquin River Delta to Southern California. And the Colorado River, also a major source for Southern California, is headed for a federally declared shortage next year.

"Conditions across California differ but are growing worse," Crowfoot said. "All areas of the state will have big problems if we have another, third dry winter in a row."

For part of the 2012-16 drought, then-Gov. Jerry Brown ordered a mandatory 25% reduction in urban water use. Many Californians responded by cutting back and taking steps such as converting lawns to drought-tolerant plants. Many of these changes have had a lasting effect in reducing water use.

Department of Water Resources Director Karla Nemeth said it's time for "that next leap in conservation ethic."

"Whether or not that needs a mandatory push to make it happen, I think remains to be seen. But those are conversations we're having. And it is definitely on the table as a tool," Nemeth said.

There are some steps short of statewide mandatory restrictions that could also be taken, Crowfoot said, such as prohibitions on hosing down driveways or other water-saving rules. And local water suppliers can activate shortage measures on their own.

"We've heard from local water agencies that they really want to take the lead on weathering through the drought," Crowfoot said, adding that the time is now to urge "local water partners to step up and to demonstrate water conservation."

The State Water Resources Control Board has been tracking the monthly water usage of more than 400 cities, towns and water districts.

If the board moves toward mandatory reductions in urban water use, officials would look to have not a "one-size-fits-all" approach but one that would account for how much different communities have already conserved, said Joaquin Esquivel, the board's chairperson.

Just as the declining reservoirs are leading to shortages, the low water levels in streams pose serious threats for fish such as Chinook salmon.

"Streams across the state are growing warm and disconnected," Crowfoot said. "And as a result, the Department of Fish and Wildlife is monitoring conditions and wherever possible relocating native fish, as well as amphibians, and increasing hatchery production to make up for loss as a result of these conditions."

He and other officials touted California's newly approved \$15-billion budget package for addressing climate change, drought and wildfires, which Newsom signed last week.

The budget includes \$5.1 billion to support drought response efforts and water projects. Portions of the funds are to go toward water infrastructure projects, water recycling, flood management and efforts to protect watersheds and ecosystems, among other things.

"It's a quantum leap of investment," Crowfoot said. "Our policymakers are quickly leading the effort to adapt to these changes. But these climate changes are coming fast and furious."

Esquivel said these investments will help the state "stretch through these dry times."

The drought has also affected deliveries of water to agriculture. This summer, the state water board issued an emergency order barring thousands of water rights holders, including farmers and other landowners, from diverting water from the delta.

"This is the first drought where we've had such an extensive landscape impacted by the drought conditions," Food and Agriculture Secretary Karen Ross said. "The curtailment process has been especially painful this year, although it came late in the year, when many of our crops, annual crops, were already in the ground, and people were just trying to finish out the crops."

She said the budget package brings critical funding that will help the state capitalize in years when atmospheric rivers bring deluges, which can be captured and used to recharge depleted aquifers.

Ross said the funding will also "improve our resiliency and our ability to survive from one drought to the next."

###

Historical drought' likely to persist in Calif. and Nev.

San Francisco Estuary Institute | September 28, 2021 | Thomas Frank



A kayaker fishes in Lake Oroville, Calif., last month. Severe drought conditions are expected to continue through the fall in California and Nevada.

High temperatures and below-average precipitation that have spread drought across the western United States are likely to continue for another year, according to new estimates from the National Weather Service's Climate Prediction Center.

Forecasts reaching to December 2022 show above-average temperatures across the southern United States and below-normal precipitation in California and Nevada, which have been parched by drought all year. "We're in the midst of a historical drought," climate researcher John Abatzoglou said yesterday at a virtual NOAA conference on drought conditions in California and Nevada. "This is quite a situation we're in."

All of California has been in drought conditions since late April, and 88 percent of the state has been experiencing extreme drought or exceptional drought since late July, according to the U.S. Drought Monitor. In Nevada, only two-thirds of the state is experiencing extreme or exceptional drought, which are the most severe of four drought levels. But the entire state has been in drought since early February, the Drought Monitor shows.

Record-low water levels at Lake Oroville in Northern California forced officials in August to stop running a hydroelectric dam for the first time and have prompted other water conservation measures. "Things are quite, quite bad on the reservoir situation," Abatzoglou said. "We had record heat this summer across most of California and Nevada."

Low reservoir levels have forced both California and Nevada to rely on groundwater to supply water for agriculture and human consumption, state officials said yesterday. "With the extra reliance on groundwater and pumping, we're seeing a corresponding decrease in groundwater levels," Steven Springhorn of the California Department of Water Resources told the NOAA conference.

Levi Kryder of the Nevada Division of Water Resources said that groundwater levels in the state "are generally on a downward trend." Drought in the two states has been exacerbated by record-high temperatures in June through August and minimal precipitation in the winter and spring. "We had a terribly dry winter last year," Abatzoglou said.

In California, the average temperature from June through August was a record 77.3 degrees Fahrenheit, which is 5.1 F above the normal temperature for the three-month span, according to government records dating to 1895.

Nevada's average temperature of 74.2 F from June through August also was a record and was 5.5 F above the historical average. Drought conditions have helped fuel another destructive wildfire season in California, Abatzoglou said. Nearly 2.5 million acres has burned in California so far this year, according to the California Department of Forestry and Fire Protection. That's more than double the number of acres that burned on average in the previous five years as of Sept. 27.

The Dixie Fire in northeastern California has burned 963,000 acres and is likely to eclipse last year's 1.03-million-acre August Complex as the largest fire in state history.

###

Here's How California's Drought Is Impacting Bay Area Reservoirs

NBC Bay Area | Robert Handa | September 24, 2021 at 10:41 am

California is running out of water. That's the harsh assessment by experts who say 90% of the state is dealing with drought conditions with the threat of mandatory statewide water restrictions looming.

The most glaring indications of the drought in the Bay Area are the local reservoirs. The reservoirs during the last drought were relatively full and offered a temporary buffer to a major water shortage. That is not the case this time around.

"I think we need a lot more rain to bring them up," said Philip Anzalone, who owns the God's Little Acre nursery near the Almaden Reservoir.

Anzalone is no stranger to dealing with drought, especially when it comes to protecting his 5,000 trees.

"So we haven an automatic drip system for the whole nursery," he said. "And it automatically waters by itself - a little bit at a time."

Anzalone adds his method does not waste any water.

The Santa Clara Valley Water District oversees the 10 reservoirs in the South Bay, which are collectively at less than 12% capacity.

"We're in a really challenging situation," Santa Clara Valley Water District Vice Chair Gary Kremen said. "And if we don't have a good winter, it's going to be critical. We're going to see wells go dry in this county."

Kremen said the top options to solving the situation is water conservation for both businesses and residential properties, with emergency purchases of water as the other.

Those short-term solutions are tricky. The water district said the public is suffering crisis fatigue and the price of emergency water is five times higher than just a couple of years ago.

The biggest hit the district took was when its largest dam -- Anderson -- had to be drained for seismic reinforcement, a 10-year project.

"It's never a good time to take down half your storage offline," Kremen said.

The most promising long-term plan is the expansion of relatively tiny Pacheco Reservoir in south county from about 5,000 acre feet to 140,000 acre feet -- enough to serve almost 1.5 million residents for a year all by itself.

"It's bigger than Anderson, it's bigger than all 10 of our other ground reservoirs combined," said Chris Hakes with the Santa Clara Valley Water District. "So that's emergency supply we could tap when we're in a drought."

But Pacheco Reservoir is also a projected 10-year project still in its environmental review stage.

The major looming factor is climate change, which could mean extended droughts and could force a more unified state strategy.

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Why Southern California is generally better prepared for drought than Northern California SF Gate | October 4, 2021 | Amy Graff



People play golf in the morning, when temperatures are relatively cooler, amid drought conditions in the region, on July 11, 2021, in Palm Springs, Calif. Mario Tama/Getty Images

It's counterintuitive.

Northern California receives more annual rain and snow than Southern California, with 75% of the state's precipitation falling in the watersheds north of Sacramento. Yet amid a drought, it seems people in the north are conserving water by letting their lawns turn brown and taking shorter showers as districts and municipalities impose mandatory water-use restrictions, while urban areas of the arid south are lush and green with well-watered gardens and lawns.

Gov. Gavin Newsom asked Californians in early July to voluntarily reduce their water consumption by 15% in response to the state's shrinking reservoirs after two consecutive dry winters. Recent data from the state showed that in July the North Coast reduced water use by 17% compared with July 2019 and the Bay Area cut back 8%, while the South Coast region that includes Los Angeles and San Diego increased used by 0.1%.

Why is Southern California facing less pain in the drought than Northern California?

Southern California's urban areas have a more robust and varied water supply than those in Northern California and are generally better prepared for drought conditions. Roughly half of Southern California's water is transported from other places through a vast system of aqueducts

drawing from water rights agreements that go back decades. The other half draws from local sources, such as groundwater basins and recycled water.

It also has the powerful Metropolitan Water District of Southern California, the regional wholesaler that's the largest supplier of drinking water in the country. Importing water into the region from the Colorado River and Northern California's Sacramento-San Joaquin Delta, Met sends water to the region's most most heavily populated places. It serves more than 19 million people in Los Angeles, Orange, Riverside, San Bernardino, San Diego and Ventura counties.

Eighty percent of California's urban and agricultural water demand comes from the southern two-thirds of the state. Southern California's hold on water dates back to the late 1800s to early 1900s, when people were drawn to to Southern California's mild climate, and several water projects were built to transport water to the most arid places in the state. The highly engineered water system made water plentiful across the state but has changed the state's natural environment and wildlife habitat.

The Met was established in 1928 with a founding mission "to build and operate the Colorado River Aqueduct."

Jeanine Jones, the interstate resources manager for the Department of Water Resources, explained that the Metropolitan Water District supplements local agencies' stores that mostly pull from groundwater. The region is lucky to have underground aquifers, and Jones said these have been well recharged with groundwater.

"When you move outside Southern California, what you don't have in the Bay Area is one overarching large wholesaler that brings in water from multiple sources," explained Jones, who is managing the state's drought response. "You have San Francisco with its water supplies from the Hetch Hetchy System, you have East Bay MUD [Municipal Utility District] with its Mokelumne River Aqueduct and much of the Peninsula and the Bay Area does not have ground water resources.

"They're in an area where Mother Nature was just not favorable for groundwater so they rely more heavily on those surface sources."

Surface sources are reservoirs, and across Northern California, they are dropping down to near record-low levels. Take the state's largest reservoir, Shasta Lake, which feeds into the federal Central Valley Project, providing Central Valley farmers with water and supplementing the supply of some municipalities such as Santa Clara County's Valley Water District. Fed by the Sierra snowpack, it's at 23% of capacity after back-to-back dry winters.

In Marin County, reservoir levels are at 34% of capacity compared with the 70% historical average for this time of year. The Marin Municipal Water District is exploring desalinization and seriously considering building a pipeline that would stretch across the Richmond-San Rafael Bridge and pull in water from the Central Valley.

Jones noted that looking back to the 1977 drought, Marin was famous for building an emergency pipeline to supplement its water from a handful of small reservoirs. Since then, the county formed a partnership with Sonoma Water to also pull from the Russian River Basin, but amid this severe drought, the additional supply was cut.

"Obviously, the Russian River Basin is also dry," Jones said. "The State Water Resources Control Board has curtailed diversions on the Russian River, and, of course, the local supplies to Marin Municipal Water District. Their reservoirs are low. ... If next year were to repeat last year's hydrology, they believe that they would be having big problems."



Santa Clara County's Anderson Reservoir after it was drained to prepare for work on the Anderson Dam Seismic Retrofit Project. Santa Clara Valley Water District

Jones also pointed to Santa Clara County's Valley Water as an example of another water district struggling in Northern California. "They had imported supplies from two sources, the State Water Project and the federal Central Valley Water Project, but both of those sources have been cut back in response to dry hydrology and they have the additional difficulty that their largest reservoir is out of service," Jones said, noting that the district's Anderson Reservoir was recently drained for a seismic retrofit. "Horrible timing with respect to hydrology."

Meanwhile in Palm Springs, water seems to be plentiful. A community in the middle of the Sonoran Desert of Southern California is among the top 10% of water users in the state, Ashley Metzger, a spokesperson for the Desert Water Agency, told NBC News.

Where is this place in the middle of the desert getting its water from?

"It may sound counterintuitive because Palm Springs is in the middle of a desert," Jones said. "But on the other hand, they're sitting over a very large groundwater basin and they've had historically very reliable supplies from the Colorado River even if their State Water Project supplies are reduced in dry years."

###

Drought Emergency: EBMUD To Draw 11 Billion Gallons From Sacramento River To Supplement Supplies

KPIX | October 4, 2021

OAKLAND (CBS SF/KPIX) – Amid the ongoing drought, officials with the East Bay Municipal Utility District announced it would draw supplemental water from the Sacramento River for the next several months.

The district, which serves more than 1.4 million customers in Alameda and Contra Costa counties, said it would pump 35,250 acre-feet of water to boost its supplies on the Mokelumne River through February. EBMUD said the amount of water is about 11 billion gallons, which represents almost 20% of customer water needs for one year.

The latest efforts to make it through the drought will mean a change in the tap water for hundreds of thousands of East Bay residents.

A lot of water districts are reaching for the emergency lever during the current drought. EBMUD has started that process and it might mean a change in the flavor or smell of customers' water. Officials stressed that water is treated to meet or exceed all state and federal standards.

"As soon as this week, customers are going to start getting water from the Sacramento river," says Tracie Morales with EMUD. "So customers might notice a change. It's a different watershed, it's a different source."

Water is being pumped from the Sacramento River through the \$500 million Freeport Regional Water Facility, which was completed in 2011. The facility was previously used to pump water during the historic drought between 2014 and 2016.

"Because it's a different source, they might notice a different taste or a different characteristic in the water," Morales says.

When Freeport was used during the last drought many residents did notice the difference.

For me, it was like a little sulfur kind of taste in the background of the water," says Brooke Bennett of El Sobrante. "More of an aftertaste, even almost an odor as well that went along with it."

But in between droughts, the district has been working on this problem, adding additional treatment steps at the two facilities that will be processing the newly diversified water.

"We've invested more than \$46 million in improvements to the treatment plants that are going to be treating the Sacramento River water," Morales explains. "We have an ozone system to address some of those taste or smell issues that might have been an issue in the previous drought."

It should be a couple of days before the newly mixed water reaches taps across the East Bay MUD district.

"We've planned and invested for decades to make our water supply resilient and now our plans are paying off," Board President Doug Linney said in a statement. "Ensuring reliable water supplies requires a diverse water supply portfolio including conservation, recycled water, and use of supplemental supplies – we're doing it all."

Earlier this year, the agency declared a Stage 1 drought and asked customers to voluntarily cut back usage by 10%. Since July, the agency said customers have saved nearly 8% compared to last year.

The district said as of October 1, total system storage is about 437,000 acre-feet, 76% of average and 57% of capacity.

EBMUD said the cost of purchasing and delivering the supplemental water is nearly \$15 million, which is being funded by budgeted operations costs. The district said it plans to pursue additional water transfers for the upcoming year.

###

Calif. regulators buckle up for the potential of 0% water allocation for 2022

San Joaquin Valley Sun | October 4, 2021



California's reservoirs are so dry from a historic drought that regulators warned Thursday it's possible the state's water agencies won't get anything from them next year, a frightening possibility that could force mandatory restrictions for residents.

This year, unusually hot, dry conditions caused nearly 80% of that water to either evaporate or be

absorbed into the parched soil — part of a larger drought that has emptied reservoirs and led to cuts for farmers across the western United States. It caught sate officials by surprise as California now enters the rainy season with reservoirs at their lowest level ever.

"Nothing in our historic record suggested the possibility of essentially that snow disappearing into the soils and up into the atmosphere at the level that it did," California Natural Resources Secretary Wade Crowfoot said. "These climate changes are coming fast and furious."

California's State Water Project — a complex system of dams, canals and reservoirs — helps provide drinking water to about 27 million people in the state. In December, state officials will announce how much water each district can expect to get next year.

Thursday, Department of Water Resources Director Karla Nemeth said the agency is preparing for what would be its first ever 0% allocation because of extraordinarily dry conditions.

"It's a done deal, we're sure that we will get a zero," said Demetri Polyzos, manager of resource planning for the Metropolitan Water District of Southern California that provides water for about 19 million people. "These are uncharted territories, what we are seeing."

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This is how much rain California needs to get out of the drought

San Francisco Gate | September 30, 2021 | Amy Graff

With California starved for water amid dire drought conditions, there's a lot of hope that the upcoming winter will deliver plentiful rain and snow.



Folsom Lake, one of the state's larger water reservoirs fed by the three forks of the American River, was at 24% capacity on Aug. 13, 2021, and is at historically low levels, impacting hydroelectric power, tourism and agriculture.

But exactly how much precipitation is needed to pull the state out of a drought?

The California Department of Water Resources, the state agency that manages drought responset, has answered that question with a model from the U.S. Geological Survey. It utilizes historical climate data from 1896 to 2010 and an ensemble of 18 future climate projections to develop hydrologic output such as snowpack, recharge, runoff and climatic water deficit.

"We are going into [winter] with depleted storage in many reservoirs and very dry antecedent conditions," said Jeanine Jones, who is leading the state's drought effort as the interstate resources manager for the California Department of Water Resources. "One interesting factoid is that using something called the USGS Basic Characterization Model, we're anticipating it would take 140% of average precipitation to get to average state runoff."

Runoff is the water that runs across the landscape and doesn't evaporate or seep into the ground. It's the water from snowfall and rainfall that flows into streams, rivers, reservoirs and the ocean.

Jones explained that the runoff would need to be especially high this year to replenish streams and reservoirs after two consecutive dry winters. A dry, parched landscape absorbs more water than a moist one as rainfall and snowmelt run down mountains into reservoirs and rivers.

"We know that when you have a single dry year — let alone a prolonged period of dryness as we have experienced over the last decade plus — your runoff efficiency decreases," Jones said. "Runoff efficiency is the ratio of runoff to precipitation. So if the climate system is dry, you're essentially paying a tax to the system. You get less bang for your buck. We'd have to get a very wet year and those don't happen all that often."

California has historically experienced long dry periods, but research suggests the droughts are becoming more common while rain is more sporadic and intense.

It's impossible to predict with accuracy what will unfold across California in the upcoming winter, but the preliminary forecast from the National Oceanic Atmospheric Administration's Climate Prediction Center for November to January favors warmer than normal weather for the entire state and "likely below" normal precipitation for the south, "leaning below" normal for the central region that includes the Bay Area and equal chances of normal and below normal for the far north.

California meteorologist Jan Null, who worked for the National Weather Service for more than 20 years and now has a private consulting business, said he wouldn't bet money on the forecast, especially amid a changing climate in which we can no longer depend on weather patterns unfolding as they did in the past.

Case in point: A weak La Niña, a lowering of sea-surface temperatures in the tropical eastern Pacific Ocean, is expected to persist through winter. While meteorologists in the past associated the atmospheric conditions with a drier than normal winter in Southern and Central California, Null said more recent trends suggests this happens only sometimes.

Weak La Niña conditions were present in the 2016-2017 winter in which California saw well above average precipitation regionwide, while during a weak La Niña in 2017-2018, there was below normal rain and snowfall.

Null noted that La Niña isn't the only factor that impacts winter weather. Several other oscillations are at play, including the Pacific Decadal, Arctic and North American oscillations.

"We have this whole alphabet soup of other things going on in the ocean and atmosphere," he said. "Sometimes they line up to make a La Niña stronger in terms of precipitation in California and sometimes they make it less. It's one of the stronger events going on and it's influenced by everything else — and then it's influenced by the warmer atmosphere and warmer ocean — and then all those telecommunications we used to have no longer make sense."

California Drought May Pressure Water Utilities' Margins

Fitch Ratings | September 29, 2021

Fitch Ratings-San Francisco/New York-29 September 2021: The current drought in California could cut into water utility revenues and pressure financial margins, Fitch Ratings says. Statewide water conservation mandates could be announced this fall, and some water agencies have already initiated cutbacks.

After two years of dry conditions, California is experiencing a moderate-to-exceptional drought, and an exceptional drought has been declared for over 88% of the state. The federal Central Valley Project (CVP) and California State Water Project (SWP) provide much of the state's water from the Sacramento and San Joaquin river basins. The largest of the SWP reservoirs, Lake Shasta and Oroville, are only at 25% and 22% capacity, respectively, or 40% and 35% of historical averages. As a result, the SWP water allocation is just 5% of the requested amount, the lowest since the prior drought that ended in 2016. The CVP, which provides water to seven of the state's top-10 agricultural counties, implemented a 0% allocation for agricultural contractors.



California State Water Project Historical Allocations

Source: Fitch Ratings, California Department of Water Resources, State Water Project Historical Table A Allocations.

FitchRatings

Certain areas are exercising locally imposed voluntary or mandatory water conservation. Sacramento announced a stage 2 'water alert', which has targeted up to 20% voluntary water cuts. Marin Municipal Water District has a goal of a 40% reduction in water usage. Santa Clara Valley Water District declared water shortage emergency conditions requiring a mandatory 15% reduction in usage relative to 2019.

This is the second extended drought in California in the past decade. During the five-year drought ending in 2016, the governor imposed mandatory statewide water cuts of 25%, with

each water agency required to cut 4%-36% based on gallons per person per day consumed. Water utilities responded by increasing the fixed component of rate structures, increasing rates overall, and/or making continued significant investments in increasing water storage and diversification of supplies. While many utilities experienced one to two years of reduced financial margins, steps taken resulted in rebounds for most, and Fitch did not take any negative actions on water utility credits.



California Palmer Drought Severity Index (PDSI)

However, due to ongoing droughts, utilities generally have less rate flexibility and fewer tools available to mitigate potentially lower revenues/sales. Utilities' ability to absorb lower revenues is highly dependent on an individual utility's supply portfolio, its financial picture going into a drought and rate affordability in the service area. Most Fitch-rated water utilities are highly rated, reflecting robust margins and rate setting flexibility. Those with margins that are low for the rating category may see greater credit pressures. Utilities that purchase most of their water supply can reduce purchases, somewhat offsetting lower water sales.

The enactment of water cuts under the Colorado River Drought Contingency Plan does not affect California utilities immediately, but material cuts could occur in early 2024 if reservoir levels do not stabilize or rebound.

Governor Gavin Newsom recently announced a \$15 billion climate package, which includes \$5.2 billion over three years for water and drought resilience. Funds may be spent on projects to secure and expand water supplies and support water and wastewater infrastructure, and should bolster utilities' financial resources and ability to address drought preparedness.

With continued droughts occurring at more frequent intervals, conservation measures could become harsher, leading to even greater stress on water utilities. Forecasts for fall and winter

2021 increasingly reflect the potential for La Niña development, associated with drier conditions in southern California. Most California water utilities carry ESG Relevance Scores (ESG.RS) of '3' for environmental impacts, as utilities are able to manage drought conditions at this time. Fitch's ESG.RS are expressed on a '1' to '5' scale, with '1' indicating irrelevance and '5' being highly relevant for the rating.

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Related Research: Ratings Stable for U.S. Water and Sewer Utilities with Reserves Set to Weaken

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Here's how much water Bay Area districts saved in the past year

San Francisco Chronicle | September 27, 2021 | Jessica Flores and Yoohyun Jung

Bay Area water agencies have saved nearly 10 times more water than the state average in the past year.



LiPo Ching/Special To The Chronicle Some Bay Area water districts are saving a lot more water than others.

Collectively, 58 Bay Area water districts saved an average of more than 10% in July 2021 compared with the same time last year, according to new statistics from the State Water Resources Control Board.

That still falls short of Gov. Gavin Newsom's call for 15% savings as the state battles another crippling drought. Though Bay Area agencies generally outperformed South Coast-area districts in water use reduction, some saved much more than others.

More than 400 water agencies across the state were included in the new data, which also contains information about their water shortage status and water shortage contingency stages, which are indicative of a district's current and future supply levels.

Data showed Bay Area districts with higher contingency stages saved more water in the past year. The six districts that indicated they were in stage three or four saved an average of 34%, compared with 6.7% by those in the 24 districts in stage one.

Water districts in Sonoma County were the top water savers not just among Bay Area agencies but also statewide. The city of Healdsburg in Sonoma County, which is seeking 40% savings through mandatory local cuts, conserved the most water in the region and statewide. It reported a 54% water use reduction.

Healdsburg was followed by the water districts serving the cities of Cloverdale at 37%, Daly City in San Mateo County at 36%, Petaluma at 25% and the town of Windsor at 23%. All five agencies have declared a water shortage except Daly City.

In contrast, the city of Santa Clara actually increased their water use by 5%. In June, Santa Clara Valley Water District, the main provider in Santa Clara County, declared a water shortage emergency and set a goal to reach a 33% countywide reduction in water use from 2013 levels.

###

California agency shares graphic with shocking differences in water savings by region SF Gate | September 22, 2021 | Amy Graff



The California State Water Resources Control Board shared a graphic Tuesday showing how much regions across the state reduced water use in July 2021 compared to July 2020. California State Water Resources Control Board

An eye-catching takeaway from a graphic shared by the California agency overseeing the state's water supply: The northern part of the state has generally done a better job of cutting water use — whether by taking fewer showers or letting lawns go dry — than the southern half amid historic drought conditions and a call for voluntary reductions.

The map shared Tuesday at the California State Water Resources Control Board's monthly meeting showed that the South Coast region, which includes Los Angeles and San Diego, saw use in July 2021 drop by a mere 0.1% compared to the same month last year.

Meanwhile, the North Coast was the region with the biggest drop, falling 17% in July 2021 compared to July 2020. The San Francisco Bay Area cut use by 8.4%.

These numbers were released more than two months after California Gov. Gavin Newsom urged residents statewide to voluntarily reduce water use in 2021 by 15% compared to last year.

On Tuesday, the board revealed water use statewide only fell by 1.8% in July. You can see how each region did in the map above.

"We believe that 15% is achievable because we've gotten down to these state water use levels before," Marielle Pinheiro, a research data specialist for the board, said Tuesday.

Pinheiro later addressed the state's failure to meet the goal: "It's not entirely unsurprising. The call went out on July 8, and it takes some time for conservation to be reflected in the numbers."

While the state is urging every day consumers to help conserve California's supply as reservoirs reach record-low levels, it's also calling on major industrial and agricultural users to play an even bigger role.

The board will release August numbers next month.

###

Californians falling far short on water conservation as drought worsens

Gov. Gavin Newsom asked for 15% reductions, but in July urban users cut use by just 1.8% Bay Area News Group | September 21, 2021 | Paul Rogers



San Luis Reservoir, a major water source located between Gilroy and Los Banos, is just 12% full on Thursday, Sept. 16, 2021. (Nhat V. Meyer/Bay Area News Group)

Facing a severe and deepening drought, California received its first report card for water conservation on Tuesday. The news wasn't good.

Driven by a lack of conservation in Southern California, the state's largest cities and water districts cut statewide urban water use by just 1.8% in July compared to July 2020 — far short of Gov. Gavin Newsom's call for a 15% statewide voluntary reduction.

Of 376 cities and water districts that reported numbers to the State Water Resources Control Board, only 26, or 7%, met or exceeded the target.

"This drought is very serious," said Karla Nemeth, director of the State Department of Water Resources. "In particular, how quickly it has developed. So we need people to be paying attention and acting now."

San Jose's Agave Sports Bar will permanently shut down after fatal crash, shootings and alleged prostitution

The North Coast region of the state was the only one of 10 that met the target, reducing water use 16.7% amid some of the most severe water shortages in California. Next was the Bay Area, which cut use 8.4%, followed by the Central Coast, at 5.2%.

Most of Southern California showed no significant conservation. The South Coast region, which includes Los Angeles, Orange County and San Diego, cut water use by only 0.1%.

Water experts said that if this winter is dry, many parts of the state will be in an emergency.

"The new conservation numbers are both extremely disappointing and not surprising," said Peter Gleick, founder of the Pacific Institute, a nonprofit water research organization in Oakland. "They show that unless there is really a strong message from the top about the need to conserve, the public doesn't respond. And we didn't get that strong message either from the governor's office or from the Southern California water agencies."

Some state water officials said they expect to see improvement.

"It is important to note that conservation takes time to boot up," said Joaquin Esquivel, chairman of the state water board. "We saw that in the last drought as well."

Southern California received slightly more rain than much of Northern California this winter. Local officials there have noted new supply projects built in the past 20 years, including Diamond Valley Reservoir in Riverside County and a \$1 billion ocean desalination plant in Carlsbad near San Diego, have helped.

But much of Southern California relies on water from the northern part of the state.

Reservoir levels in the past 10 years

Don Pedro Reservoir

Monthly levels at the 12 largest state reservoirs. Updated monthly.

And after the two driest years since 1976-77, many of Northern California's largest reservoirs are dangerously low. On Tuesday, the largest, Shasta Lake, was just 25% full. The second largest, Lake Oroville in Butte County, was at 22% capacity, the lowest level since it was built in 1969. More locally, the 10 reservoirs in Santa





Clara County are just 12% full. Marin County's reservoirs are projected to run completely dry by next summer.

Even so, Nemeth said that Newsom is not planning to announce statewide mandatory water conservation targets right away, the way Gov. Jerry Brown did in 2015 during the state's last drought. Brown's rules — which came after lackluster voluntary conservation and resulted in the state hitting its goal of 25% savings by 2016 — were controversial, she noted. Some cities said then that they had sufficient supplies, and Brown's cutbacks cost them millions of dollars in lost water sales.

Instead, this time Newsom and other state leaders plan to wait until November to see how cities and water districts ramp up conservation on their own, she said. Many are still allowing lawn watering three or more days a week.

"They said, 'We can manage our own supplies," Nemeth said of local water districts. "If they want to do it, they should do it. But make no mistake. Gov. Newsom will step in with something mandatory if they are not able to meet their numbers and we continue to see these trends deepen."

Nemeth also said Tuesday that cities and farms across the state should brace to receive no water next year from the State Water Project if this winter is dry again.

A few communities reported dramatic savings, particularly in Sonoma and Mendocino counties, which saw some of the driest conditions in recorded history during the past two winters.

Healdsburg cut water use 54% this July compared to the prior year, the most of any city in California. Because of state cutbacks on pumping from the Russian River, Healdsburg officials banned all lawn watering this summer, with fines of up to \$500 for violators. Also leading the pack statewide was Cloverdale with 37%, Daly City with 36% and Petaluma with 25%.

The cities farthest from the goal were Chowchilla, in the Central Valley, which increased water use 35% and El Segundo in Los Angeles County, which increased by 31%.

There were major differences between Northern California and Southern California.

Residents of Los Angeles increased water use by 1%. So did San Diego.

Who saved the most water?

California cut residential water use only by 1.8 percent in July compared with July 2020. <u>Click here</u> for the electronic article and see how individual water districts fared by using the search or clicking on the column headers. A negative number denotes water savings whereas a positive number means more water was used this year.

But the Bay Area went in the other direction. The 1 million people who receive water from San Jose Water Company cut their use by 11%. Similarly, San Francisco cut by 10%, the East Bay Municipal Utility District saw an 8% drop, Contra Costa Water District reported a 7% decline, and the Alameda County Water District cut by 6%.

"We are heading in the right direction," said Liann Walborsky, a spokeswoman for the San Jose Water Company. "Our customers are hearing the call to action. This is very good news."

The company is expected to decide in the next month whether to put in place water budgets and surcharges for San Jose residents for the first time in four years. The intent would be to meet tougher conservation rules from the Santa Clara Valley Water District, which declared a drought emergency this summer in part because its largest reservoir, Anderson, near Morgan Hill, is empty for earthquake repairs.

At East Bay MUD, which has asked its customers for a 10% voluntary reduction, the rules could tighten in the coming months if the winter is dry, said spokeswoman Andrea Pook.

"We're grateful for the conservation that our customers are doing," she said. "We can and should and do more."

###

Temporary Power Generators Now Online to Support California's Electricity Grid California Department of Water Resources | September 29, 2021



The Department of Water Resources has deployed four temporary power generator units like the one seen here, at two sites in Northern California: two here in Roseville and two in Yuba City.

SACRAMENTO, Calif. – Four temporary mobile emergency power generating units totaling 120 megawatts (MW) deployed by the Department of Water Resources (DWR) are online and ready to support California's energy grid in times of extreme stress on the grid.

Two units each have been temporarily installed at two sites in Northern California: Greenleaf Unit 1, operated by Calpine in Yuba City, and the Roseville Energy

Park, operated by Roseville Electric. Each unit can produce up to 30 MW of power, totaling 60 MW of power at each site. The units run on natural gas but can run on a blend of up to 75 percent hydrogen.

In a July emergency proclamation, Governor Gavin Newsom's administration directed DWR to work with the California Energy Commission (CEC) to develop additional energy capacity to safeguard the state's grid from the impacts of climate-induced drought, wildfires, and extreme heat waves.

"DWR's expertise as the fourth largest power producer in California allowed us to work quickly with the CEC, the California Independent System Operator, and our regional partners in Yuba City and Roseville to bring these units online," said DWR Deputy Director for the State Water Project Ted Craddock. "DWR is proud to play a role in safeguarding the state's energy grid and doing everything possible to avoid power shortages and outages as a result of climate-induced conditions."

The generators would be deployed under emergency conditions determined by the California Independent System Operator (ISO) under a contingency plan developed in coordination with the CEC and the California Public Utilities Commission. The plan includes a range of measures to address potential energy supply shortfalls, including Flex Alerts, coordination with adjacent balancing authorities, demand reduction strategies, and bringing online new resources such as the temporary generators.

"These temporary generators are an important last resort resource that can be relied on to support electricity reliability across California during grid emergencies," said CEC Commissioner

Siva Gunda. "The state's energy agencies are committed to ongoing monitoring of these facilities in coordination with DWR and local partners to ensure any impacts are accounted for."

The four generators are located next to existing powerplants operated by Calpine and Roseville Electric. They can be online within five minutes at the direction of the California ISO or the Western Area Power Authority.

The project cost for the four temporary emergency generator units is \$196 million which will be paid for through emergency funds. The units will be available until December 31, 2023.

For more information, go to <u>DWR's Power Production website</u> or the visit the <u>CEC's temporary</u> and emergency generation program website.

For more information on management of the statewide power grid, please contact the CEC at mediaoffice@energy.ca.gov or the California ISO at <u>ISOMedia@caiso.com</u>.

###

Stanford lab builds a water-resilient future, gallons of sewage at a time

The Stanford Daily | September 22, 2021 | Evan Peng



image of the Codiga Resource Recovery Center on Stanford's campus The William and Cloy Codiga Resource Recovery Center (CR2C) is a collection of walkways, colored pipes, tanks and meters on Stanford's campus. (Photo: ANDY HUYNH / The Stanford Daily)

As the American West faces unprecedented drought, one promising solution is the expansion of water recycling programs and technology. Stanford's William and Cloy Codiga Resource Recovery Center (CR2C) has been buoyed by the demand for solutions, and continues to expand as it carries out its mission of researching water and energy resource recovery and recycling.

In recent years, water systems in the American West have come under more and more strain, culminating in today's severe drought. Water resources are scarce in the West, and yet the population continues to grow, leading to an urgent search for sustainable solutions.

"The fact that we are back in a drought a couple of years after we were in a severe drought — it is problematic, and it's a real issue," Newsha Ajami, director of Urban Water Policy at Stanford's Water in the West program, said. "It is a really problematic issue, especially because we are experiencing drier and hotter droughts than we used to."

But because of the history of drought, most jurisdictions in California have addressed "the lowest hanging fruit" in terms of water conservation, CR2C Executive Director Sebastien

Tilmans M.S. '10 Ph.D. '15 said. So the solution is not simply cutting more water use, as much of the current water demand is fairly rigid; instead, water recycling, Tilmans said, is critical for a sustainable water system in the long-run.

But funding and regulations are lagging. Many current water recycling systems in California, including many which were built around the passage of the Clean Water Act in 1972, are nearing or exceeding the end of their life cycles. More importantly, they use technology that consumes a significant amount of electricity to run. And this shortcoming is where CR2C's research initiatives come in.

CR2C is an active research facility on Stanford's campus, tucked away behind a police station and a bank. It consists of an unassuming collection of walkways, colored pipes, tanks and meters all shielded from the elements by a metal canopy. The tanks and pipes allow for active experimentation on real wastewater that is siphoned from Stanford's wastewater output.

Any resulting material from the experiments is then inserted back into Stanford's regular wastewater stream, which flows to Palo Alto's wastewater treatment plant to be treated as normal sewage. Although everything CR2C currently produces in its tanks is strictly for research purposes, the eventual goal would be for wastewater treated using the processes CR2C is testing to be reused in actual water systems.

The research conducted at CR2C varies, but the shining star of the program is a project testing new anaerobic biological wastewater treatment methods. Currently, such biological treatment is commonly aerobic, done using types of bacteria that require oxygen to be pumped in constantly. This process uses a massive amount of energy and produces undesirable byproducts, including carbon dioxide.

Anaerobic treatment, which does not require oxygen, is typically viewed as being too slow for commercial, large-scale use. But the anaerobic system CR2C is testing, called the Staged Anaerobic Fluidized Membrane Bioreactor (SAF-MBR), not only requires no oxygen pumping, but it even produces methane, which can then be used to produce energy.

According to Tilmans, in contrast to today's common electricity-guzzling treatment plants, the modeled energy output from burning the produced methane in a SAF-MBR facility is greater than the energy that is needed to run the system at full scale.

"You could see a future in which these treatment plants could be converted into green power plants," Tilmans said. "So not only are you producing clean water, but you're also producing renewable energy."

As an extension of the SAF-MBR testing, CR2C recently partnered with Silicon Valley Clean Water, a wastewater treatment group in the Bay Area, to build a secondary test treatment site in Redwood City. This second site is essentially a larger version of the one on Stanford's campus, built to run further experiments at a larger scale.

That Redwood City system came online earlier this year, and the SAF-MBR has had promising results. Running at full capacity since last month, resulting water quality has hit target level.

Right now, the wastewater is recovered only to a point where it is safe to release into the environment. The next phase in research is to test technologies that CR2C hopes will be able to bring the wastewater all the way to drinking-quality.

The current drought in the West is uniquely accelerating the urgency of the type of work CR2C is doing. Though drought is a common occurrence in the region, this time around traditional water reserves such as snowpack, groundwater basins and reservoirs did not have a chance to recover between droughts as they normally do, according to Ajami of the Water in the West program.

"Because we were in a drought, got out and then a couple years later we're back in it again, our system hasn't recovered fully," Ajami said. "It's definitely testing the resiliency of our environment, our system as a whole."

Testing that resiliency is where wastewater recovery comes in, and CR2C is hoping to show its potential. "We're trying to sort of transform people's perspectives on wastewater away from it being a hazardous waste that needs to be mitigated toward thinking of it as an ore that needs to be purified," Tilmans said.

"I view water recycling as critical to our strategy in California, and I think it's not a question of if we're going to recycle the water, but when and how," he added.

The University, too, is not immune to the drought, and is thinking critically about these questions of water conservation and management — especially as the University has plans to expand. Water use has decreased from 2.5 million gallons per day in 2000 to 1.5 million gallons per day now.

But like Tilmans said of municipalities across California, "the 'easy' savings have been achieved," as Tom Zigterman, the senior director of Water Resources and Civil Infrastructure at Stanford, wrote in an email. "But we can do even more," he added, listing plans ranging from stormwater capture to using non-potable lake water for irrigation as paths the University is pursuing to further mitigate drought conditions.

Tilmans and CR2C hope they can make it onto that list; there have been discussions with the University about a partnership to construct a full-scale water recycling facility on campus. But so far, the University has not made any commitments.

Tilmans is hopeful that Stanford will make the leap eventually.

"In today's world, it's kind of necessary — it's the prudent thing to do," he said of implementing robust water recycling programs. "We think that this is without question the right way to go, and would basically allow Stanford to continue to lead on questions of sustainability by demonstrating a path forward."

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This article has been corrected to clarify that CR2C's eventual goal of reinserting treated water back into water supplies is not specifically in relation to Stanford's water system and to reflect that, while the University's water use has decreased, no campus buildings use graywater for toilets or any other use.