BAY AREA WATER SUPPLY AND CONSERVATION AGENCY
BOARD OF DIRECTORS MEETING

July 14, 2023

Correspondence and media coverage of interest between June 12, 2023 and July 13, 2023

Correspondence

From:	Spreck Rosekrans, Executive Director, Restore Hetch Hetchy
To:	Nicole Sandkulla, BAWSCA, CEO/General Manager Karen Hardy, Chair, Board Policy Committee
Date:	June 15, 2023
Subject:	Groundwater banking

From:	Dave Warner
To:	SFPUC Commissioners, Dennis Herrera, and Steve Ritchie
cc:	BAWSCA Board of Directors
Date:	June 12, 2023
Subject:	Agenda Item 13d: Water Math: AWS needs are less than Water Supply Shortfalls

Press Release

From:	California Department of Water Resources
Date:	July 13, 2023
Press Release:	State Water Board releases draft report on expediting permitting for seawater desalination plants

From:	California Department of Water Resources
Date:	July 11, 2023
Press Release:	Next Phase of recycled water begins for California “Updated with advance copy of the Regulations”

Water Supply Conditions:

Date:	July 12, 2023
Source:	San Francisco Chronicle
Article:	Most major California reservoirs are over 90% full. But there’s one big exception

Water Policy:

Date:	July 12, 2023
Source:	The Center Square
Article:	California Democrats move forward bill to chip away historic rights

Date:	July 11, 2023
Source:	NPR
Article:	A racist past and hotter future are testing Western water like never before

Date:	July 10, 2023
Source:	Mercury News
Article:	Gov. Newsom signs budget with bills to streamline environmental approval for clean

energy

Water Supply Management:

Date: July 11, 2023
Source: Mercury News
Article: Opinion: Clear California goals needed to develop future water supply

Date: July 5, 2023
Source: Bay Nature
Article: Recharge Alone Won't End California's Groundwater Drought

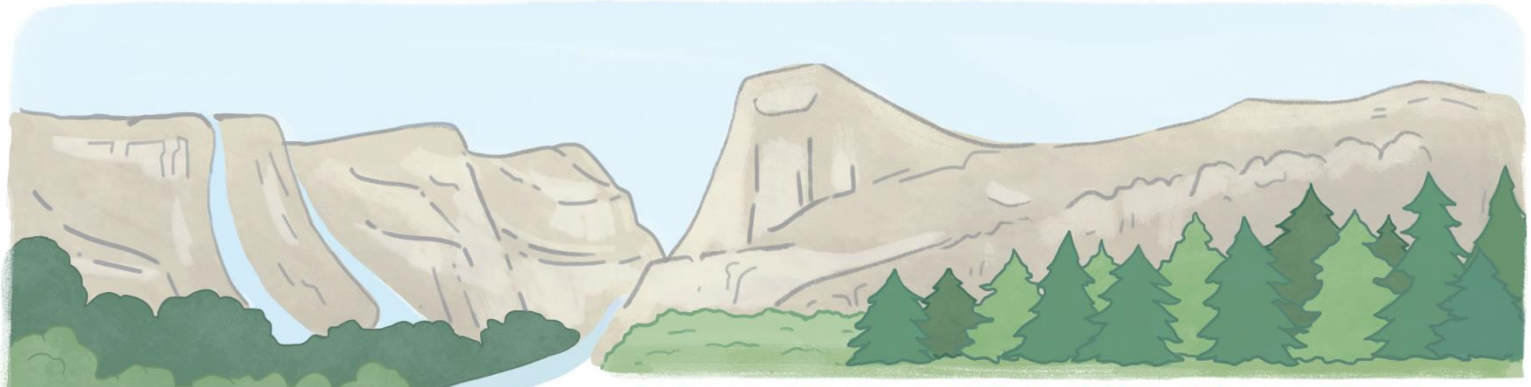
Date: July 5, 2023
Source: DWR
Article: Local Actions are Key to Progress in Reaching Groundwater Sustainability

Water Infrastructure:

Date: July 12, 2023
Source: LAist
Article: California Take Big Step To Boost Use Of Purified Sewage Water To Control Drought

Date: July 7, 2023
Source: GreenBiz
Article: Beyond the yuck factor: Cities turn to 'extreme' water recycling

Date: July 5, 2023
Source: KCRA
Article: California lawmakers OK Newsom's push to build energy, water and transportation projects faster



RESTORE HETCH HETCHY

Yosemite National Park

June 15, 2023

Ms. Nicole Sandkulla
General Manager and CEO
BAWSCA

Ms. Karen Hardy
Chair, Board of Directors
BAWSCA

Re: Groundwater banking

Dear General Manager/CEO Sandkulla and Chair Hardy

It was a pleasure to address the BAWSCA Board yesterday and to encourage BAWSCA to pursue a cooperative groundwater banking program in Stanislaus County. Such a program could produce substantial supplemental water supplies at lower cost than other programs and projects under consideration.

Coincidentally, yesterday, SJVWater published an article (attached) praising a similar program, initiated four decades ago, that has provided benefits to farmers in Kern County's Arvin Edison Water District as well as a 350,000 acre-foot groundwater bank for the Metropolitan Water District of Southern California.

As author Lois Henry notes "Such a collaboration was unheard of back then." and it was controversial at the time. But that is no longer the case.

Metropolitan also banks groundwater in Kern-Delta, Mojave, Antelope Valley and Semitropic. Santa Clara Valley WD, Zone 7, and Alameda County WD bank groundwater at Semitropic. These programs total more than 1,500,000 acre-feet.

New institutional agreements are always challenging. The hydrology, geology, depleted groundwater basin and proximity of San Francisco's conveyance, however, all suggest that a cooperative deal between agricultural interests in Stanislaus County and urban interests in the Bay Area should be vigorously pursued – whether spearheaded by BAWSCA of the SFPUC.

Restore Hetch Hetchy is prepared to help develop a program with benefits for all.

Sincerely,

Spreck Rosekrans
Executive Director

Cc: Dennis Herrera, General Manager, SFPUC
Newsha Ajami, President, SFPUC

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Freeway sign marks significant chapter in California water history

JUNE 14, 2023

• by Lois Henry

Northbound Highway 99 traffic passes by a sign announcing the Howard Frick Pump Plant, which marks a significant chapter in California water history. Lois Henry / SJV Water

Travelers along northbound Highway 99 may have noticed a large – very large – sign a little ways past Highway 166 that says “Howard Frick Pump Plant” in massive white letters on a blue background.

Well, who the heck is Howard Frick, some drivers may wonder.


Howard Frick

Frick was one of the main people who ushered in the era of groundwater banking in Kern County, now one of the biggest groundwater banking regions in the state, if not the country.

The pumping plant at the feet of that giant freeway sign, how it connects to the California Aqueduct and the deal behind it all are a significant chapter in California’s water history.

And it as all written right here in Kern County with Howard Frick at the center.

On Wednesday, the Arvin-Edison Water Storage District, where Frick served as board president for many years, honored that legacy with a formal dedication of the plant as the “Howard Frick Pump Plant.”

Frick, who died in 2018, was part of a longtime farming family in the Arvin area.

His father, Forrest, had helped create the Arvin-Edison Water Storage District more than 80 years ago. At that time, south San Joaquin Valley farmers didn’t have any surface water and groundwater tables were in a nose dive from excessive pumping, said Edwin Camp, the current Arvin-Edison board president at Wednesday’s dedication.

“They saw they had a problem and needed to fix it and they did,” he said of the farmers of that era. The fix was convincing the federal government to build the Friant Dam just north of Fresno and the 156-mile-long Friant-Kern Canal to bring San Joaquin River water to farms and towns all the way to Arvin.

“When you think of that system, it’s nothing short of a miracle,” Camp said.

Howard Frick followed in his father’s footsteps, farming in the Arvin area and serving on the Arvin-Edison board for 26 years


Edwin Camp

In 1985, Frick and others conceived an audacious idea to partner with the Metropolitan Water District of Southern California to park MWD’s water in Arvin in flush years and send it back in dry years – less a small percentage of water and, of course, fees to pay for the recharge, pumping and conveyance costs.

Arvin-Edison is a federal contractor and MWD contracts for water though the state system on the California Aqueduct. So, while the water molecules are the same, rules for how and where those molecules are handled are very different. And ag-urban partnerships were far from common.

Such a collaboration was unheard of back then.

When the Arvin-Edison team brought it to MWD it was received as an intriguing and "bold proposal," wrote former Deputy General Manager Tim Quinn in a statement read at the dedication.

"Who could oppose such a brilliant idea?" he asked. "Everyone."

Some of the most stringent opponents were Arvin-Edison's fellow contractors on the Friant-Kern Canal. An initial vote by Friant Water Authority members rang up a decided 24-1 "no" on the proposal.

Howard Frick was undaunted and after two years of explaining and lobbying, Camp said, another Friant vote came in 24-1 but this time in favor of the proposal. By 1997 Arvin-Edison was sinking MWD state water below its fields.

Over the years, revenue from that deal has brought in $150,000 million that Arvin-Edison has used to build other facilities and make more deals, Camp said.

Frick wasn't just focused on infrastructure. His mantra: "Connections, connections, connections," included people as well, Camp said. It was all with an eye to make sure water could flow through the district to wherever growers most needed it.

"Howard thought of the problems of the future and how to solve those problems now," Camp said.

These days, numerous water districts in Kern County and elsewhere have deals with a wide array of urban water purveyors. Arvin-Edison was the model.

"It all started because of Howard Frick," said Arvin-Edison's General Manager Jeevan Muhar.

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June 12, 2023

Re: Agenda Item 13d: Water Math: AWS needs are less than Water Supply Shortfalls

Dear Commissioners, General Manager Herrera and Assistant General Manager Ritchie,

In agenda item 13d, figure 1 of the latest Alternative Water Supply (AWS) Program Quarterly Report (copied here) has two water supply shortfall figures, 122 mgd and 92 mgd

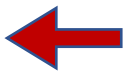
Figure 1. Water Supply Shortfall in 2045 as a Dry Year

Water Availability through the Regional Water System (RWS)	
152 mgd *(assumes implementation of the Bay-Delta Plan Amendment)*	
Total Existing and Potential Obligations	**Total 2045 Demands on the RWS**
265 mgd *(Retail and Wholesale)*	244 mgd *(including Retail, Wholesale, and San Jose and Santa Clara)*
*+ 9 mgd (San Jose and Santa Clara)**	
Water Supply Shortfall	
-122 mgd	-92 mgd

*The SFPUC Commission will make a decision on whether to commit to future supply guarantees totaling 9 mgd for San Jose and Santa Clara by December 31, 2028.
**Demands reflect updated purchase projections for Wholesale Customers from BAWSCA's FY 21-22 Annual Survey.

The above figures are larger than the AWS needed to meet this shortfall. The corresponding amounts of AWS needed are 108 mgd and 81 mgd respectively. The AWS needed figures were validated using the SFPUC's water supply and demand worksheet dated March 24, 2021. It would have been helpful to have these additional green shaded boxes added to the chart:

Water Supply Shortfall	
-122 mgd	-92 mgd
Portion met by Rationing Policy	
-14 mgd	-11 mgd
AWS Shortfall	
-108 mgd	-81 mgd



Corresponding AWS Needs

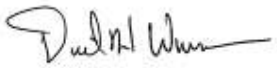
The reason for the difference is that the SFPUC accounts for rationing as an increase to its supply rather than as a reduction in demand. In other words, if there is a demand shortfall of 92 mgd, 81 mgd of

additional water supplies are needed and 11 mgd will be covered by the SFPUC's current rationing policy per the current 8.5 year drought planning model.

Please ask that future reports provide such a breakdown wherever a shortfall is discussed so that it is easy for all to understand what levels of AWS are being contemplated. Or ask that future reports just list the AWS shortfall as the water supply shortfalls listed here aren't particularly useful. Note, it is helpful that figure 1 in this quarterly report states that San Jose and Santa Clara are included in the totals.

Of course, nowhere close to 81 mgd in AWS are actually needed in the foreseeable future (20 year time horizon), as I described in my February 13, 2023 letter to you (copy attached). Since that letter we have learned that the Bay Area population has been declining, led by San Francisco with a 7% decline in the last two years. As you know population growth is a primary driver of demand projections, particularly given declining per capita demand.

Kind regards,



Dave Warner

Enclosure

cc: BAWSCA Board of Directors
Nicole Sandkulla, BAWSCA CEO
Matt Moses, SFPUC Water Resources Engineer

February 13, 2023

Re: More Robust Alternative Water Supply Data Needed

Dear Commissioners, General Manager Herrera and Assistant General Manager Ritchie,

The January 30th budget meeting highlighted the need for more robust alternative water supply planning data. Comments by staff included: Challenging capital budget; large amount of outstanding debt, 90% increase in rates over the next 10 years, and debt service will become 50% of our budget with the proposed capital plan. And the proposed capital plan includes no significant investment in alternative water supplies. In such context it is important to have more robust information regarding alternative water supplies (AWS). Here are examples of data that would inform AWS planning.

Please note that many assumptions and guesses were made in developing the data in this letter and it should not be relied upon. Instead, the SFPUC should develop its own analyses for these items.

AWS Capital Costs $4.7 - $6.1 billion with double the interest rate

The December 2022 AWS quarterly report does not estimate possible AWS capital outlays although it specifies unmet obligations of 122 mgd and unmet demands of 94 mgd. Looking at the capital costs for both the soon to be completed San Francisco Westside Enhanced Water Recycling Project and the soon to break ground San Diego Pure Water Phase 1, the capital cost per mgd of AWS can range from $50 million to $108 million. Using the lower figure, $50 million of capital required per mgd, this translates to $4.7 billion in capital needed to produce 94 mgd of AWS and $6.1 billion to produce 122 mgd of AWS. These are staggering figures when considering that the SFPUC is already looking at a possible $15.7 billion of debt before considering AWS.[1]

Extrapolated AWS Project Costs	Project Cost (millions)	Output (MGD)	Project Cost per MGD (millions)	Extrapolated to 94 MGD (billions)	Extrapolated to 122 MGD (billions)
San Francisco Westside Enhanced Water Recycling Project	$ 216	2	$ 108.0	$ 10.2	$ 13.2
San Diego Pure Water Phase 1	$ 1,500	30	$ 50.0	**$ 4.7**	$ 6.1

AWS Cost per Acre Foot Could Range from $3,100 to $6,000

Using capital costs as described above, a 5% interest rate mentioned in the January 30th budget meeting and $550/acre foot operations and maintenance costs, the cost per acre foot of AWS could be 22% higher to as much as 138% higher than the currently projected water cost for 2032. Against today's cost per acre foot, AWS costs could be 50% to 190% higher.

[1] As of the January 30th budget meeting the SFPUC had $9.4 billion in debt and the 10 year capital plan, without AWS investments, contemplated an additional $6.3 billion in debt, for a total of $15.7 billion.

Projected AWS Cost Per Acre Foot

Capital cost per MGD (millions)	Percent financed	Interest rate	Amortization/ Loan Period (years)	Amortized Capital cost/AF	Ops and maint. cost/AF	Total cost /AF	Percent increase from 2032 cost
$108.0	75%	5%	30	$5,508	$550	**$6,058**	**138%**
$50.0	75%	5%	30	$2,550	$550	**$3,100**	**22%**

Reference: Projected 2032 baseline cost/AF (before AWS investments): $ 2,545

Rates are more frightening if we invest and the water isn't needed

If we were to invest in AWS per the listed unmet demands of 94 mgd, our cost of water would increase to $2,725 per acre foot, up 32% from today's rate. But the worst case would be to invest in AWS to the amount of listed unmet demands but the additional demand never materializes. Then our cost of water would increase 95% to over $4,000 per acre foot. The table below summarizes these points along with showing the impact of a scenario where only 20 mgd of AWS are added[2].

Blending AWS Costs into Overall Rates

				AWS *FULLY* Used (Demand increases by amount of AWS)		AWS *NOT* Used (Demand doesn't increase)	
AWS Added (MGD)	Cost/AF in 2032 (no AWS)	2032 Finance Dept Demand (MGD)[2]	Cost/AF from AWS	Blended cost per AF	Percent Increase from cost today	Blended cost per AF	Percent Increase from cost today
94	$ 2,545	196	$ 3,100	**$ 2,725**	**32%**	**$ 4,032**	**95%**
122	$ 2,545	196	$ 3,100	**$ 2,758**	**33%**	**$ 4,475**	**116%**
20	$ 2,545	196	$ 3,100	**$ 2,596**	**25%**	**$ 2,861**	**38%**

Reference: Cost per acre foot today: $ 2,069

It is doubtful that we'd invest in 94 mgd of additional water supplies. But the point is that decision makers need more robust information in terms of both cost and demand than what is provided in the quarterly AWS reports. With better information the decision makers can start to formulate a strategy to address uncertain demand and manage costs.

Water Rates Already Amongst the Highest in California

When considering AWS and costs, it is important to know how SFPUC water rates compare to other urban agencies. A previous letter provided a chart showing that the SFPUC's wholesale water rates were amongst the highest, if not the highest of any major water district in California (the comparison was not exhaustive). San Francisco's retail water rates are also high. Comparing to Los Angeles, San Francisco's water rates are 44% higher. We also know SFPUC's water rates will continue to increase another 23% in the next 10 years. As you know, wastewater rates are increasing even more.

[2] 2032 baseline demand based upon department of Finance projections for 2032: 131.1 Wholesale demand, 58.6 retail demand and plus 6 mgd losses. AWS investments as shown in table

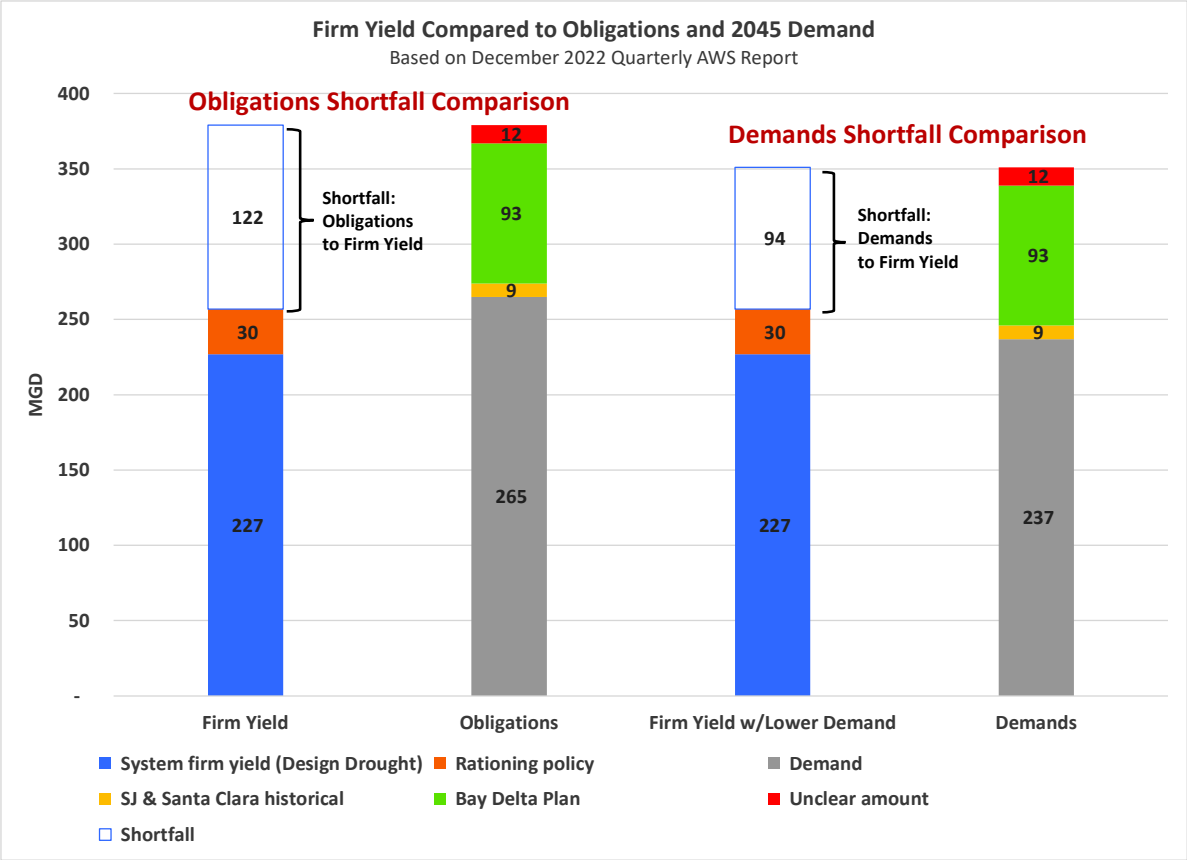
2023 Retail Water Rate Comparison				
	Service charge[3]	2nd tier ccf rate[4]	Total	
Los Angeles	$0	$8.99	$8.99	
San Francisco	$2.17	$10.76	$12.93	**44% Higher**

Breaking down 122 mgd of Obligations and 94 mgd of Demands

While the December 2022 AWS Quarterly Report called out unmet obligations of 122 mgd and unmet demands of 94 mgd, it has been difficult to determine their makeup. The chart on the next page provides some clarity as to how these figures were calculated. The left two columns compare supplies to obligations while the right two columns compare supplies to projected 2045 demand. Note that the SFPUC uses the term, "Firm Yield" to reflect the combination of water system supplies/deliveries and the water saved from rationing.

Having the information presented in this way helps the reader better understand the figures against known benchmarks. For example, the 265 mgd of demand in column 2 is a well-known figure for obligated supplies at the time the Water System Improvement Program (WSIP) was approved. The 237 mgd of demand in column 4 is a less known figure[5], which in itself should be footnoted (as was done here). Otherwise the reader doesn't know exactly which data was incorporated. It is also valuable to see demand from the "interruptible customers", San Jose and Santa Clara, broken out separately as whether or not to supply them is likely germane to AWS decisions. The 12mgd highlighted in red I am still working to understand its makeup[6].

[3] San Francisco's service charge is $15.17 per month. Assuming the average household uses 7 ccf of water per month, this translates to an average service charge of $2.17 per ccf. Los Angeles has no such charge.
[4] San Francisco has two rate tiers, a lower rate for the first 3 ccf and then $10.76 for each ccf above that. Los Angeles has 4 tiers, tier 1 for the first 16 ccf and then varying amounts for tier 2, but at least 6 ccf on top of tier 1. It seems like the fairest comparison is to use Los Angeles tier 2 rate of $8.99 per ccf.
[5] Per email exchanges the 237 mgd incorporates the BAWSCA demand projections from its 2020-21 annual survey and is higher than what was projected in the 2020 Urban Water Management Plan (UWMP).
[6] See email from Matt Moses to Peter Drekmeier dated October 26, 2022, which appears to state that the rationing policy impact, which was 30 mgd at 265 mgd demand, changes to 18 mgd because of reduced supply due to the Bay Delta Plan impact. However for the analysis demand remains at 265 mgd. It is a challenge to understand how the rationing policy impact is determined from supply rather than demand.



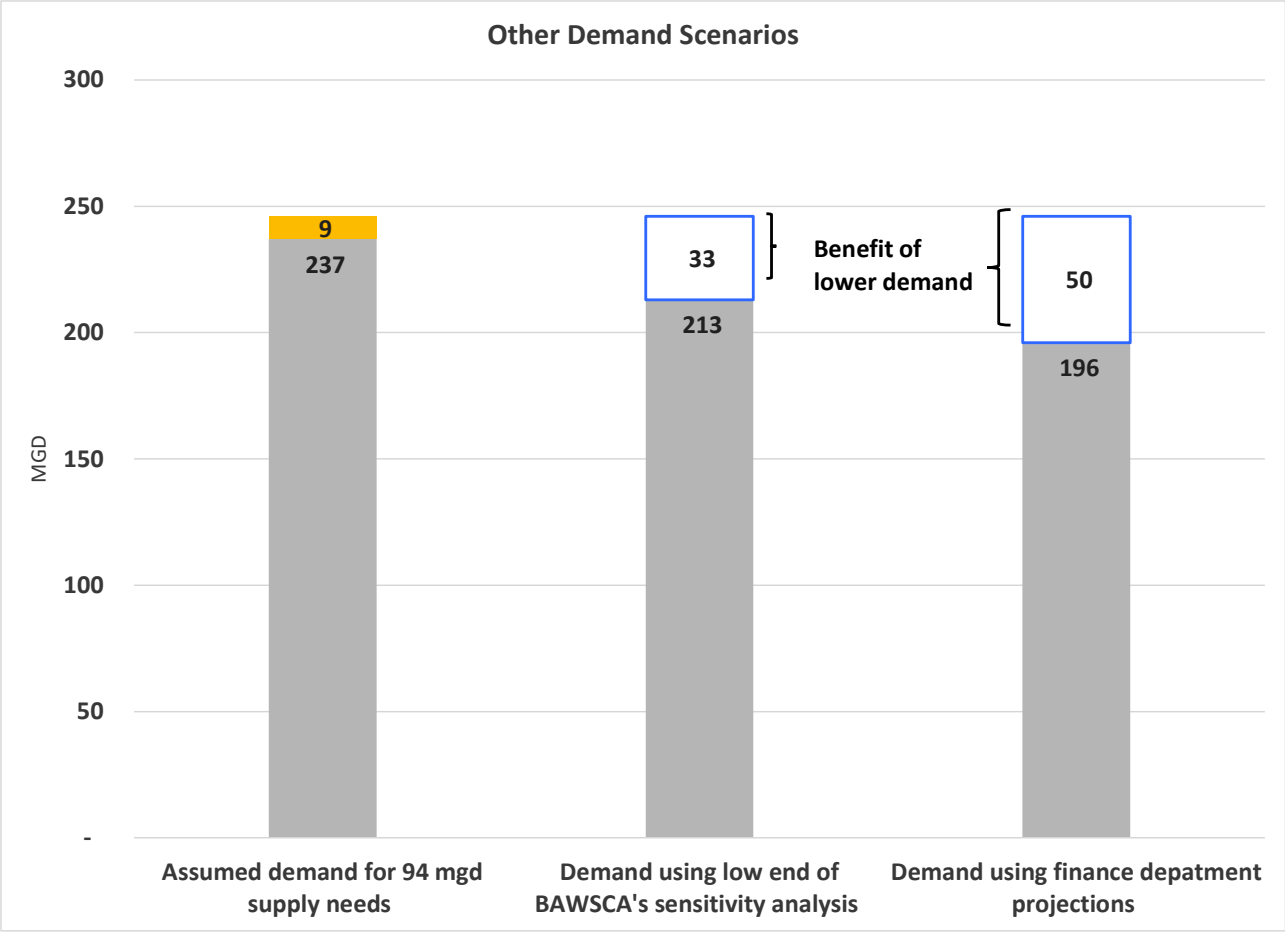
Other Demand Scenarios

Other demand scenarios that should be included in the Water Supply Needs section of the AWS are:

1) The SFPUC's department of finance demand projections, which historically have been much closer to actual demand than other SFPUC projections (albeit still above). This would show demands could be 196 mgd rather than 237+9 mgd inclusive of Santa Clara's and San Jose's RWS demand, reflecting a potential reduction of 50 mgd from the 94 mgd demand shortfall.[7] Needing 50 mgd less of AWS would save ~$2.5 billion of capital costs (assuming the lower $50 million per mgd capital cost rate).
2) The sensitivity analysis from BAWSCA's recent demand study should be considered, suggesting that there are scenarios where their demand could be as little as 80% of current projections. This would reflect a potential reduction of 33 mgd from the 94 mgd demand shortfall.[8] Needing 33 mgd less of AWS would save $1.65 billion in capital costs.

The chart on the next page depicts the potential savings from these two scenarios.

[7] At this lower level of demand the impact of the rationing policy would reduce the savings by 9 mgd, which has not been reflected in the figures.
[8] At this lower level of demand the impact of the rationing policy would reduce the savings by 6 mgd, which has not been reflected in the figures.



Other Opportunities

Design drought, the billion dollar question: Using the SFPUC's own Long Term Vulnerability Assessment (LTVA), the NGO's have been making the case that the likelihood of the design drought is too rare and that it should be shortened. There was data in the LTVA showing that the design drought was potentially a once in a 70,000 year event. The NGO's argue that by removing a year from the design drought model, the likelihood of a drought as severe as 7.5 years of a design drought is still very rare, once in 10,000 years.

The SFPUC's Water Supply worksheet indicates that there is a savings of 23 mgd by reducing the design drought from 8.5 years to 7.5 years.[9] Applying an opportunity cost to 23 mgd comes to $1.15 billion of capital costs.

At the August 23rd, 2022 workshop then Commission President Anson Moran said that the LTVA wasn't designed to answer the question of the adequacy or excessiveness of the design drought model. Given

[9] The water supply worksheet shows that removing a year from the design drought increases supply by 31 mgd but because the year removed had small Bay Delta Plan flows, the average annual impact of Bay Delta Plan flows increases from 93 mgd to 101 mgd.

the question has a potential $1.15 billion dollar impact, it seems well worth investing the resources to answer this question.

The wonderful part about this item is that it's a "stroke of the pen" issue. If the answer to the question is favorable, we've just saved a large amount of investment to the benefit of all.

Earlier Runoff: The NGO's have suggested that due to climate change and the SFPUC's unique water rights, the SFPUC will see increased entitlements as temperatures increase. According to the LTVA a 2°C increase in temperature will cause runoff to shift 10 days earlier. A 4°C increase in temperature will cause a 20 day shift.10 We found that during the design drought a shift in flows two weeks earlier had average favorable annual impact of 17 mgd. A three week shift in flows had an average favorable impact of 29 mgd. When asked about this, LTVA researchers said that on average they did not see a change in flows due to temperature increases. However NGO's found that during dry years there was a favorable impact to water supply and during wet years there was a negative impact (and of course during wet years there's not a concern about a negative impact as flows are very high).

A 17 mgd favorable impact to water rights is potentially worth $0.85 billion in reduced capital costs. It seems like it is worth investigating the impact of temperature change and flow shift on SFPUC's water rights during dry years (perhaps the driest quintile).

Interruptible Customers: Santa Clara and San Jose are labeled interruptible customers and have historically used 9 mgd of water. When supply exceeds demand, Santa Clara and San Jose buying RWS water benefits all in the form of lower water costs. But if demand exceeds supply and the cost of additional supply is greater than projected prices, then adding supply to accommodate them becomes a burden to all other customers. The SFPUC, BAWSCA, San Jose and Santa Clara should all understand their options when faced with developing expensive water supplies. If saving 9 mgd of supply from Santa Clara and San Jose would reduce AWS needs by the same amount, capital cost savings would amount to $0.45 billion.

If the above three actions were taken, the water supply shortfall would be reduced by 49 mgd and the capital savings would be $2.45 billion of funds not spent. It seems well worth the investment to better understand these scenarios.

Scenario	Water savings (MGD)	Capital Cost Savings (billions)	
7.5 year design drought	23	$ 1.15	**Worth funding a study**
Earlier runoff	17	$ 0.85	**Worth funding a study**
Savings from Interruptible customers	9	$ 0.45	Worth considering
Total	49	$ 2.45	

[10] LTVA page 147, bullet starting at the bottom of the page. It should also be noted that with temperature increases drought frequency decreases. When asked, researchers did not have an answer for why this was the case (see table 5-2 on page 159).

Impact of Rationing Scenarios: The rationing scenario for the water supply shortfall calculations assumed 2 years, no rationing, 3 years 10% rationing and 3.5 years 20% rationing. This rationing scenario is conservative for the water supply needs presented in the last AWS quarterly report. Not only should the report be explicit on the rationing scenario used, but also other rationing scenarios should be explored, having the potential to reduce water supply needs by several mgd.

Summary

It is this kind of information that all parties should have available when considering alternative water supplies:

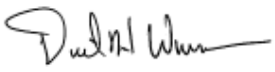
1) What are the potential capital costs of AWS at the level of needs contemplated?
2) What are the potential per acre foot costs of AWS?
3) What are the blended per acre foot costs incorporating AWS and assuming demand grows to match added AWS supplies?
4) What are blended per acre foot costs incorporating AWS but demand doesn't grow, reflecting the downside/risk of investing in excess AWS?
5) How were the unmet obligations of 122 mgd and unmet needs of 94 mgd determined, including a breakdown of which demand projections were used?
6) What are the other relevant demand projections when considering AWS and how do they impact unmet needs?
7) How do our water rates compare to other agencies?
8) What other opportunities could mitigate water supply needs, such as shortening the design drought, earlier runoff, or not supplying interruptible customers and what is the financial impact of each?

While a decision of developing alternative water supplies may not occur this year, providing such information now in the quarterly alternative water supply reports will have everyone better prepared.

Please do not rely upon the data presented here but instead ask staff to provide its own analysis for these areas.

It seems financially worthwhile and timely to commission a study now to understand the adequacy or excessiveness of the design drought model. It also seems worthwhile to study the impact of earlier runoff in dry years due to climate change.

Kind regards,



Dave Warner

cc: BAWSCA Board of Directors
Nicole Sandkulla, BAWSCA CEO

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PRESS RELEASE: State Water Board releases draft report on expediting permitting for seawater desalination plants

July 13, 2023

Draft siting and streamlining criteria developed as part of state's multipronged Water Supply Strategy

As part of California's all-of-the-above strategy to address an anticipated 10% reduction in its water supply by 2040 due to hotter and drier conditions, the State Water Resources Control Board, in coordination with multiple state agencies, has developed a Draft Siting and Streamlining Report to Expedite Permitting Seawater Desalination Projects. The State Water Board is accepting public comments on the draft report until 12 p.m. on Friday, July 28, 2023.

In August 2022, Gov. Gavin Newsom's Water Supply Strategy directed agencies to take various actions to bolster the state's water resilience amid intensifying climate impacts, including advancing desalination among other key tools to develop new water supplies, expand storage, promote conservation and more. This draft report identifies siting criteria to help guide the location of future desalination projects where they are cost effective and environmentally appropriate, and it proposes ways to streamline permitting.

"Given the increasing threats to our water supply and the reality that we are experiencing hotter, drier weather, desalination will continue to be an important water source for some communities within our state," said Karen Mogus, deputy director for the Division of Water Quality.

"This report was developed to facilitate projects that meet the waste discharge requirements set forth in the Ocean Plan to ensure that the most advanced technology and protections for the marine environment are utilized. This draft report provides valuable information for those considering pursuing seawater desalination projects to help safeguard local water supplies."

The draft report proposes several ways permitting can be accelerated, such as: engaging with California Native American tribes and interested parties, including affected underserved communities; submitting applications simultaneously to responsible agencies; using subsurface intake designs that exclusively withdraw seawater or improve seawater intrusion conditions; and considering reasonably foreseeable coastal hazards that will result from climate change, sea-level rise, or geologic or seismic hazards, among others.

Desalination offers a vital water supply for some communities, but depending on the circumstances it isn't always the best option. That is why the Water Supply Strategy takes an all-of-the-above approach to creating a more resilient California with desalination as one effort alongside conservation, recycled water, increased storage and stormwater capture and use. Together, these alternatives strengthen and diversify the state's water supplies, especially during drought.

The Desalination Interagency Group, headed by the board, includes representatives from the regional water quality control boards, California Natural Resources Agency, Coastal Commission, Department of Water Resources, Ocean Protection Council and Department of Fish and Wildlife, among others.

The group will host an informational webinar on the report on July 21 from 11:00 a.m. to noon, and it will consider all public comments prior to finalizing the report. More information about seawater desalination and the California Ocean Plan can be found on the board's website.

# # #

The State Water Board's mission is to preserve, enhance and restore the quality of California's water resources and drinking water for the protection of the environment, public health and all beneficial uses, and to ensure proper water allocation for present and future generations.

PRESS RELEASE: Next phase of recycled water begins for California *UPDATED with advance copy of the regulations

July 11, 2023

State advances nation-leading proposed regulations to convert wastewater to high-quality drinking water

Achieving a major milestone in the state's efforts to maximize the potential of recycled water, the State Water Resources Control Board announced today proposed regulations that would allow for water systems to add wastewater that has been treated to levels meeting or exceeding all drinking water standards to their potable supplies. The process, known as direct potable reuse, will enable systems to generate a climate-resilient water source while reducing the amount of wastewater they release to rivers and the ocean.

This development advances Gov. Newsom's all-of-the-above Water Supply Strategy, which includes the goal of recycling and reusing at least 800,000 acre-feet of water per year by 2030.

This turning point in California's history with recycled water, which began in the mid-20th century with the use of recycled water for crops, comes after an expert panel of 12 scientists and engineers evaluated work by the State Water Board's Division of Drinking Water and determined that the proposed regulations are protective of public health. The regulations are the most advanced in the nation and reinforce California's position as a leader of innovative solutions to climate challenges. They are now open for public comment and subject to revision based on that input.

"This moment has been some time in the making because we have been careful and thorough to produce regulations that ensure, down to a chemical level, that water treated to these standards will be pure and wholesome," said Darrin Polhemus, deputy director for the Division of Drinking Water. "In fact, the extensive treatment requirements we've proposed mean that direct potable reuse processes in California will produce water of higher quality and lower risk than many traditional drinking water sources."

Direct potable reuse relies entirely on immediate, multi-barrier treatment that can recycle wastewater to drinking water standards in a matter of hours. This contrasts to the method currently being deployed in major projects launched throughout the state, called indirect potable reuse, which further improves treated wastewater over time through groundwater recharge or dilution with surface water. While no formal direct potable reuse projects can be initiated in California until the regulations are adopted, water agencies in Santa Clara, San Diego and the city of Los Angeles have launched pilot projects in recent years.

“We’ve seen real enthusiasm and interest from major urban water agencies, who are the ones that will take direct potable reuse forward, adding it to their water supply portfolios to increase resiliency,” added Polhemus. “California has been a leader for years in water recycling, and this last step–going directly from treatment to usage as drinking water–builds on that experience and the expertise of scientists and engineers who have worked with recycled water for many years.”

The board will consider adoption of the regulations before the end of the year.

# # #

Advance copy of the regulations

The State Water Board is pleased to provide an advance copy of the proposed draft Direct Potable Reuse regulations. Please note that formal rulemaking will not begin until the Notice of Proposed Rulemaking is published in the California Notice Register, which starts the formal 45-day public comment period under the Administrative Procedure Act.

PLEASE NOTE:

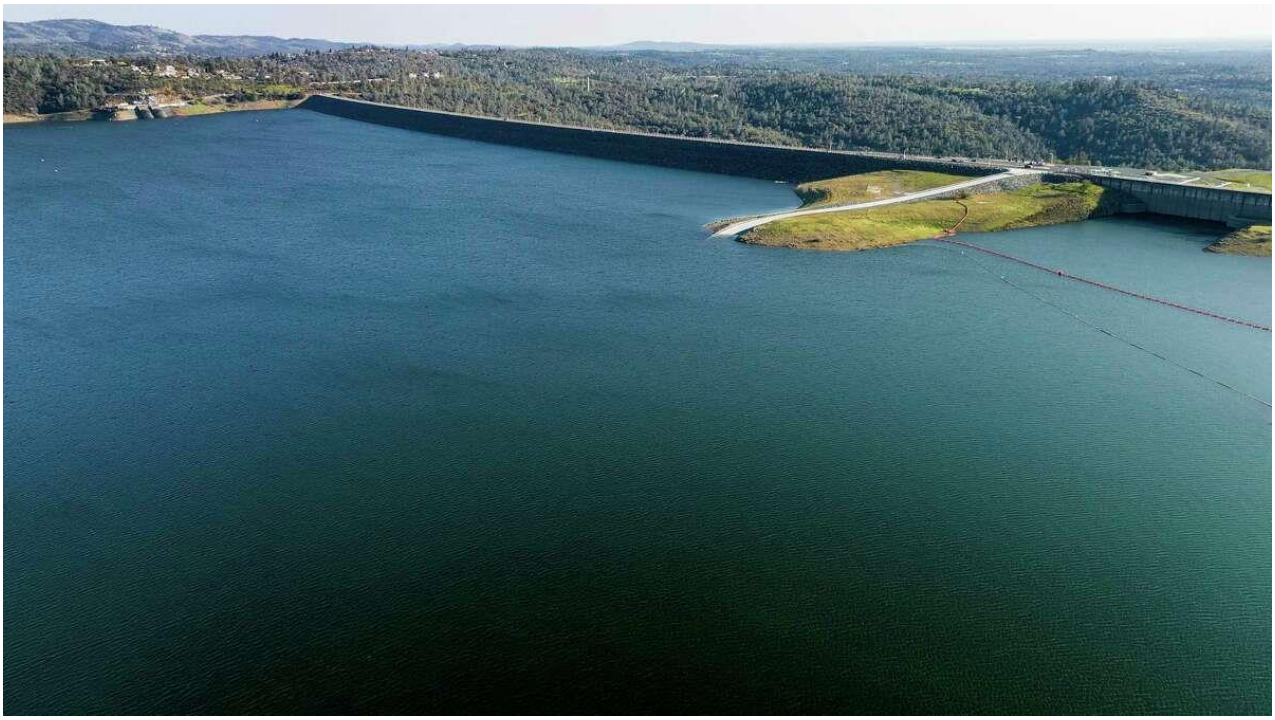
Do not submit comments to the State Water Board on the advance copy. Comments submitted before the start of the formal 45-day public comment period will not be considered by the State Water Board.

Revisions could be made to the advance copy, and therefore, the proposed DPR regulations that will be posted for the 45-day public comment period under the Administrative Procedure Act may be different than the advance copy provided today. Stakeholders are cautioned to obtain the official version of the proposed regulations once the Notice of Proposed Rulemaking is published.

The State Water Board expects that the Notice of Proposed Rulemaking will be published in the California Notice Register on July 21, 2023.

The State Water Board’s mission is to preserve, enhance and restore the quality of California’s water resources and drinking water for the protection of the environment, public health, and all beneficial uses, and to ensure proper resource allocation and efficient use for present and future generations.

Most major California reservoirs are over 90% full. But there's one big exception
San Francisco Chronicle | July 12, 2023 | Danielle Echeverria



The Oroville Dam (top right) holds back water at Lake Oroville in Butte County. Lake Oroville, the state's second largest reservoir, is at 98% of capacity, or 135% of its historic average. Noah Berger/Associated Press

More than two-thirds of California's major water supply reservoirs are more than 90% full as the state's record snowpack continues to melt, and most are well above their historic average levels for this time of year, according to data from the California Department of Water Resources.

But there's one major exception: Trinity Lake northwest of Redding (Shasta County), which has yet to exceed 60% of its capacity, and is at just 78% of its historic average.

Trinity Lake, California's third largest reservoir, has seen its water level steadily climb since the storms that pounded the state last winter, rising from about 20% of its total capacity last fall to 58% as of Tuesday.

But that still lags behind most of the other major water supply reservoirs in the state, including nearby Shasta Lake, which is the largest in the state and is at 91% of its capacity, after nearing 100% last month.

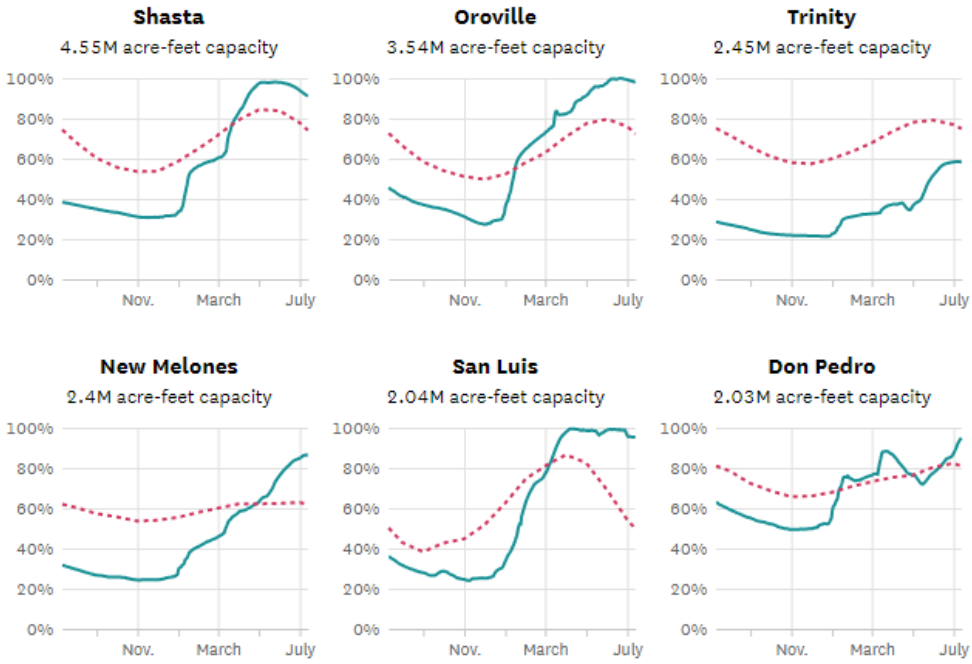
Water storage levels at California's reservoirs

Daily percentage of storage capacity from July 12, 2022 to July 13, 2023

Average storage is based on data from 1991 to 2020.

Average storage (1991-2020) — Actual daily storage

Page 1 of 8



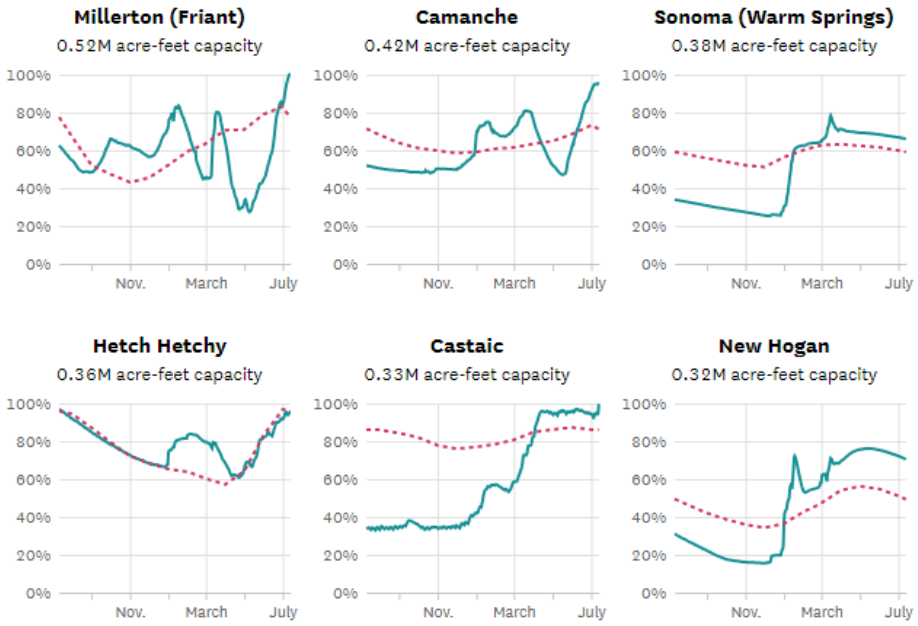
Water storage levels at California's reservoirs

Daily percentage of storage capacity from July 12, 2022 to July 13, 2023

Average storage is based on data from 1991 to 2020.

Average storage (1991-2020) — Actual daily storage

Page 3 of 8



That's in part because of a difference in how the reservoirs fill, according to Mary Lee Knecht, the regional public affairs officer for the U.S. Bureau of Reclamation.

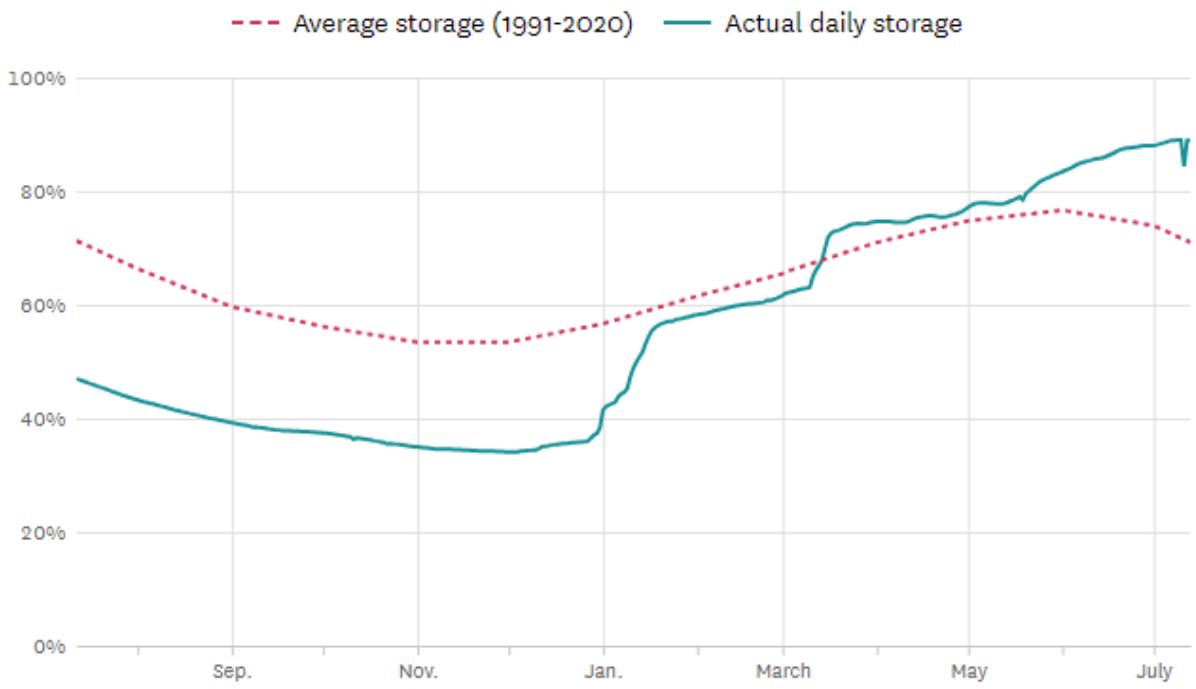
Knecht said that Trinity Lake, which in the fall was at slightly lower levels than many other large reservoirs, has a small drainage basin — the area of land where surface water such as streams and rainfall converges to a common outlet, according to the U.S. Geological Survey. That means it fills more slowly, and that it takes more than one wet season to refill.

And the snowfall in the area that feeds Trinity Lake wasn't as strong as in other areas of the state, Knecht said. The area got 120% of its historic average snowfall, compared to the Sierra Nevada, which saw more than twice the normal amount of snow this winter.

On top of that, the bureau is obligated by federal law to make releases from the reservoir as part of the fish restoration goals established in the Trinity River Restoration Program, she said. Water was released throughout the spring.

Water storage level across California's major reservoirs

Daily percentage of storage capacity across 48 of the state's major water supply reservoirs from July 12, 2022 to July 13, 2023



Reservoir data is from the California Data Exchange Center. One acre-foot is equivalent to 325,851 gallons.

Chart: Nami Sumida and Ying Zhao

Even with Trinity's lower levels, the state's overall water storage in reservoirs is at 123% of its historic average for this time of year, with many reservoirs having reached full capacity over the past month for the first time since 2019.

In addition to Shasta Lake, which at 91% of capacity is at 123% of its historic average for this time of year, Lake Oroville in Butte County, the state's second largest reservoir, is at 98% of capacity, or 135% of its historic average.

Closer to the Bay Area, Lake Sonoma is at 66% of its total capacity, which is 112% of its historic average, and the San Luis Reservoir in Merced County is at 95% of its capacity — 190% of its historic average.

Besides Trinity Lake, the only major California water supply reservoir below its historic average is Casitas in Ventura County, currently at 74% capacity, or 92% of its historic average.

Still, state water experts caution that the one wet year doesn't reverse the damage of several years of extreme drought.

"While recent rain and snow has been promising, it will take more than a single wet year for California to fully recover from the last three years — the driest ever recorded in state history," says the state water department's website.

# # #

Reach Danielle Echeverria: danielle.echeverria@sfchronicle.com; Twitter: @DanielleEchev

California Democrats move forward bill to chip away historic water rights
The Center Square | July 12, 2023 | Kenneth Schrupp

The Colorado River cuts through Black Canyon, Tuesday, June 6, 2023. Matt York / AP Photo

(The Center Square) - The California Assembly Committee on Water, Parks, and Wildlife today passed a bill out of committee that would empower the State Water Board to chip away at historic water rights and significantly reduce rural water allocations. Under SB 389, sponsored by Ben Allen (D-Redondo Beach), the California State Water Resources Control Board and its five appointed members would be able to review historic riparian and appropriative water rights to determine whether or not they are appropriate.

Already passed by the California Senate, the bill's affirmative vote in committee is a strong sign the bill may become law. The main targets of the bill are holders of pre-1914 water rights who secured their water rights before a formal permitting and records process was adopted. By challenging water rights holders to provide exhaustive paper trails proving their rights' legality and complete adherence to "beneficial use," the State Water Board would effectively hold riparian and appropriative water rights holders guilty-until-proven-innocent, with their water, and their livelihoods, on the line at the board's discretion.

"It gives a clear mandate to the State Water Board to start reviewing and determining whether these riparian and appropriative rights are appropriate," said Nick Dokoozlian, a California

Assembly Republican Caucus consultant covering the bill. “Their end goal is to upend the California water rights system to benefit favored political groups through unelected bureaucrats.”

Amid significant opposition from a broad coalition ranging from water districts that provide water to big cities, all the way to California farmers, bill author Senator Ben Allen (D-Redondo Beach) painted the law in a different light, focusing on how this bill is designed to ensure the State Water Board has the data it needs to best manage future droughts.

In his official statement on the bill, Allen said, “SB 389 provides information-gathering tools that allow the State Water Board to align a watershed’s reported demand with the diversions and use authorized under California law, thus more accurately determining water availability for all beneficial uses.

# # #

A racist past and hotter future are testing Western water like never before
NPR | July 11, 2023 | Lauren Sommer

A two decade-long drought on the Colorado River is drying up reservoirs. Droughts there and in California are bringing new scrutiny to the way Western states decide whose water allotment gets cut back. John Locher/AP

As droughts strain water supplies across Western states, some cities and farmers have struggled with mandatory cutbacks. Determining who gets cut is decided by the foundational pecking order of Western water: the older your claim to water, created as the country expanded westward, the better protected it is.

When there's a shortage, those with newer water rights have to cut back first, sometimes giving up their water completely before older claims lose a single drop.

It's known as "first in time, first in right." But "first" is a relative term.

"First in time, first in right is kind of laughable, because the ones that were here first were the indigenous people," says Gary Mulcahy, government liaison for the Winnemem Wintu tribe in Northern California.

As the climate gets hotter and further shrinks strained water supplies, Western states are grappling with whether a century-old water system created by white settlers can equitably handle a future of worsening droughts.

Rights to water have long been seen as sacrosanct by many. But after decades of exclusion, Native American tribes are helping lead the charge both in California and on the Colorado River, arguing for overhauling an arcane system they say is inherently racist.

California lawmakers are debating whether to create new authority to rein in the oldest water users, who have long contended their rights can't be constrained by the state. Cities like San Francisco and farming districts with senior water rights are lobbying hard against the bills, saying billions of dollars invested into the water system are at stake.

"The weight of the inequities is really stunning," say Felicia Marcus, a fellow at Stanford University's Water in the West program and a former California water regulator. "Folks are going to need to think about what are the alternatives to cure what might be a historic injustice, while also being aware of the equities of all the communities and people dependent on the system that we do have."

Gary Mulcahy of the Winnemem Wintu tribe (right) speaks at a rally for water rights and the environment at California's state capitol building. Tim Daw

First in time, via a piece of paper on a tree

More than a century ago, San Francisco locked up a pristine water supply. The city was booming in the late 1800s, and officials knew that local supplies wouldn't be enough for the growing population. They set their sights on a river high in the Sierra Nevada mountains, more than 150 miles away.

To tap into that river, the city had to first officially file for a water right.

"It meant you write it on a piece of paper and nail it to a tree," says Steve Ritchie, assistant general manager at the San Francisco Public Utilities Commission.

Thanks to that piece of paper nailed to an 8-inch round oak tree near the Tuolumne River in 1901, San Francisco has enjoyed a stable water supply ever since. During California's most severe

droughts, the city hasn't had to make mandatory cutbacks, even when other cities and farms around the state saw their supplies dwindle.

"We and others have invested a lot of money in our systems to make them work based on the principle of first in time and first in right," Ritchie says.

For tribes, being first doesn't mean you have water

For California's Native American tribes, which have largely been excluded from the water rights hierarchy, that focus on the history of settlers' interests rings hollow.

"What we say about the senior water rights holders is they all got their water through murder, mayhem, rape, theft and genocide," Mulcahy says.

The traditional land of the Winnemem Wintu tribe in Northern California was flooded in the 1940s when California built Shasta Dam, creating the largest reservoir in the state. Today, it's one of the most valuable sources of water, supplying farms and cities that stretch hundreds of miles, all the way to Los Angeles.

Lake Shasta in Northern California is one of the state's most vital water supplies. When it was built in the 1940s, it also flooded the traditional homeland of the Wimmemem Wintu tribe. Ken James/California Department of Water Resources

"We have no water rights," Mulcahy says. "We're the Winnemem Wintu tribe. Winnemem means 'middle water'– middle water people. That kind of tells you our culture, our spirituality is based on water."

California's tribes, like most across the West, were forced to sign treaties with the federal government, giving up their land in exchange for a reservation to live on. But the treaties with most California tribes were never ratified by the U.S. Senate and were lost for 50 years. As a result, the tribes have no federal recognition, giving them little standing to claim water.

"The water rights system absolutely totally needs to change for everybody's right, for everybody's health and well-being, and not just a select few who think that they are the gods of water and they can't be touched," Mulcahy says.

State bills would grant authority over senior rights

California lawmakers are now debating whether to take some steps toward reform. State bills would give regulators more power to investigate the water use of senior rights holders, allow them to order those rights holders to stop using water when there's a shortage, and to increase the fines against those who take water illegally.

The pushback has been swift from senior rights holders, which represent some of California's wealthiest cities and farming areas. Many contend their water use can't be curbed, since their rights were established before California created its regulatory water agency in 1914, the California State Water Resources Control Board.

"We don't think that curtailment should apply to us," Ritchie says. "Water rights are basically a form of a property right. So having the uncertainty that that supply might be cut at some point, that is very troubling."

During California's last two droughts, state regulators struggled to order cutbacks among those with senior water rights, lacking data about how much water was being used and what rights were affected. When water users have defied orders to cut their use, the state's ability to levy fines has been minimal.

"I don't mean to say it's kind of a hot mess, but it's kind of a mess," Marcus says. "We have to figure out how to have a better way of allocating water more fairly according to set-upon rules that everybody can see."

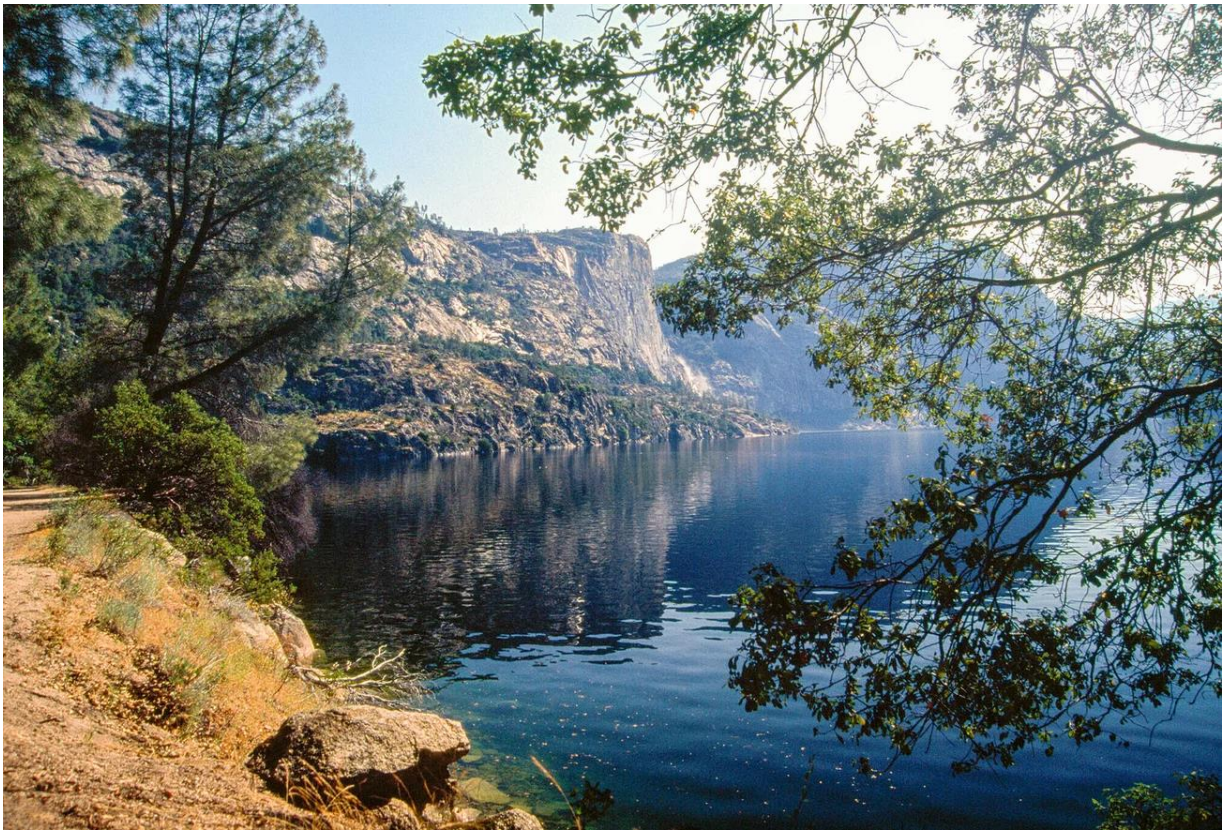
Tribes push for water rights on the Colorado River

Water cutbacks are also contentious on the Colorado River. There, a two-decades long drought is forcing states to face a harsh reality: the future will mean less water for everyone. But tribes on the river have been left out from the very beginning.

The Navajo Nation has been battling with the state of Arizona for decades over getting its water rights clarified on the river. Some parts of the reservation still lack running water, forcing residents to get deliveries by truck. As a federally-recognized tribe, the Navajo Nation has rights to water as part of the "permanent home" the federal government granted with a treaty creating the reservation.

"The issue is that they haven't been quantified and no one really knows what the scope of those rights look like," says Dylan Hedden-Nicely, director of the Native American Law Program at the University of Idaho College of Law.

Last month, the Supreme Court ruled against the tribe, saying the federal government had no duty to support the investment needed to deliver a water supply. Still, after a long-fought battle, tribes are now being included in key negotiations over the future of the river.



In 1901, San Francisco claimed water from the Tuolumne River by nailing a piece of paper to a tree. The city has long contended that its senior water rights shouldn't be constrained by the state.
California Department of Water Resources

In cases where tribes have had their water rights spelled out, they've struck deals to transfer some of that water to alleviate the overall shortage for everyone.

"Those are the types of opportunities that exist if people can get over this historical paradigm that this is a zero-sum game – if you get anything, it's coming out of my hide and therefore I'm going to fight you tooth and nail," Hedden-Nicely says.

As the climate gets hotter, water supplies both on the Colorado River and in California are expected to shrink and become more erratic. With the pressure mounting, the inequities in the system are becoming hard to ignore.

"I think climate change is forcing these conversations that are uncomfortable because the water's just not there," Marcus says. "And we need to figure out what to do."

# # #

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Gov. Newsom signs budget with bills to streamline environmental approval for clean energy

Infrastructure package signed with $311 billion budget

Mercury News | July 10, 2023 | John Woolfolk

California Gov. Gavin Newsom speaks during a news conference, Thursday, May 25, 2023, in Richmond, California. Newsom updated his plan for the state to move away from fossil fuels. State regulators say California is unlikely to have an electricity shortage this summer. (AP Photo/Adam Beam)

Gov. Gavin Newsom signed off on the state's $311 billion budget Monday along with a package of what he called California's most ambitious environmental review reforms in half a century to speed approval of clean energy projects.

The governor, expected to be a future White House contestant, touted the 2023-2024 budget for the fiscal year that began this month as a model of Democratic financial stewardship, noting it built reserves and closed a nearly $32 billion shortfall.

"We've proven a paradigm: You don't have to be profligate to be progressive," Newsom said.

A key part of that budget was a package of bills aimed at streamlining permitting and project reviews for clean energy and other infrastructure construction that the governor bargained with

lawmakers for in finalizing the state budget last month. The governor has said it will cut project timelines by three years or more while creating thousands of jobs.

The infrastructure legislation builds on Newsom's earlier efforts to reform the California Environmental Quality Act, or CEQA, the state's signature environmental protection law often criticized as overly burdensome.

Then-governor Ronald Reagan signed CEQA into law in 1970. It requires detailed studies of proposed projects to reduce the impacts of noise, traffic, pollution and other factors on wildlife and the environment.

But critics have argued CEQA has invited abuse and project-killing delays, even for environmentally friendly projects like clean energy generators and bicycle lanes. Newsom has said such bureaucratic quicksand put California at risk of losing billions of dollars in new federal infrastructure funding.

"This package cuts green tape to move projects faster," said Assemblywoman Rebecca Bauer-Kahan, a San Ramon Democrat who chairs the Water, Parks and Wildlife Committee and joined Newsom for Monday's bill signing. "But it does so while ensuring that our endangered species and biodiversity are protected, our environmental impacts are considered — just more swiftly — and that we continue to drive down greenhouse gas emissions and mitigate our impacts to our precious lands."

Newsom had announced the bill package in May at a Patterson solar farm that broke ground last August and is expected to be operational in December, flanked by project workers to demonstrate the measures' job-creation potential. The governor said clean energy projects could produce 400,000 jobs over the next decade, and a sign on the desk where he signed the bill read "Building More Creating Jobs."

Three of the five infrastructure bills Newsom signed Monday — Senate Bills 145, 146 and 149 — passed out of the Senate and Assembly with no opposition votes.

- SB 145 calls for wildlife crossings over Interstate 15, which runs from San Diego through Los Angeles to Las Vegas, in connection with intercity passenger rail.
- SB 146 extends environmental review and contracting streamlining provisions for rail and public transportation projects.
- SB 149 calls for limiting CEQA judicial review to 270 days for energy, transportation, water, and semiconductor projects.
- SB 147 allows protected species to be killed by water infrastructure, transportation, wind, solar and associated electric transmission projects as long as there are efforts to reduce the harm and the species wouldn't be driven to extinction. It passed the Assembly without opposition, but five Senate Republicans were opposed.

- SB 150 adds local-hire provisions and other requirements in labor agreements for state projects of $35 million or more in construction costs. All eight Senate Republicans and 11 of the 18 Assembly Republicans were opposed.

Left out of the final infrastructure package as part of last month's negotiations was an effort to streamline CEQA approval for Newsom's plan to build a massive $16 billion tunnel under the Sacramento-San Joaquin River Delta to make it easier to move water from Northern to Southern California. Critics call that project a Southern California water grab, and some Democrats and environmentalists balked.

# # #

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Opinion: Clear California goals needed to develop future water supply

With warmer climate and longer droughts ahead, we must figure out how much more water we'll need and how to get it

Mercury News | July 11, 2023 | Jim Wunderman

The Bay Area is highly dependent on water imported from the Sierra Nevada. (AP Photo/Rich Pedroncelli)

Over the past decade, California has withered and swelled under huge swings in annual rain and snowfall. We've endured two of the most severe droughts in recorded state history, two of the wettest years on record, and even one of those rare occurrences — the average water year.

The trend, however, is clear. California is getting warmer, and the drought intervals between our wet years are getting longer. State officials estimate climate change could reduce water supplies by about 10% by 2040, resulting in an approximate 8 million acre-feet per year loss. Meanwhile, the Colorado River basin is in steady decline, and scientists at Lawrence Berkeley National Laboratories estimate warming temperatures will eliminate the Sierra snowpack most years beginning in the 2040s.

California's prosperity depends on a safe and reliable water supply adequate for meeting the future needs of people and the environment. In other words, the future largely depends on how well we answer two questions: How much more water do we need? And what's the plan to get it?

Right now, we don't know the answers to those questions, but Senate Bill 366 by state Sen. Anna Caballero, D-Fresno, will move us in the direction of getting them.

SB 366 requires the California Department of Water Resources to incorporate ambitious water supply targets into the California Water Plan, the state's guiding water management document, and establishes an interim target of 10 million acre-feet of new water by 2040 achieved through increased storage, wastewater recycling and reuse, desalination and conservation.

It also requires the state to develop an implementation plan necessary for holding policymakers, current and future administrations, and stakeholders accountable for meeting the targets. Furthermore, the legislation would require the state to conduct an economic analysis of the costs and impacts of failing to develop adequate water supplies for people and the environment.

SB 366 also builds on recent actions by state leaders to bolster California's drought readiness. Last summer, Gov. Gavin Newsom unveiled a water-supply strategy that directed state agencies to facilitate the production of 7 million acre-feet of water by 2040 by expanding new storage, recycling, desalination and conservation projects. The strategy puts state agencies on the right path, but SB 366 ensures state agencies will remain focused on developing these targets across future administrations.

Developing future water-supply targets is especially crucial for the Bay Area. Our region is highly dependent on water imported from the Sierra Nevada. Approximately half the water used in the Bay Area — and the majority of all water used by 4 million people living in San Francisco, Alameda, San Mateo and Santa Clara counties — originates in the Hetch Hetchy and Mokelumne watersheds high in the Sierra.

However, warming temperatures have reduced the Sierra snowpack by about 15% since 1950. As the Sierra continue to warm, yesterday's blizzard is becoming tomorrow's monsoon, and water that was once gradually released from melting snow is instead rushing out of the watershed in a deluge. The Bay Area and other regions must be prepared to store, recycle and desalinate more water to prevent a future catastrophic water-supply emergency.

California's topsy-turvy climate has produced a banner water year in 2023, but we can't let that distract us from the long-term trend of more and deeper droughts. The state needs to keep its eye on the ball and help regions develop specific water-supply production targets. For that, we need SB 366.

# # #

Jim Wunderman is the president and CEO of the Bay Area Council.

Recharge Alone Won't End California's Groundwater Drought

Groundwater sustainability will take more than one epic rain year, and recharging aquifers is just one piece of the puzzle.

Bay Nature | July 5, 2023 | Guananí Gómez-Van Cortright

After a winter of historic rains, California's reservoirs are filled to the brim. Rivers are supercharged—and have flooded much of the Central Valley. With the water came a deluge of news voicing worries that California is letting all that water wash into the sea after years of drought—and heralding the idea of capturing it to recharge our long-parched groundwater aquifers. The political will is strong: Gov. Gavin Newsom has issued three separate executive orders aimed at amping up recharge efforts.

But while recharge is a useful way to put surface water back underground, experts say it is a limited solution.

"We have unrealistic expectations of groundwater recharge, as a way of addressing groundwater overdraft and long-term drought in particular," says Jay Lund, a professor of civil and environmental engineering at UC Davis. "We will probably be able to reduce the overdraft by maybe 15 to 25 percent by increased groundwater recharge. It's nice, but it's not going to be enough."

To solve California's groundwater woes, we will need to increase the water supply, as recharge does. But we must also reduce demand—namely, by pumping less groundwater. California's Department of Water Resources has tracked 2.1 million acre-feet of recharge so far in 2023, about one-third of last year's groundwater overdraft of 6.5 million acre-feet. To make a meaningful dent in that overdraft, agencies and landowners will need to take irrigated agricultural land out of production.

"We, along with the locals, are doing everything we can to maximize recharge," says Steven Springhorn, an engineering geologist at the California Department of Water Resources. "But we know that that's not the only action that's needed to get to sustainability."

Water can be recharged by percolating through flooded farm fields, a common sight in the Central Valley this winter. (Photo by Guananí Gómez-Van Cortright)

An underground drought

Chances are, groundwater is flowing beneath your feet.

Groundwater basins are made up of layers of underground aquifers, which store water between layers of rock, gravel and sand. California's aquifers have the capacity to store 850 million acre-feet—17 times more water than all of the state's major reservoirs combined.

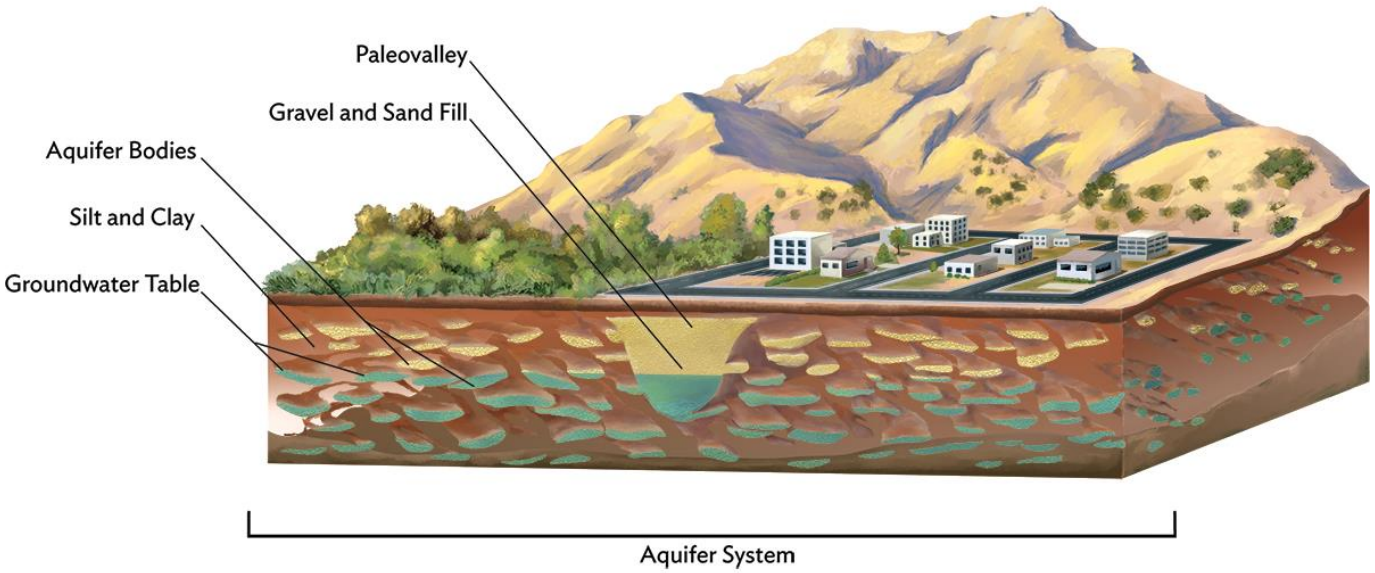
Some surface water naturally percolates down and replenishes these aquifers, but it does so rather slowly. When people talk about recharging groundwater, they usually mean "managed aquifer recharge," where humans intervene to accelerate the percolation process. This can involve injecting water back down into aquifers through wells, flooding agricultural fields, or building recharge ponds to hold water while it percolates.

"The conditions this year really led to a lot of activity and a lot of excitement about the opportunity to recharge," says Andrew Ayres, a research fellow at the Public Policy Institute of California's water policy center. "There are really high hopes, especially in places like [the] San Joaquin [Valley]."

Farmers in California's most profitable agricultural regions hope recharge will help them avoid costly reductions in how much water they pump. But the San Joaquin Valley also sits atop the most overdrafted aquifers in the state, with about 1.8 million acre-feet more water pumped out each year than is replenished. Groundwater sustainability plans in the region ambitiously proposed that 75 percent of the overdraft could be made up for with recharge—but many of the local groundwater sustainability agencies aimed to recharge the same water, according to Ayres. He says it's more likely that 75 percent of the overdraft will be resolved by reductions in pumping, and that maybe 25 percent can be made up with recharge.

This unusually wet winter has relieved California's surface water drought, but not the state's groundwater deficit, which has developed over decades. California uses 1 million to 3 million more acre-feet per year than is replenished—mostly due to overpumping. About 40 percent of California's freshwater supply for human use comes from groundwater—and it's more like 60 percent in drought years. Climate change is exacerbating the whiplash between drought and flood years. This makes it even more essential to recharge groundwater during wet years to rely on in dry years.

"If the groundwater is being depleted, there's only two ways to reverse that: you either reduce pumping, or you increase recharge, or both," says Graham Fogg, professor emeritus of hydrogeology at UC Davis. "In this age of California trying to get its groundwater basins in balance, the more popular alternative is recharge. But in truth, people have to do both."



Graphic by Michelle Buziak

The power of recharge

Experts agree recharge is worthwhile. It can replenish dry wells and groundwater-dependent ecosystems, counter seawater intrusion along coastlines, and keep land from sinking, a major problem in severely overdrafted areas.

Among the best opportunities for recharge are underground geological features known as paleo valleys, which a 2022 Bay Nature feature covered in depth. These long-buried gravel-and-silt riverbeds, reaching up to 100 feet deep and a mile across, make for excellent groundwater storage. Yet most of California's paleo valleys have yet to be discovered; state-funded surveys are mapping them in the Central Valley.

Once a paleo valley is found, storing water in it can still pose scientific, legal, and financial challenges. One paleo valley identified by Fogg and colleagues in Sacramento County seemed perfect—except that it was underneath private property, which would mean extensive negotiations and paperwork. Recharging a significant amount of groundwater, whether in paleo valleys or elsewhere, will likely require paying thousands of landowners to flood their fields or build recharge ponds.

In regions with aquifers that are not so overdrafted, recharge projects have boosted groundwater levels after this year's rains—but that underground bounty is far from equal across the state. Out of the 3,400 California wells monitored by the Department of Water Resources, 59 percent of them showed no change in water levels after this year's wet winter, and 6 percent actually dropped.

"It's a year like this where we're learning a lot about how much recharge can really get done," says Ayres.

# # #

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Local Actions are Key to Progress in Reaching Groundwater Sustainability
DWR | July 05, 2023 | Paul Gosselin, DWR Deputy Dir. of Sustainable Groundwater Mgmt.

A drone view of Fresno Irrigation District's Lambrecht Basin which provides groundwater recharge and groundwater banking. Photo taken April 27, 2023.

Some may be asking after this extremely wet water year -- how is California progressing towards sustainable groundwater management and efforts to recharge groundwater basins? Local agencies, with state support, have made tremendous progress thus far in carrying out the requirements of the Sustainable Groundwater Management Act (SGMA), and locals are continuing to make critical decisions about how to manage this vital resource beneath our feet through future extreme weather cycles.

As the Governor is building a more climate ready California, progress towards a sustainable groundwater future is helping communities become resilient against long-term climate-driven extremes like extended periods of drought and periodic intense storms.

When SGMA was enacted into law in 2014, the California Legislature distinctly recognized that groundwater management is best carried out at the local level, by the people that live and work locally and understand their groundwater conditions and their communities. SGMA entrusted local agencies with new authority to manage groundwater and work with their communities to develop and implement plans to bring California’s groundwater basins into sustainability over the long-term.

Remarkably, all of the ambitious early milestones set by SGMA were met. New groundwater sustainability agencies (GSAs) were formed in all required basins by the June 30, 2017 deadline, and by January 2022 all required basins developed and submitted the first ever Groundwater Sustainability Plans (GSPs) to DWR for evaluation. These accomplishments mark the early successes under SGMA, and we are now transitioning from planning to implementation – where agencies have 20-years to achieve groundwater sustainability.

These strides towards sustainable groundwater management are difficult and complex, and each basin faces its own unique challenges related to local conditions and our changing climate. Local agencies are making important and often tough decisions on how they will reach a sustainable balance of pumping and recharge, and how they will accelerate groundwater recharge and maximize the extreme wet years that may occur infrequently throughout more intense, prolonged drought years.

Some GSAs have taken steps to initiate groundwater pumping allocation programs that reduce the amount of water that has historically been pumped in their basins. In some basins, necessary steps will include fallowing agricultural land and determining alternative land uses, such as habitat corridors. Most basins are working on fee structures to fund these SGMA implementation activities. These types

of decisions affect whole communities, and GSA Board representatives are working hard to find the best path forward for the long-term sustainability of their groundwater basins and their communities.

As SGMA plays out across California, the state wants local agencies to succeed at reaching their sustainability goals, and DWR will continue to provide critical planning and technical assistance to ensure GSAs have the tools needed to manage groundwater resources and implement their plans. As this year's historic water year quickly took shape, DWR supported local agencies to help them expedite groundwater recharge projects that diverted potential flood waters to recharge depleted groundwater basins. Through targeted outreach and assistance to local agencies, DWR has tracked an estimated 3.8-million-acre-feet of managed groundwater recharge capacity this year, in addition to naturally occurring recharge.

Additional DWR assistance includes professional facilitators that help locals work through challenging water management solutions, and important data like airborne electromagnetic technology that describes underground geology. Additionally, since the passage of SGMA and through the next budget year, DWR is on track to award nearly $500 million in grant funding and financial assistance to GSAs for the development and the initial implementation of their plans.

By the beginning of 2024, DWR will complete the initial assessments for the nearly 100 compliant groundwater basins, evaluating how locals are providing a roadmap to achieve long-term groundwater availability. These initial plans are not perfect or the end of the journey to sustainability, but rather the first steps to managing basin conditions that will change over time. We expect plans will be adjusted over time in light of ongoing weather extremes associated with climate change, land use changes, water supply reliability and as data gaps are filled.

Our evaluations may lead to identifying a need for local assistance, new guidance and/or regulatory determinations. Some basins, including those initially approved, may need state intervention along the way. Whether under state intervention or not, locals will continue to progress with implementation of their plans, including submitting annual reports. DWR will provide periodic evaluations at least every five years to ensure GSAs continue to make progress towards achieving their local basin sustainability goals.

Since local control is one of the founding cornerstones of SGMA, GSAs are expected to continue working with landowners, farmers, community-based organizations, and other groundwater users, including domestic well users and underserved communities. All perspectives are valuable, and diverse interests must be considered as part of the local decision-making processes. The public is encouraged to ask questions, be informed, and stay engaged.

As SGMA moves into this next phase of implementation, there will be adjustments and challenges ahead, but through local actions, wise management, and collaboration, the path forward will lead to progress towards a sustainable groundwater future for California.

# # #

California Takes Big Step To Boost Use Of Purified Sewage Water To Combat Drought
LAist | July 12, 2022 | Erin Stone

Mehul Patel, operations director for Orange County's wastewater recycling plant, explains how reverse osmosis works. It's the most important purification step in the water recycling process. (Erin Stone /LAist)

California has taken a big step towards boosting how much sewage water local governments can purify and reuse for drinking — a process known as water recycling. On Tuesday, the state proposed draft regulations to expand recycling by introducing new purification standards and processes.

Why now: California law currently doesn't allow cities to put recycled wastewater directly into municipal water distribution systems. Instead, cities are required to first inject that water underground into an aquifer, where further, natural filtration occurs.

What's proposed: These new regulations would allow putting recycled water directly into the local water system, allowing more cities to recycle water that don't happen to have an underground basin to store water, or don't have enough space in groundwater basins because of past pollution, which is the case in L.A.

Why it matters: The climate crisis is driving longer and more extreme droughts, pushing our already overstretched water supplies to the brink. Recycling more water for drinking is one way

Southland cities are working to lessen reliance on imported water from the Colorado River and northern California.

The backstory: Since 1918, California water agencies have used recycled water that's not purified to drinking standards to create artificial ponds and irrigate places like parks and medians. In recent decades, technology has allowed us to purify that water so it's safe to drink. From Long Beach to San Bernardino, Fountain Valley to Santa Monica, Southern California cities are already recycling more water than anywhere in else in the state. L.A. plans to recycle all of its wastewater by 2035.

What's next: The State Water Board will hear feedback on the regulations and plans to consider adoption of final regulations before the end of the year. See current recycled water projects in the state here.

# # #

Go deeper:

- Southern California Has A Plan To Ease The Colorado River Crisis. And It Starts Right Under Your Feet
- I Drank Recycled Sewage Water To Get A Taste Of SoCal's Water Future
- As Climate Crisis Worsens Drought, Local Water Supplies Are Needed. Southern California Cities Can Lead The Way
- Where Does The Water We Drink, Shower And Flush With Come From?
- Most Read

Beyond the yuck factor: Cities turn to ‘extreme’ water recycling

San Francisco is at the forefront of a movement to recycle wastewater from commercial buildings, homes and neighborhoods and use it for toilets and landscaping. This decentralized approach, proponents say, will drive down demand in an era of increasing water scarcity.

GreenBiz | July 7, 2023 | Jim Robbins

A rendering of the Park Habitat office building, now under construction in San Jose, which will use treated wastewater to irrigate a living green wall. Image via Hayes Davidson/Westbank

In downtown San Francisco, in a cavernous garage that was once a Honda dealership, a gleaming white-and-blue appliance about the size of a commercial refrigerator is being prepared for transport to a hotel in Los Angeles.

There, this unit, called a OneWater System, will be installed in the basement, where its collection of pipes will take in much of the hotel’s graywater — from sinks, showers and laundry. The system will clean the water with membrane filtration, ultraviolet light and chlorine, and then send it back upstairs to be used again for nonpotable uses.

And again. And again.

"There is no reason to only use water once," said Peter Fiske, executive director of the National Alliance for Water Innovation, a division of the Lawrence Berkeley National Laboratory, in Berkeley. Just as natural systems use and reuse water repeatedly in a cycle driven by the sun,

he said, "we now have technologies to enable us to process and reuse water over and over, at the scale of a city, a campus and even an individual home."

While centralized water reuse for nonpotable purposes has been around for decades, a trend called the "extreme decentralization of water and wastewater" — also known as "distributed water systems," or "on-site" or "premise" recycling — is emerging as a leading strategy in the effort to make water use more sustainable.

“Proof of concept is unfolding in San Francisco, which in 2015 required all new buildings of more than 100,000 square feet to have on-site recycling systems”.

The concept is to equip new commercial and residential buildings as well as districts, such as neighborhoods and universities, with on-site recycling plants that will make water for nonpotable use cheaper than buying potable water from a centralized source. By driving down demand for potable water, which is costly to filter, treat and distribute, the units will help manage water more efficiently. It is, many experts believe, the future of water. Eventually it’s hoped that buildings will be completely self-sufficient, or "water neutral," using the same water over and over, potable and nonpotable, in a closed loop.

It’s not just a pipe dream. Proof of concept is unfolding in San Francisco, which in 2015 required all new buildings of more than 100,000 square feet to have on-site recycling systems. So far, six blackwater and 25 graywater systems are using the technology, and many others are in the works. (Blackwater comes from toilets, dishwashers and kitchen sinks; graywater comes from washing machines, showers and bathtubs.) The headquarters of the San Francisco Public Utilities Commission has a blackwater system, the Living Machine, that treats its wastewater in engineered wetlands built into the sidewalks around the building, then uses it to flush low-flow toilets and urinals. The process reduces the building’s imported potable supply by 40 percent.

Recycling graywater alone can save substantial amounts of water. Using it to flush toilets and wash clothes reduces demand for new water by about 40 percent. Using recycled water for showers would eliminate another 20 percent of water demand, though the safety of that practice is being researched and is not yet permitted in San Francisco.

“A fully circular system, in which water is reused on-site for both potable and nonpotable uses, is at least 5 years away”.

To demonstrate its technology, Epic Cleantec, a water recycling company, has even brewed a beer called Epic OneWater Brew with purified graywater from a 40-story San Francisco apartment building.

With the megadrought and water crisis on the Colorado, the Rio Grande and other Western rivers, "extreme decentralization" is making its way to other places in the American West, including Colorado, Texas and Washington state. And decentralized projects are ongoing in Japan, India and Australia. There are serious pressures on fresh water supplies around the

world, with climate change exacerbating shortages. A recent study found that more than half the world's lakes have lost significant amounts of water over the last 30 years. By 2050, the UN estimates that 5 billion people could be subjected to water shortages.

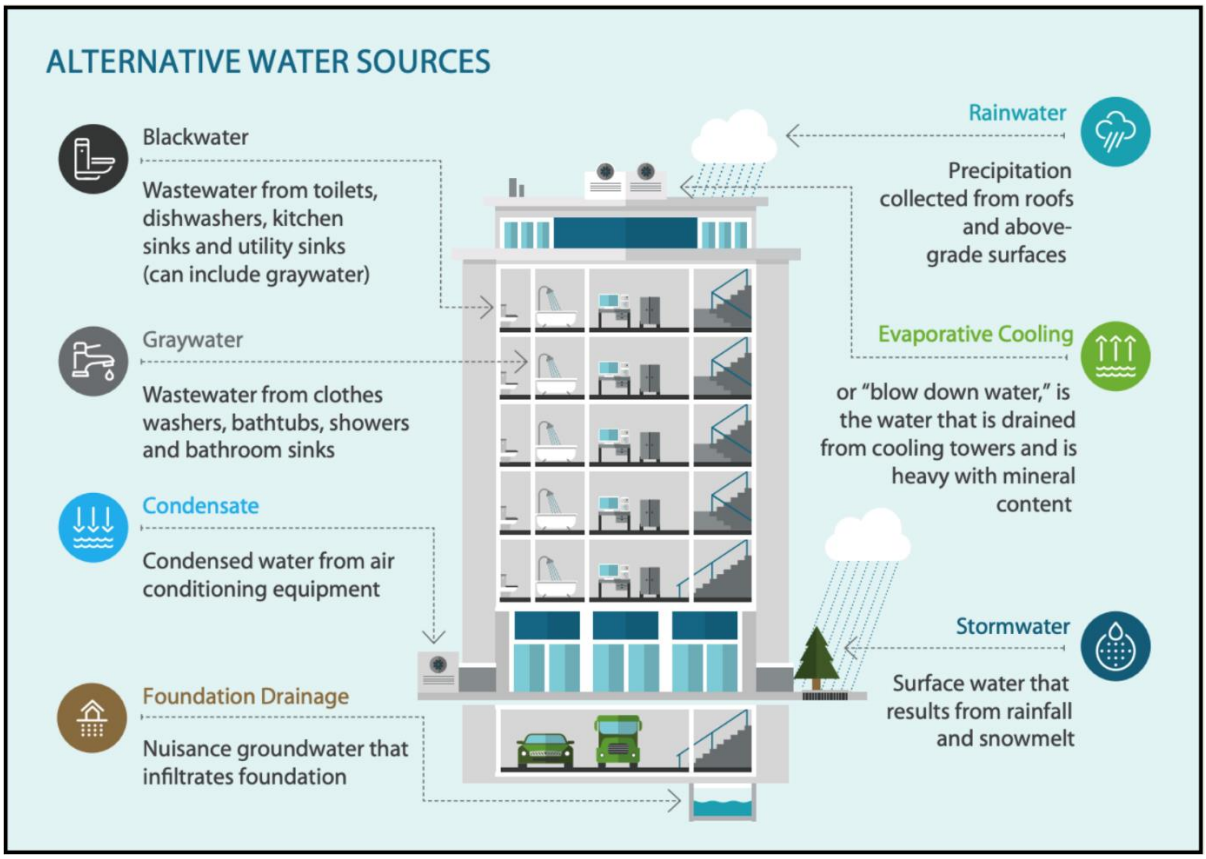
"This is the future of water for everybody," Newsha Ajami, director of Urban Water Policy at Stanford's Water in the West program, said of decentralized water systems and recycling. "It's a slow-moving process, but at the end of the day — considering all the scarcity — a lot of communities are going to pick this up as a way of having economic development while having water security."

"The technology to do this has been around for a long time. What has prevented [its] adoption has been regulatory hurdles".

San Francisco's recycling systems are not water neutral. The largest building with an on-site system is the Salesforce Tower, a 61-story office tower that opened in 2018 and is the tallest building in San Francisco. Built by the Australian company Aquacell, the system cleans 30,000 gallons of sewage, sink, shower and other wastewater each day and uses it for irrigation and toilet flushing, saving an estimated 7.8 million gallons of water a year. That's the equivalent of the annual use of 16,000 San Franciscans, the company says. Outside water is still needed for potable uses. (In New York, the Domino Sugar Refinery redevelopment project, under construction on the Brooklyn waterfront, will recycle 400,000 gallons of blackwater a day.)

The San Francisco Public Utilities Commission, the water provider, estimates that there are a total of 48 reuse systems in operation and 29 more projects being planned in the city. By 2040, the agency says, its Onsite Water Reuse program will save 1.3 million gallons of potable water each day.

The technology for these buildings to capture and treat all their water to potable standards already exists. But the safety of direct reuse of recycled wastewater is still being studied, and U.S. regulations so far do not allow that. A fully circular system, in which water is reused on-site for both potable and nonpotable uses, is at least five to 10 years away in this country, experts say.



Alternative water sources available in a typical urban building. Image via Pacific Institute

Centralized recycled water systems, by contrast, have been used for decades, although they too have rapidly grown as a solution to water shortages. Orange County, California, for example, is home to the world's largest water recycling facility. It cleans 130 million gallons of blackwater a day in a process called indirect potable reuse. Highly treated wastewater, which would normally have been discharged into the ocean, is put through an advanced three-step purification process that includes micro-filtration, reverse osmosis and disinfection with ultraviolet light and hydrogen peroxide. The output is injected into nearby groundwater, to be pumped up and treated to drinking-water standards by local utilities.

In water-short Singapore, the massive Changi Water Reclamation Plant cleans and purifies 237 million gallons of wastewater a day to potable standards.

But the new reuse paradigm fundamentally rethinks water systems, localizing them in much the same way that households and districts with rooftop and community solar have transformed energy systems away from centralized power plants.

New buildings and neighborhoods, said Fiske, of the National Alliance for Water Innovation, may someday no longer need to hook up to sewer lines and water supplies. People will be able to build without regard to connections to water infrastructure, simply by using the same water again and again in a virtually closed loop. "The water that falls on the roof in most places in the

world will be enough to sustain a home," predicts Fiske, citing a recent study that found that this approach could save at least 75 percent of water demand.

“Extreme decentralization' is making its way to other places in the American West”.

Premise recycling not only saves water, it can also save the cost of pumping water over long distances and the costs associated with digging up streets for replacement and installation of pipelines. "Water is heavy," said Fiske, "And we live on a planet with gravity. So use water where you live over and over again."

While in some situations decentralized systems are expected to save money by reducing the energy needed to pump water, in others situations they could require more electricity to pump water through a building.

The increased prevalence of water recycling will allow water to be cleaned to varying standards — or different "flavors" — according to its intended use, a concept called "fit for purpose." Water to flush toilets, for example, doesn’t need to be cleaned as thoroughly as drinking water.

The recycling systems being built in San Francisco are widely considered a success, and representatives from water-stressed cities around the world have come here to study the approach.

Epic Cleantec has designed a system that will provide 30,000 gallons a day for the Park Habitat office building, under construction in San Jose. Its blackwater system will be used to irrigate a living green wall on the tower’s 20-story exterior. The system collects water from rain, cooling towers, showers, toilets and sinks, then circulates it through a multistep treatment process in the basement. The solids are separated, sterilized and turned into a soil amendment.

“This is the future of water for everybody”.

"San Francisco has written the playbook and de-risked the whole process" by smoothing the regulations needed to build these systems, said Aaron Tartakovsky, who founded Epic Cleantec with his father, Igor, and is its CEO. "The technology to do this has been around for a long time. What has prevented the adoption of the technology has been regulatory hurdles. Without any established framework there was no way to get this done. What cities and states are doing is coming up with a clear playbook for how these systems can be operated safely and efficiently."

Tartakovsky said the systems Epic Cleantec is building cost from a few hundred thousand to a few million dollars. The return on investment takes about seven years, he says. After that, there are considerable ongoing savings on water and sewer costs that vary from building to building.

Heather Cooley, director of research for the Pacific Institute in Oakland, an independent organization that studies water sustainability, and an author of a report on distributed systems and water resilience, believes premise systems are essential for California’s water future.

“These on-site and distributed systems are an exciting addition to the range of tools to meet weather challenges,” she said. "They will help build resilience." However, she added, "there’s no silver bullet. They’re not going to be applied in every building everywhere."

“The water that falls on the roof in most places in the world will be enough to sustain a home”.

It might seem counterintuitive that the San Francisco Public Utilities Commission requires new buildings to reduce their consumption of city water: After all, the commission is in charge of selling that resource. But San Francisco has a policy of densification in the urban core. As three- and four-story buildings are replaced with 10- and 12-story buildings, the cost of building new water infrastructure and finding new water sources is soaring.

Premise recycling is also taking place in what are known as districts. The University of California, Davis, has a blackwater system used for irrigation, and new neighborhoods are rising with their own closed-loop recycling systems. In San Diego, for example, developers are building a large district system to recycle blackwater at a shopping center that’s being converted into an office campus.

"Neighborhood scale is the right scale for sustainability" for recycled water, said Claire Maxfield, director of the San Francisco office of Atelier Ten, a London-based engineering and design firm.

“What are the barriers to wider-scale residential changes [on water reuse]?" The yuck factor, experts say”.

Maxfield led the sustainability team that helped design an 11-acre mixed-use district system for Mission Rock, a neighborhood under construction next to the San Francisco Giants ballpark. It will collect blackwater from a main sewer, filter it, then send it to all 17 of the neighborhood’s buildings to be used for irrigation and toilet flushing. "It works really well, and it works really cost effectively" at the neighborhood scale, said Maxfield. "It shares the cost, it’s good for resilience and environmental justice. It’s better than telling everybody to solve this on their own."

A recent study found this approach to water recycling adds about 6 percent to the cost of a single home and 12 percent to the cost of a multifamily dwelling. But as the number of people using these systems increases, economies of scale come into play, making recycled water far less expensive than city water.

The Hydraloop, created in Holland, is one home-based technology on the market, a kind of "water washing" machine. It recycles up to 95 percent of a household’s water, disinfecting shower and washing machine flows to irrigate lawns, flush toilets and fill swimming pools. Overall water consumption declines by 25 to 45 percent. A company in Vancouver makes a product called RainStick, which recycles shower water over and over while you shower.

What are the barriers to even wider-scale residential changes? The yuck factor, experts say. "When we talk about reuse, there’s a lot of fear" among builders and architects, said Maxfield, although she believes they can be overcome.

That’s why, she said, decentralization of water and waste systems appears to be destined to play a major role in a water-stressed world. "No one talked about carbon 20 years ago" in the design of buildings, Maxfield said. "And now everyone does. Water is going to have that moment."

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This story first appeared on: Yale 360

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California lawmakers OK Newsom's push to build energy, water and transportation projects faster

KCRA | July 5, 2023 | Ashley Zavala

SACRAMENTO, Calif. — California lawmakers on Wednesday approved Gov. Gavin Newsom's infrastructure package that aims to make it easier and faster to build renewable energy, water and transportation projects in the state.

The State Senate gave the bills the final stamp of approval with bipartisan support on most of the measures.

The package of bills aims to cut down on the process, paperwork and litigation time for infrastructure projects that are subject to California's Environmental Quality Act.

Critics of California's environmental laws have said they are weaponized to slow down or halt projects. The cornerstone piece of the legislation limits the amount of time certain projects can be tied up in court to 270 days.

"Historic drought, massive flooding and dangerous energy grid blackouts have offered insight into the consequences regulatory gridlock creates for our communities," said State Senator Anna Caballero, D-Merced. "The thoughtful changes were drafted to not only ensure our state's climate goals but ensure public safety and a better future for our constituents."

State Senator Henry Stern, D-Calabasas, said the legislature should consider adding additional projects to fast-track, including other energy and wildfire mitigation projects.

"I don't think this is a perfect bill, and I do think there's actually a lot more work that needs to get done, on CEQA reform even, I truly believe we need to go further," Stern said.

Another piece of the package eases protections for dozens of wildlife species, allowing the Department of Fish and Wildlife to issue permits for projects that may impact species deemed "protected," so long as the project meets certain conditions and does not jeopardize the existence of the species.

Republican lawmakers in the Senate spoke out against this part of the plan.

"It disturbs me that we're going to take all of these species off the fully protected species list so that a company can further the green ideology that comes out of this building and the federal government, to install wind farms and allow them to kill the bald or golden eagles along with all these other species," said State Senator Shannon Grove, R-Bakersfield. "This is a vicious circle."

Democrats rebuffed Grove's claims, noting companies need to plan to prevent negative impacts on certain species.

Another measure allows the California Department of Transportation and the Department of Water Resources to use what's known as the progressive design-build method for some projects, meaning the design and construction of a project are provided by a single contractor.

The plan also requires CalTrans to earmark $50 million of federal funds over the next four years to support the state's high road construction careers program. Lawmakers have said this is meant to provide greater inclusion and equity in employment for women, veterans, and others who come from economically disadvantaged areas.

Newsom's administration has said streamlining parts of the permitting process would help speed up $180 billion in projects. Lawmakers and the governor have specifically excluded water projects that involve seawater desalination and the controversial Delta conveyance project.

The infrastructure package was fast-tracked through the state's budget process, and the plan, introduced weeks ago by Newsom, became the most contentious part of the budget negotiations.

Multiple sources said his initial attempt to include the Delta conveyance project as well as concerns about how the overall plan would impact disadvantaged communities were major sticking points.

Republican lawmakers, who have said they support the governor's overall goal, want to see more projects included in the streamlining effort, including housing and wildfire prevention.

Newsom has said fast-tracking energy, water and other infrastructure plans in California will make the projects more attractive for competitive federal dollars.

In a statement on Wednesday the governor said in part, "Thanks to our partners in the Legislature, we're about to embark on a clean construction boom that maximizes the unprecedented funding available from the Biden-Harris Administration. I look forward to signing these bills to build California's clean future, faster."

The governor is expected to sign the infrastructure package next week when he returns to California.

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