

# Veles Water Weekly Report

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**VelesWater**



## WATER FUTURES MARKET ANALYSIS

Welcome to ***WATERTALK***

by Joshua Bell

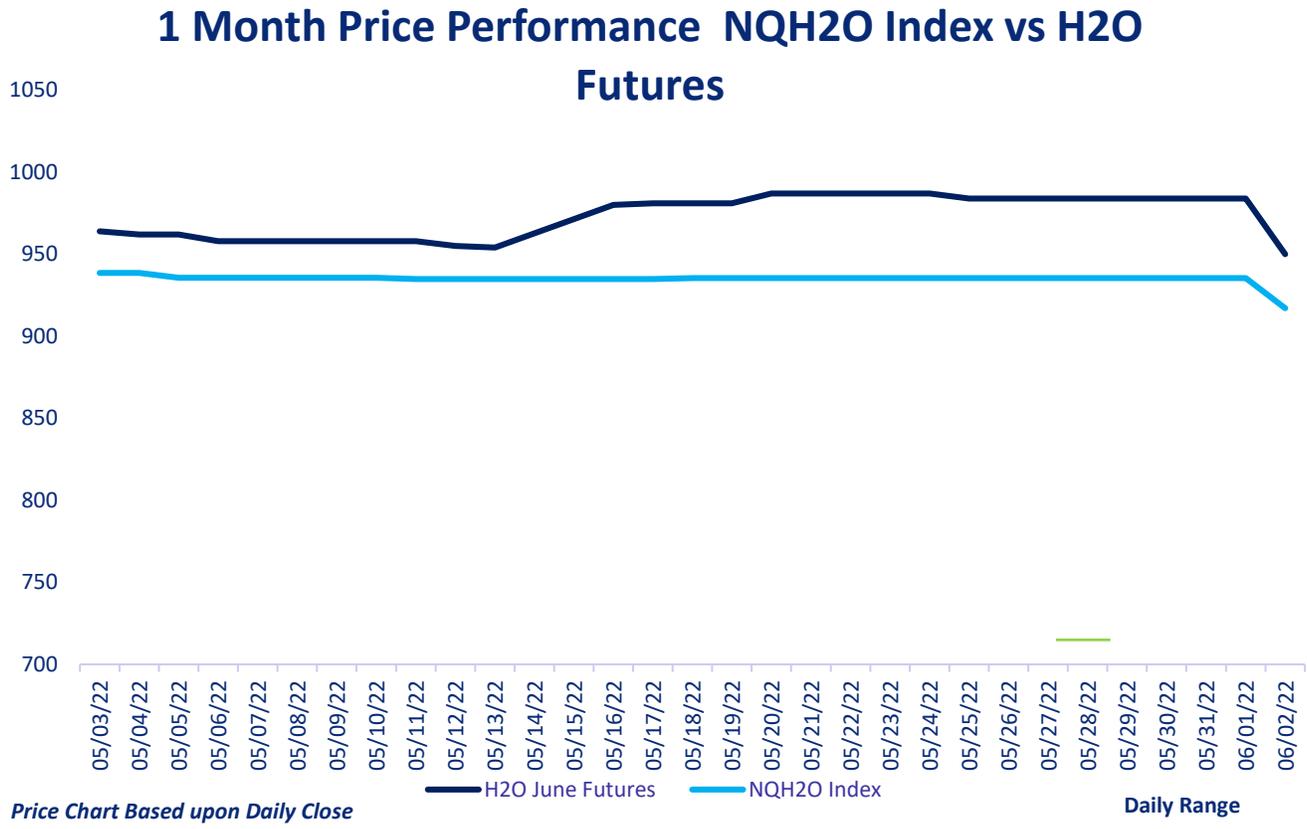
**CLICK THE LINK BELOW**

*"A 2 minute technical analysis video of H2O futures"*

<https://vimeo.com/716291079>



NQH2O INDEX PRICE vs H2O FUTURES PRICE



The new NQH2O index level of \$917.08 was published on the 2<sup>nd</sup> of June, down \$18.37 or 1.96%. Over the past week the June contract had been trading at a premium of +\$32.92- \$48.55.

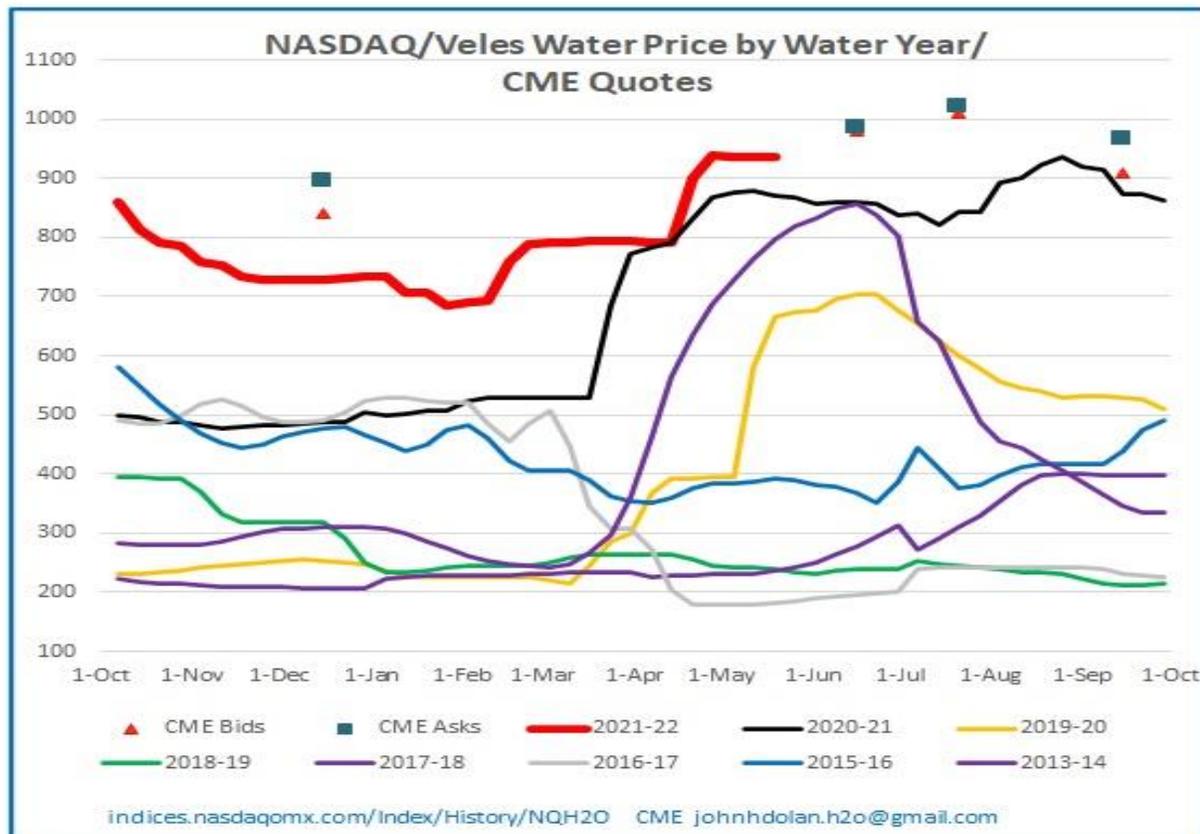
NQH2O is up 29.83% Year to Date.

Below are the bid offer prices on different expiries being quoted in the market.

June 22	921@949
July 22	960@1040
Sept 22	880@948
Dec 22	810@899
Jun 23	1000@1050



NQH2O INDEX HISTORY



The graph above lays out the Nasdaq Veles water index by year, showing 2013- 2022. In very dry years, prices clearly rise through the spring, peaking in May to July (with the exception of 2015) as demand for water from farmers peaks. Prices then taper off heading into the winter on reduced demand, and the possibility of rain/snow. The restricted ability to “carry” water, much like one can do with financial contracts, gives this index the same type of seasonal pattern that one sees on some other commodities.

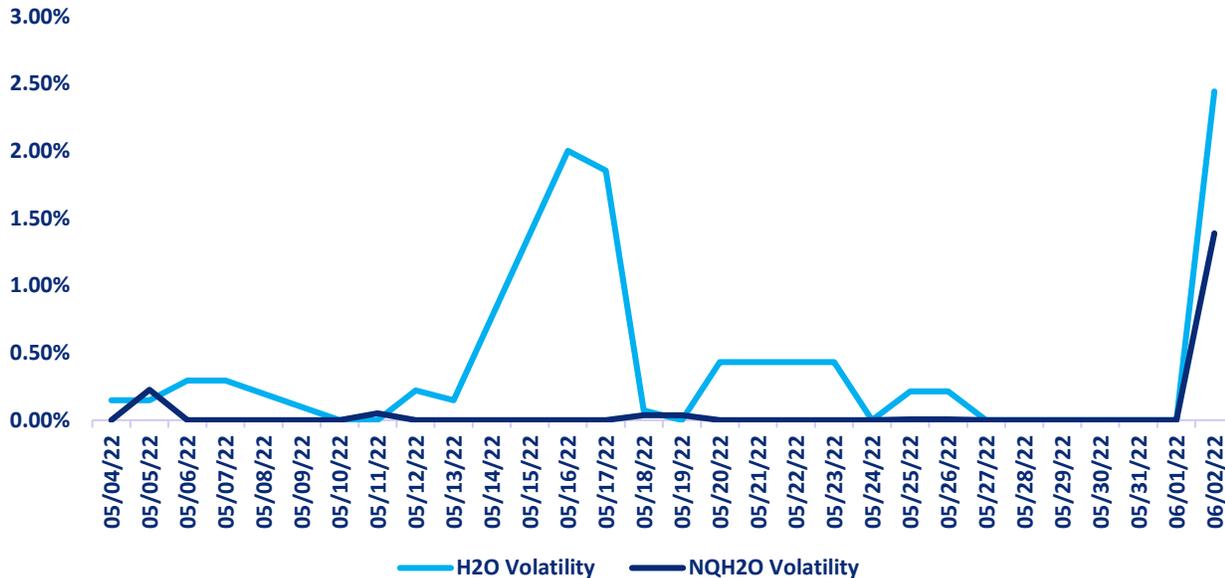
The graph for 2021 is highlighted in red. It shows the same seasonal climb, but at record-high values above each of the last eight years since February. Current bids and offers in the market are still higher than historic prices showing that expectations are that this is an exceptionally dry year and prices may not fall seasonally as much as they have in prior dry years.

**(John H Dolan, CME Market Maker)**



## H2O FUTURES AND NQH2O INDEX VOLATILITY ANALYSIS

### Daily H2O Futures Volatility vs Daily NQH2O Index Volatility



#### DAILY VOLATILITY

Over the last week the June daily future volatility high has been 2.44% on June 1st and a low of 0% for the rest of the week..

ASSET	1 YEAR (%)	2 MONTH (%)	1 MONTH (%)	1 WEEK (%)
NQH2O INDEX	21.60%	12.31%	0.33%	0.044%
H2O FUTURES	N/A	12.06%	2.92%	0.61%

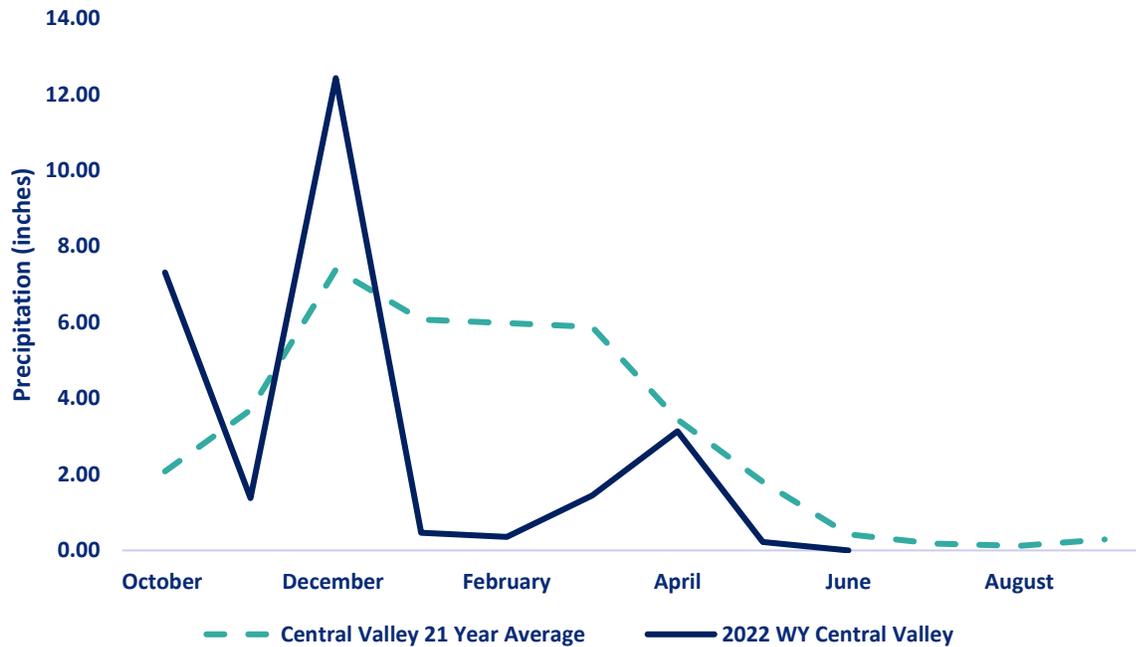
Mixed signals for the week ending on the June 2<sup>nd</sup> the two-month futures volatility is at a discount of 0.52% to the index, up 0.27% from the previous week. The one-month futures volatility is at a premium of 2.63% to the index, up 0.04% from last week. The one-week futures volatility is at a premium of 1.48% to the index, up 0.91% from the previous week.

*Above prices are all **HISTORIC VOLATILITIES** and **IMPLIED VOLATILITIES** will be introduced once an options market has been established. All readings refer to closing prices as quoted by CME.*



# CENTRAL VALLEY PRECIPITATION REPORT

Central Valley Precipitation Index



Central Valley average is calculated using data from 19 weather stations in the Central Valley, California.  
Data as of 01/06/2022

STATION	MTD (INCHES)	WEEK ON WEEK CHANGE (INCHES)	% OF 20 YEAR AVERAGE MTD	2022 WYTD VS 2021 WYTD %	2022 WY VS 20 YEAR AVERAGE TO DATE %
SAN JOAQUIN 5 STATION (5SI)	0	0.00	0.00	47	63
TULARE 6 STATION (6SI)	0	0.00	0.00	35	59
NORTHERN SIERRA 8 STATION (8SI)	0	0.00	0.00	45	78
CENTRAL VALLEY AVERAGE	0.00	0.00	0.00	42	67

## RESERVOIR STORAGE

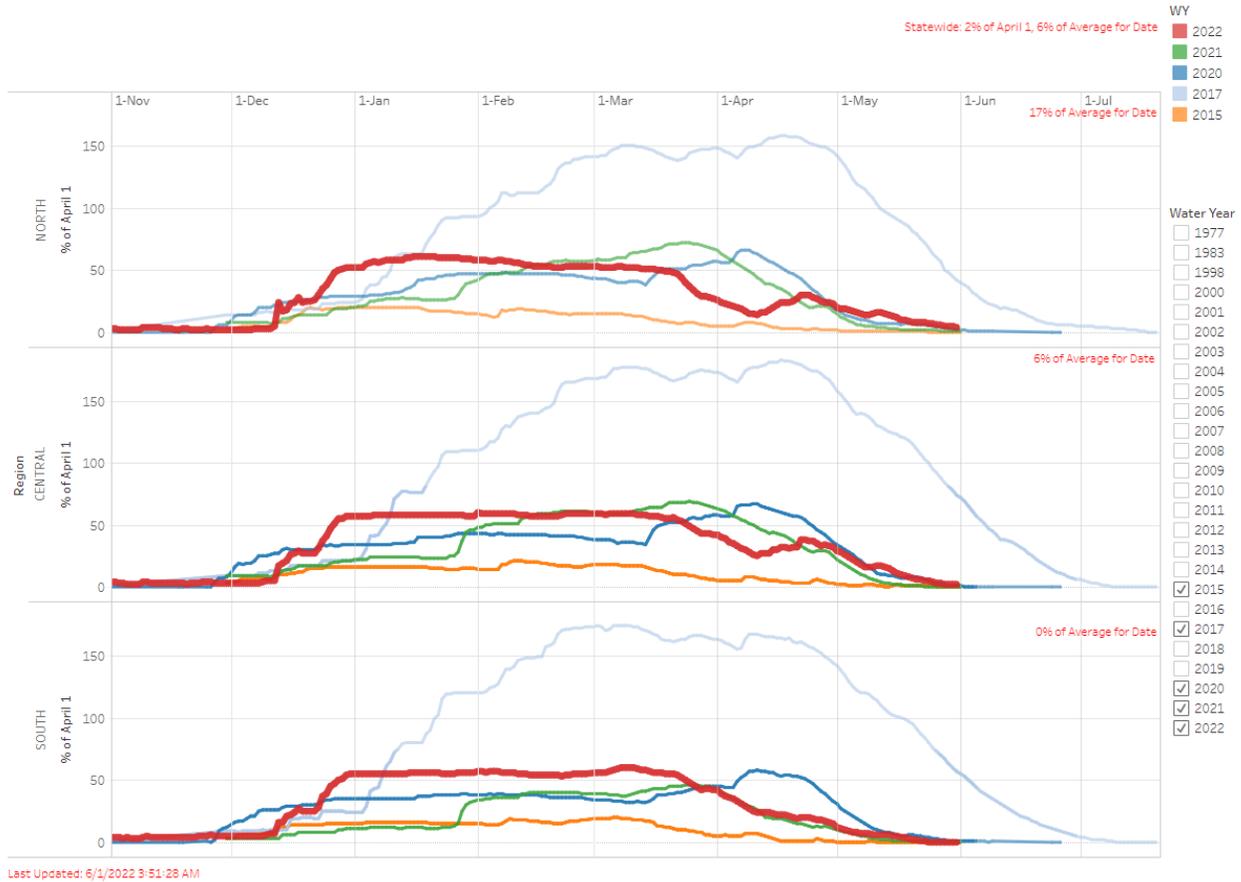
RESERVOIR	STORAGE (AF)	% CAPACITY	LAST YEAR % CAPACITY	HISTORIC ANNUAL AVERAGE CAPACITY %
TRINITY LAKE	739,724	30	52	38
SHASTA LAKE	1,815,129	40	44	48
LAKE OROVILLE	1,915,194	54	38	68
SAN LUIS RES	920,488	45	44	65

Reference: [California Water Data Exchange](https://www.waterdataexchange.com/)



# SNOWPACK WATER CONTENT

## Snow Water Equivalent Dashboard



REGION	*SNOWPACK WATER EQUIVALENT (INCHES)	WEEK ON WEEK CHANGE (INCHES)	% OF AVERAGE LAST YEAR	% OF 20 YEAR HISTORICAL AVERAGE	% OF HISTORICAL **APRIL 1ST BENCHMARK
NORTHERN SIERRA	1.2	-0.80	4	17	4
CENTRAL SIERRA	0.5	-0.90	0	6	2
SOUTHERN SIERRA	0	-0.30	0	0	0
STATEWIDE	0.6	-0.70	0	6	2

\*Snow Water Equivalent, or SWE, is a commonly used measurement used by hydrologists and water managers to gauge the amount of liquid water contained within the snowpack. In other words, it is the amount of water that will be released from the snowpack when it melts. SWE has regional variance.

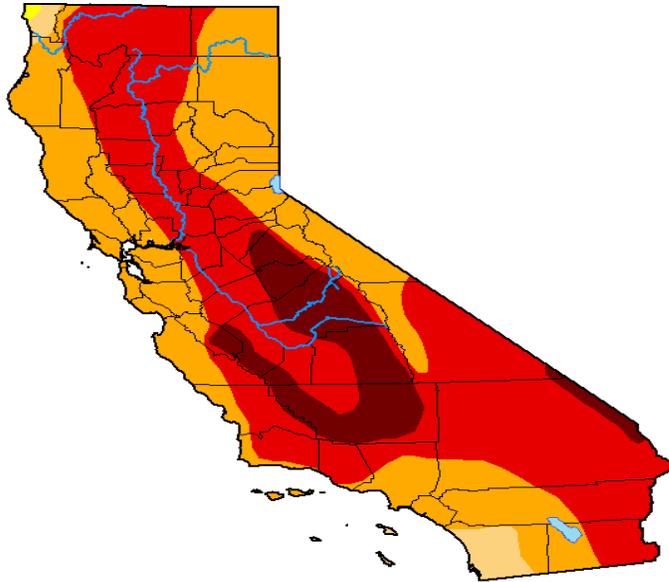
\*\* April 1<sup>st</sup> is used as the benchmark as it when the snowpack in California is generally deepest. It has been used the benchmark date since 1941 by DWR and can be used to predict spring river flow.



DROUGHT MONITOR

U.S. Drought Monitor  
California

May 24, 2022  
(Released Thursday, May 26, 2022)  
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	99.86	97.56	59.81	11.59
Last Week 05-17-2022	0.00	100.00	99.86	95.14	59.81	0.18
3 Months Ago 02-22-2022	0.00	100.00	100.00	68.77	6.70	0.00
Start of Calendar Year 01-04-2022	0.00	100.00	99.30	67.62	16.60	0.84
Start of Water Year 09-28-2021	0.00	100.00	100.00	93.93	87.88	45.66
One Year Ago 05-25-2021	0.00	100.00	100.00	94.61	74.46	26.04

Intensity:

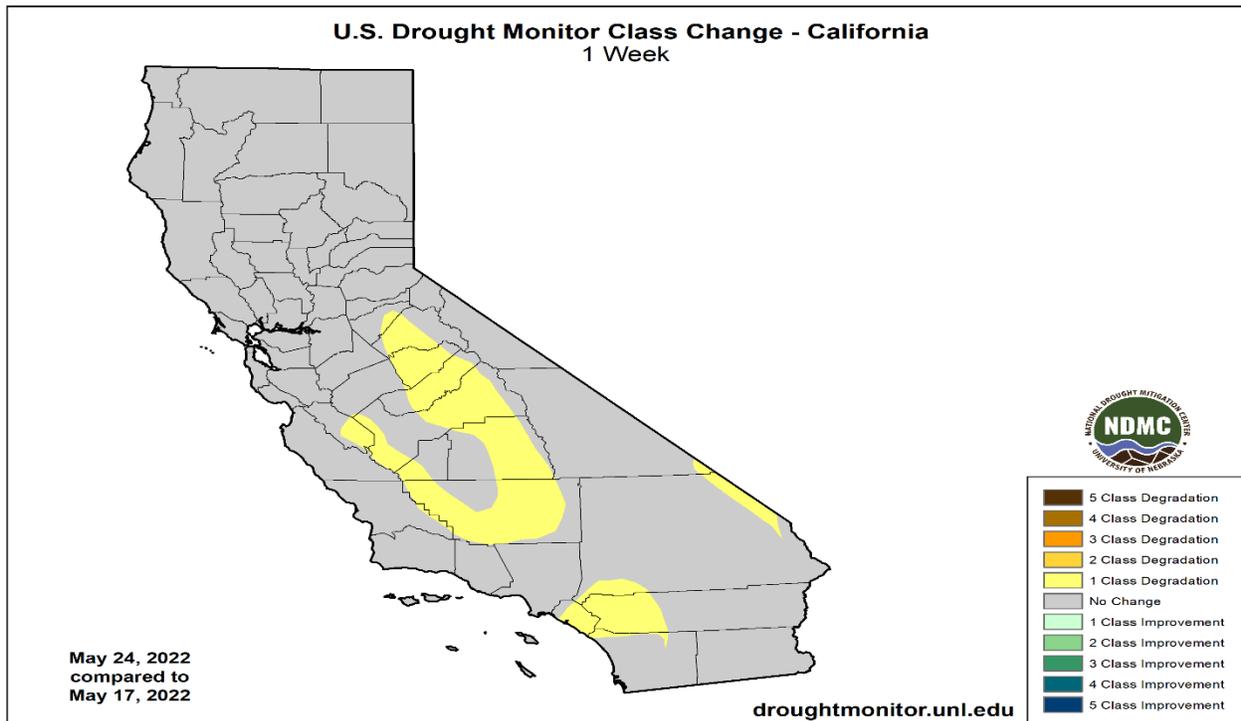
- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

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

Author:  
Richard Heim  
NCEI/NOAA



droughtmonitor.unl.edu

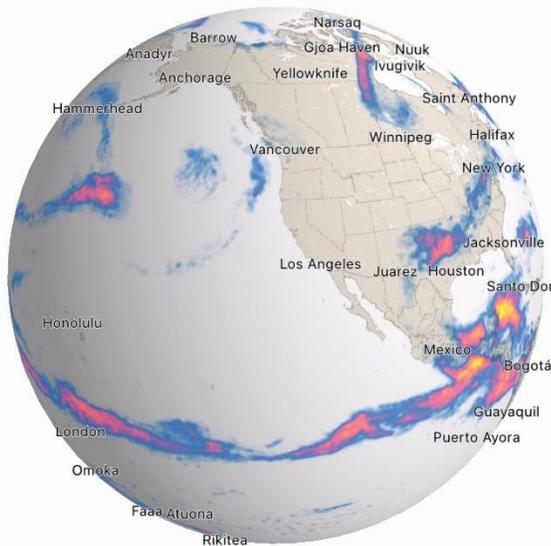
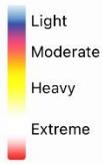


The US Drought Monitor release their statistics with a 1-week lag to this report. Over the past week the has been 2.42% Class 1 Degradation in D2 Severe Drought conditions. There also been a 11.41% Class 1 Degradation in D4 Exceptional Drought conditions.

The U.S. Drought Monitor is jointly produced by the National Drought Mitigation Center at the University of Nebraska-Lincoln, the United States Department of Agriculture, and the National Oceanic and Atmospheric Administration. Map courtesy of NDMC.



## CURRENT SATELLITE IMAGERY

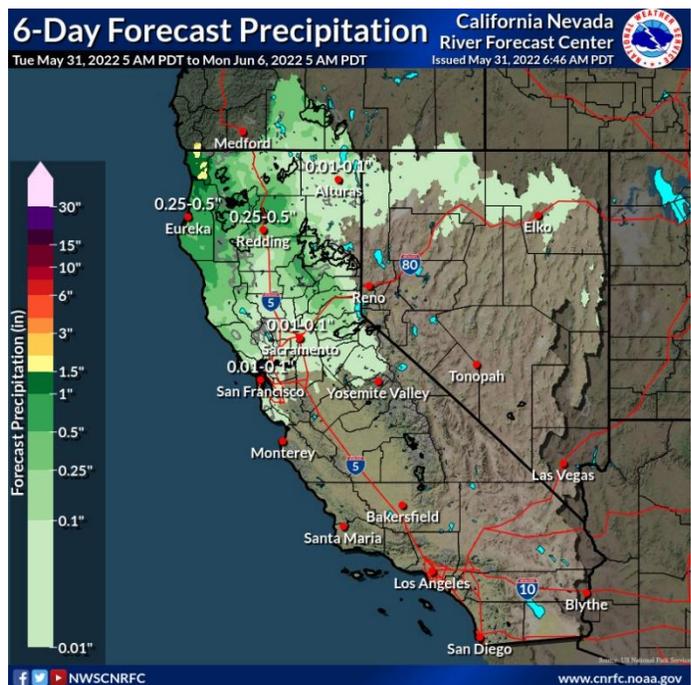


The satellite picture shows a very dry Western US with a weak frontal system just off the Canadian Coastline around Vancouver which may bring very limited precipitation to the Seattle region. This is showing a significant weakening of the Pacific weather systems with a small area of consolidation further west in the Pacific. Once again there is a weather system stretching from Houston through New York up into Eastern Canada. The LA area and the Southern Central Valley region will be relatively dry throughout. There is no Monsoon activity at present and can only be expected in the next few months. There is no Monsoon activity at present and can only be expected in the next few months.

Map: Dark Sky

### 10 Day Outlook

The ridge bringing the mid-week heat looks to be out of the area on Friday allowing temperatures to drop back to near normal. The upper low over the Gulf of Alaska will strengthen Friday evening while a surface low moves towards the PacNW. This system will take a more southerly trajectory compared to Thursday/Friday's allowing for better precipitation chances for northern areas. The GFS/ECMWF both show showers arriving along the north coast sometime Friday night. The ECMWF is just slightly to the south of the GFS with the surface low, spreading precipitation a bit further across the region than the GFS. Both do agree on the surface low making landfall somewhere in the PacNW later Saturday continuing precipitation across the northern portion of the region for the rest of the





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weekend. Highest precipitation totals for Saturday/Sunday will be over the Smith Basin (0.25-0.60") and the crest of the Cascades (0.40-0.70") with amounts tapering off to the south. Some light precipitation may fall as far south as the central Sierra, but likely not more than a tenth of an inch. In addition to potential showers, this change in pattern will also lower temperatures across the region back to below normal for most areas Saturday.

Reference: National Weather Service / California Nevada RFC / Sacramento CA

## WESTERN WEATHER DISCUSSION

Half of an inch or more of precipitation fell in the Coastal and Cascade ranges of the Pacific Northwest, and northern to central Rockies. But more southerly parts of the West, from southern Oregon to New Mexico, received no precipitation. Abnormal dryness to severe drought were trimmed in Washington, Oregon, Idaho, and Montana. Extreme drought shrank in southwest Montana, while exceptional drought was trimmed in Oregon. Some of the drought contraction was due to drought indicators showing slightly less severe conditions. In the drier areas of the West, D3-D4 expanded in New Mexico, D2-D3 expanded in Arizona, D3 spread in Utah and adjoining parts of Idaho and Wyoming, and D2 expanded in southern California with slight expansion of D4 from adjoining southern Nevada. Arms of exceptional drought were added to the San Joaquin Valley in California where the National Weather Service noted that dry conditions continue throughout the area; snow cover is virtually non-existent below 8,000 feet; peak flow through area rivers and inflow into the reservoirs has already occurred or will occur soon, weeks ahead of normal; and applications for grants for well drilling, purchasing tanks, and bottled water recipients are increasing. In southern California, the Coastal Fire broke out on May 11th in Orange County near Laguna Niguel. Windy conditions spread it rapidly upcanyon where it burned 200 acres, destroyed 20 homes, and damaged 12 others. Near-record dry fuels around the May 11th time frame set the stage for this fire.

Reference:

Richard Heim, NOAA/NCEI

Tsegaye Tadesse, National Drought Mitigation Center



## WATER NEWS

### CALIFORNIA WATER NEWS

#### **California drought resurrects decades-old plan for controversial Sites Reservoir**

A long-dead proposal to flood a bucolic valley north of Sacramento and create a massive reservoir for thirsty Southern California is finding new life — and opposition — amid the effects of climate change and worsening drought.

First conceived in the 1950s, the Sites Reservoir project was abandoned in the 1980s — the twilight years of America’s big Western dam-building projects. Now, decades later, a Southwestern megadrought and historic water restrictions in Los Angeles, Ventura and San Bernardino counties are fueling renewed interest in the plan, much to the dismay of environmentalists.

Recently, the Metropolitan Water District of Southern California appropriated \$20 million for project planning, saying the reservoir would make the region’s water supply more resilient in times of drought.

The proposal has also gained bipartisan support led by Gov. Gavin Newsom, \$816 million from a voter-approved bond and more than \$2.2 billion in loans offered by state and federal agencies.

“Drought is pushing this project forward,” said Rep. John Garamendi (D-Walnut Grove), a longtime supporter of the proposal. “We are in the third year of a serious drought, and the frequency of drought has shifted from every 10 years to every few years.”

Newsom echoed support for the plan.

“We’re actually going to get the project done,” Newsom said during a tour of Oroville Dam last month. The reservoir, he said, was “something I’ve long supported.”

The controversy has transformed the western Sacramento River valley into a battleground. Hardly a day goes by during which web pages of agricultural interests and petitions circulated by conservation groups don’t feature some divisive development or fiery comment.

The \$4-billion off-stream reservoir is intended to hold storm water from the Sacramento River and would not dam the river or block fish migration. Operating under the public-private joint powers authority, it would contain, at capacity, 1.5 million acre-feet of water and would be available to investors for consumption, sale or lease. (An acre-foot of water is enough to supply three households for a year.)

But environmentalists say the reservoir will do little to solve Southern California’s water problem.



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“Sites Reservoir won’t provide a lot of water — it will be costly, though, and hard to stop because it enables elected officials to say, ‘Look, we’re doing something about megadrought,’” said Ron Stork, senior policy advocate for the nonprofit Friends of the River. “It’s become their solution to climate change.”

Sierra Club California also warns that the reservoir, about 10 miles west of the small town of Maxwell and Interstate 5, would facilitate development of the controversial Delta Conveyance Project, a.k.a. the Delta Tunnel. That’s because, they say, it would help justify spending about \$20 billion to move fresh water through the tunnel from Northern California to the San Joaquin Valley and Southern California.

Mike Conroy, executive director of the Pacific Coast Federation of Fishermen’s Assns., describes the reservoir proposal as “an expensive water grab that benefits California’s most wasteful water brokers, not average Californians.”

Yet in a region that is renowned for its bounty of rice, almonds, walnuts, pistachios and fruit trees, public sentiment for dams and reservoirs runs deep.

Billboards along Interstate 5 and State Route 99 proclaim, “Build Dams Now,” “Newsom stop wasting our dam water!” and “Irrigation matters.”

If permitted, the first major new reservoir built in California since 1999 would be owned and operated by a group of Central Valley agricultural interests and water districts.

Original Article: [The LA Times by Lois Sahagun](#)

### **Does California have enough water for lots of new homes? Yes, experts say, despite drought**

To some, it defies common sense. California is once again in the middle of a punishing drought with state leaders telling people to take shorter showers and do fewer loads of laundry to conserve water. Yet at the same time, many of the same elected officials, pledging to solve the housing crisis, are pushing for the construction of millions of new homes.

“It’s the first question I’d always get,” said Jeffrey Kightlinger, who until last year ran the Metropolitan Water District of Southern California, the agency that delivers the water ultimately used by half the state’s population. “How in the world are you approving new housing when we’re running out of water?”

The answer, according to Kightlinger and other experts, is that there’s plenty of water available for new Californians if the 60-year trend of residents using less continues and accelerates into the future.

Case in point: Angelenos use 44% less water per person annually than they did four decades ago, according to the Los Angeles Department of Water and Power.

Some of the changes that have freed up additional water supplies in the past, and could continue to free up water, go unnoticed by many people. New development almost always includes more water-efficient faucets, toilets, appliances and showers than older homes.



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Other efforts, such as building wastewater recycling plants to increase water supply, might be costly, but are needed to adapt to more severe droughts with the warming climate.

The landscaping must change too. Think fewer lush lawns and grassy median strips and more gardens filled with native plants.

“The reality is we use water so inefficiently and so poorly, there’s so much opportunity to change that,” said Newsha Ajami, chief development officer for research at the Lawrence Berkeley National Laboratory. “A lot of that opportunity we can use to house people.”

Most of California’s water isn’t used by people going about their daily lives at home or work. About 80% of water use statewide is for agriculture, with the rest for houses and businesses.

Of that remaining 20%, nearly half goes toward watering lawns and landscapes, washing cars or sidewalks, or filling pools and spas.

In the past, the state’s population grew in tandem with water use. But that changed starting in the 1960s. Between 1967 and 2016, California’s economy increased fivefold and the population doubled, yet water use rose by only 13%, according to a new study by the Pacific Institute, a Bay Area think tank.

In more recent years, the shift has been even more startling. Since 2007, both total and per capita water use in the state has declined substantially. Total urban water use in 2016 was at levels not seen since the early 1990s, the report found.

Original Article: [The LA Times by Liam Dillon](#)

### **Is This California’s Year for a Long-Term Drinking Water Assistance Program?**

For 35 days between March and April of this year, Dante Woolfolk went without any running water in his house in Brooktrails, a small town nestled amid the leafy canopies of Mendocino County in Northern California. A spiraling unpaid water bill had led the local water system to turn off the spigot.

For those 35 days, says Woolfolk, his life was upended. He purchased water to cook, make coffee and clean the house. He believes he “easily” spent \$600 on bottled water alone. The 36-year-old’s three children stayed with a nearby friend. Woolfolk showered there, too. “I’m so grateful for that,” Woolfolk says of his friend’s largesse. But those 35 days without running water were hard, he says.

Woolfolk lost his hotel maintenance job at the start of the pandemic and has been unemployed since. His water bill, he says, was roughly \$1,700 in arrears when the tap was shut off. He tried numerous times to make incremental payments on the debt, but the local community services district wouldn’t accept his overtures, he says. Woolfolk’s mother even made a \$100 payment, but the water system operators still turned his water off soon thereafter, Woolfolk says.



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The Brooktrails Township Community Service District failed to respond to questions. State water board spokesperson Blair Robertson wrote in an email that the agency wouldn't comment on an "open investigation."

The issue spilled out at Brooktrails Township board meeting in April when Woolfolk and several community advocates took to the floor to decry the shutoff, and to offer money to cover the debt using funds raised through a GoFundMe campaign. The service district subsequently accepted the money, he says, and water once more flows through the faucets in Woolfolk's home.

Woolfolk's experience underscores a gaping hole in California's low income safety net: the lack of a long-term drinking water rate-payer assistance program.

The state has been working towards such a program for years, but these efforts have been shaped by disagreement over issues like long-term funding sources and which agency should manage it. These differences are exemplified in Gov. Newsom's May revised budget, which includes \$200 million to bolster a federally funded, nationwide low income water assistance program rolled out here in California by a state agency. With that particular pot of money, eligible customers can apply for a one-time remittance to help cover any water-related debt.

"We support the governor's proposal," said Cindy Tuck, deputy executive director of the Association of California Water Agencies (ACWA), the largest statewide coalition of public water agencies in the U.S., representing 90% of the water delivered in California. Advocates for a permanent — as opposed to a one-time — drinking water rate assistance safety net say the state can do better. Such a program, outlined in a bill introduced last year, would offer ongoing relief to struggling households, and potentially the undocumented. If instituted, it would be the first such program in the nation.

"It's positive we're putting money towards the low income household water assistance program," said Michael Claiborne, directing attorney with the Leadership Counsel for Justice and Accountability, a policy advocacy nonprofit, referring to the federal crisis assistance program. "But it doesn't establish the low income rate assistance program we've been working towards."

The average California household paid around 45% more per month for their drinking water in 2015 than they did in 2007 (adjusting for inflation), while the expenses associated with bringing struggling water systems up to code — especially amid a drought worsened by climate change — are expected to raise the cost to households again significantly. An indication of the impact from these rising costs can be seen in a state survey from the end of 2020 that found around \$1 billion in water debt affecting 1.6 million California households and 5 million individual residents. In 2019 alone, some 500,000 Californians suffered water shutoffs. Those shutoffs came not only before the pandemic but before the impact of soaring inflation, which has weighed heaviest on California's poorest.



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Without a statewide drinking water rate-payer assistance program, the task of helping debt-riddled customers has largely fallen to local water agencies. A report from early 2020, however, found that only about half of California's community water system customers are served by a utility that offers a rate-payer assistance program, and less than 20% of the state's poorest received such a subsidy. Even when a water system does offer assistance, the amount of financial assistance can vary drastically. Further complicating matters, say utility operators, is that they are statutorily precluded from raising rates on wealthier customers to subsidize lower income residents.

Ten years ago, California passed the Human Right to Water Act — a landmark slab of legislation intended to guarantee every Californian clean, accessible and affordable water. That bill has precipitated a slew of actions including a sweeping plan to better manage the state's vulnerable groundwater resources, and a program to fix failing water systems. Legislation passed in 2015 set the ball rolling towards a statewide water assistance program, one outlined in SB 222, introduced last year by Sen. Bill Dodd.

While that bill works its way through the Legislature, the state water board has given a trial run to a drinking water and wastewater assistance program using nearly \$1 billion in funds allocated last year to cover debts accrued during the height of the COVID pandemic.

The water board says it distributed some \$301 million through the drinking water portion of the arrearages program. (Brooktrails received nearly \$300,000 to cover drinking water debt accrued between March 4 of 2020 and June 15 of last year.) The water board has also issued some \$73 million to cover wastewater arrearages. Nearly \$60 million went to the Los Angeles City Bureau of Sanitation alone.

Original Article: [Capital & Main by Dan Ross](#)

### **Department of Water Resources partners with Caltrans to remind Californians of urgent need to save water due to severe drought**

Beginning Friday and running through Memorial Day, the California Department of Water Resources (DWR) is partnering with the California Department of Transportation (Caltrans) to convey the emergency conditions the State is facing with severe drought, according to a press release.

Caltrans electronic signs across the state will display the message "Severe Drought. Save Water. Save California."

DWR has coordinated Save Our Water, California's statewide water conservation program, since 2009.

The messaging partnership aims to raise awareness of the urgent need for Californians to save water as we head into the hottest and driest months of the year.

January through March were the driest first three months of the year in the state's recorded history. As drought conditions intensify, it is critical that all Californians do



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their part to save water, especially cutting back on outdoor watering which accounts for up to 60 percent of the average Californian's water use.

Original Article: [The Desert Review](#)

### **What is the right length of time for the California drought shower?**

On mornings that are chilly by Los Angeles standards, Camilo Loza sometimes takes a hot shower before heading to the gym.

After a workout on the Stairmaster, Loza bikes home to Windsor Hills and showers again. And a few nights a week, Loza takes a third shower after getting home from work.

California is now in the third year of a drought that ranks among the worst on record. But Loza says showering is an occasional indulgence in a studio apartment that has no lawn, no garden and no pool.

"My water use is pretty minimal, and mostly utilitarian," said Loza, 32, who works in logistics for an heirloom food company. Loza previously worked as a line cook in restaurants and hotels, and left those jobs thinking that even modest water reductions at institutions and businesses "would have a far more profound effect than anything I could do at home."

Driven by worsening drought conditions and reduced supplies from the complex system of reservoirs, canals and dams that supplies water to millions, the Metropolitan Water District issued its strictest-ever water cuts last month. Starting June 1, nearly 4 million customers in Los Angeles will face new restrictions on water use, with outdoor watering limited to two days per week.

Gov. Gavin Newsom told the state's largest water suppliers last week that if conservation efforts don't improve this summer, the state could be forced to impose mandatory restrictions. Water use in cities and towns across California rose by nearly 19% in March compared with 2020, according to state officials.

Showers aren't in the crosshairs yet. But officials are encouraging Californians to save water wherever they can, including in the shower, one of the easiest places to waste — or conserve — a few gallons a day.

Which raises the question: Just what is the right length of time for a shower? Is it the national average of eight minutes, which the U.S. Environmental Protection Agency estimates uses more than a trillion gallons each year? Is it the so-called Navy shower — water on for 30 seconds, lather, rinse for a minute or so?

Or is it the Newsom model? The governor encouraged Californians last month to shorten their showers to five minutes and switch away from baths, which can use up to 2.5 times as much water.

That's second nature to some Californians whose habits stuck after past droughts. Others are tinkering with their behaviors now, sticking egg timers to shower walls, installing lower-flow shower heads, or turning off the tap while they lather up.



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Zan Dubin-Scott, who lives in Santa Monica, recently started putting a watering can in the shower to catch the water as it warms up.

The 2.1-gallon, terracotta-colored can doesn't hold as much as the 5-gallon tubs that others recommend, but Dubin-Scott knows she can easily lift it and reuse the water on her potted plants.

"It's about not letting the perfect be the enemy of the good," Dubin-Scott said. "Imagine if every Californian stuck a pretty little watering can in their shower and saved 2.1 gallons every day."

But losing or scaling back the relaxing, comforting solitude of a daily shower can be a tough sell, even in a drought. If a few extra gallons slip down the drain, some say, they'd still rather give up just about anything else first.

"In this hellscape that we're living in, it's the one joy I have left," said Enia Titova, 40, a lawyer in San Francisco.

The shower is one of the few places Titova can ignore her phone and relax. The warm water soothes her aching joints. Sometimes, she does a little yoga. She's rarely out in less than 20 minutes.

Titova said she leads a generally water-conscious life, in a small apartment without a yard, and with a diet light in meat, which has a large water footprint. So longer showers don't worry her.

"Not to overextend the metaphor, but my shower is a drop in the bucket," Titova said. "I would like to keep my showers for as long as humanly possible."

Original Article: [The LA Times by Laura J Nelson](#)

## California faces power shortages and price hikes amid drought woes: report

California faces the grim prospect of a drought-fueled summer of power shortages, hydroelectric plant shutdowns and rising electricity costs in areas where PG&E and other utilities provide services, a report released Friday warns.

The drought could deplete big reservoirs in California such as Shasta Lake and Lake Oroville to the extent that the hydroelectric plants at those sites might have to suspend operations, according to the report from the U.S. Energy Information Administration.

The forbidding electricity scenarios have surfaced due to an alarming drop in water levels at reservoirs throughout California. As of April 1, Shasta was at just 48% of historical average storage while Oroville was at 67%, the report said.

"During drought years with lower-than-average storage levels, releasing water from storage increases the possibility that the reservoir water level will drop to a point at which hydroelectric generation is no longer feasible because the water level is lower than the point of entry into the facility," the federal energy information agency said.

The new challenges arrive at a time when California residents have already been urged — or even obliged — to slash energy and water usage.



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And in March, the monthly bill for the average customer who receives both electricity and gas service from PG&E jumped to \$196.95. The monthly bill for residential electricity and gas service is now 14% higher for the typical customer than it was at the end of 2021.

PG&E is also seeking state approval to capture more revenue from ratepayers to help bankroll costs for an array of facilities and operations, according to a regulatory filing in April.

The possible shutdown of a huge hydroelectric plant isn't merely hypothetical or something that happened long ago, either.

"This situation occurred in late 2021 at Lake Oroville," the EIA report said. "During the summer of 2021, the Oroville reservoir was drained to the point that the adjacent hydropower plant, Edward C. Hyatt, had to go offline due to drought conditions for the first time since it started operations." The Hyatt plant was completed in 1967, according to the state Water Resources Department.

Plus, the Golden State has altered the mix of its power supplies lately, according to the federal agency.

"In recent years, California has shifted toward more solar and wind energy resources for electric power generation and away from natural gas power plants," the EIA reported. Hydroelectricity is often cheaper and more flexible than other sources such as natural gas. But since 2015, 58% of steam turbine natural gas units located in California have been retired, a reduction of 6,500 megawatts of electricity, the federal agency stated. That could intensify the demand for electricity from plants in other states such as Arizona, Oregon and Washington.

But the drought has scorched neighboring states as well, which could mean they might have to cling to their own electricity supplies rather than export the power to an energy-hungry California.

An increased reliance on non-hydro sources or suppliers from outside of the Golden State may trigger spikes in power costs.

Those costs will trickle down to customers turning lights on in their homes, running air conditioning, doing laundry and more.

"Our analysis showed that all summer electricity prices in California increase under a drought scenario," the federal agency said in its report.

To help alleviate the potential shortage of electricity, Gov. Gavin Newsom and PG&E are exploring ways to keep the vast Diablo Canyon nuclear power plant perched on a scenic stretch of the California coast in San Luis Obispo County operating beyond a scheduled shutdown date of 2025.

Original Article: [Silicon Valley/ Bay Area News Group by George Avalos](#)



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### **New drought rules go into effect today. Here's what you need to know**

Get ready for short showers and brown lawns: More than 6 million Southern Californians will be placed under new drought rules today in an unprecedented effort to conserve water.

The restrictions are a response to the Metropolitan Water District of Southern California's urgent call for a 35% reduction in water use following California's driest-ever start to the year. MWD's board has never before issued such severe cuts, but said they were left with little recourse after state officials slashed deliveries from the State Water Project to just 5%.

"We have not had the supply to meet the normal demands that we have, and now we need to prioritize between watering our lawns and having water for our children and our grandchildren and livelihood and health," MWD General Manager Adel Hagekhalil said during the agency's announcement at the end of April.

More than 97% of the state is now under severe, extreme or exceptional drought, according to the U.S. Drought Monitor. Many of the region's most critical reservoirs are at half capacity or less.

Original Article: [The LA Times by Hayley Smith](#)

## US WATER NEWS

### **Capturing biogeochemical details in river corridor models**

#### **The Science**

In many streams and rivers, water moves between the open channel and the adjacent groundwater. This exchange enables biological and chemical reactions in the sediments near the streams. These reactions remove or transform carbon, contaminants, and nutrients. Researchers developed a new modeling strategy to represent these effects in watershed-scale models. The new model is equivalent to existing models when there are no reactions. However, unlike those existing models, it also accommodates biological, geological, and chemical reactions. In contrast to alternative representations based on diffusion, the new model can represent the development of sharp gradients in oxygen concentrations in sediments near the river.



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### The Impact

Current computer models for how carbon, nutrients, and contaminants move and transform in river corridors do not adequately simulate biological, geological, and chemical (biogeochemical) processes. This is because the models do not fully capture scientists' current and emerging understanding of the water properties and the biogeochemical factors involved. The underlying problem is a mismatch in how these models address the spatial scale of those processes versus the scale of the systems that they affect. A new model for river-groundwater exchanges can represent those processes at the scale at which they are typically studied. At the same time, the model works well at the scale of watersheds that link rivers and streams. This establishes a framework for a new generation of models that capture the biogeochemistry of river networks.

### Summary

The transportation in rivers and streams of solutes—artificial materials such as pollutants and natural materials such as dissolved nutrients and gases—occurs primarily in flowing stream channels. However, biogeochemical transformations of carbon, nutrients, and contaminants often occur in highly localized metabolically active regions in the hyporheic zone, which is the region of saturated sediments adjacent to the stream channel. Representing stream hyporheic-zone processes is a central challenge in extending stream network flow models to include biogeochemistry. Multiscale models representing hyporheic-zone processes in subgrid models coupled to stream flow models provide an alternative to explicit three-dimensional representations, which are not feasible at watershed scales.

Researchers from Oak Ridge National Laboratory (ORNL) created a new multiscale representation of stream hyporheic processes that associates a one-dimensional subgrid model for transport and reactions with each channel grid cell in a stream network flow model. Each subgrid model represents a collection of streamlines that are diverted into the biogeochemically active hyporheic zone before returning to the flowing channel. The subgrid model is written in travel-time form, with hyporheic age serving as the independent spatial variable. In contrast to previous travel-time representations, the new model accommodates multiple mobile or immobile chemical species and general nonlinear biogeochemical reactions. Unlike alternative formulations based on multirate diffusion, the new multiscale model can represent biogeochemically important gradients in redox conditions.

Original Article: [Eureka! by Michael Church/ DOE/ US Department of Energy](#)

### Gray Declares Victory in Effort to Keep Reservoir Projects Moving Forward

Assemblyman Adam Gray (D-Merced) put together a bipartisan coalition to defeat a bill that would have prohibited the State Water Board from issuing new water right permits.



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The bill's defeat came in a showdown Thursday between Gray and the author of the legislation, Assemblyman Bill Quirk of Hayward, a fellow Democrat.

According to Gray, Assembly Bill 2639 would have jeopardized new water storage projects such as Sites Reservoir in the drought-ravaged state.

Sites is one of seven water storage projects eligible for funding from a 2014 voter-approved state water bond. In March, the federal government signaled its intent to loan the Sites project nearly \$2.2 billion — about half of the cost to design, plan and build it. “It took a broad coalition to defeat the bill. The San Joaquin Valley doesn’t always have enough friends in the state Legislature to stop bad bills, but we did today,” Gray said in a news release. “I am grateful to my colleagues who took the time to understand a complicated issue.”

The bill needed 41 votes to pass the Assembly, but it received 33. Forty-four lawmakers voted no or abstained. The strongest opposition was recorded from representatives from the San Joaquin Valley, Sacramento, and Inland Empire.

“There is no other region of the state that would be as heavily impacted by this bill as my district and the people I represent,” Gray said. “I asked my colleagues to consider what they would ask of me if their districts were similarly targeted. I told the story of the decades-long fight my community has waged against the water grab, and how the State Water Board has decided that the impacts to our economy and our drinking water are ‘significant, but unavoidable.’ I asked them if the Assembly was prepared to make the same decision.”

Original Article: [GV Wire by Bill McEwen](#)

## **Disaster Upon Disaster: Wildfires Are Contaminating The West’s Depleting Water With Ashy Sludge**

Officials in Las Vegas, New Mexico, had barely finished battling the massive Calf Canyon-Hermits Peak wildfire earlier this month before they had to point their defenses toward another threat: the ash-filled erosion that could pollute their water.

The fire-scarred land along the banks of the Gallinas River is on the forefront of Mayor Louie Trujillo’s mind these days. As much as the parched West needs rain, Trujillo and other officials are racing the weather to divert precious river water into a downstream lake before downpour comes and washes the burnt topsoil and ash into the river.

“There are large portions of the watershed you can see that are completely burned. It looks like burnt toothpicks sticking out of the ground for acres and acres,” Trujillo told CNN. “With the soil instability, during a heavy rain event it would be like putting water on a bunch of baby powder where it doesn’t absorb at all; it just falls. We hope to beat the monsoon season, doing some of the interventions we’re going to have to do along the watershed.”



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Megafires aren't just burning down homes, trees and wildlife in the West. They're also destabilizing the soil. When it rains, thousands of tons of charred sediment flow into rivers and reservoirs used for drinking water. The Gallinas River, for example, supplies about 90 percent of the water for Las Vegas.

"It's literally like tasting dirt," said Andy Fecko, general manager at the Placer County Water Agency in Auburn, California, a city that sits between Sacramento and Lake Tahoe. "It adds a tremendous amount of treatment costs," Fecko told CNN. "You're trying to filter out water that's 10 to 20 times dirtier."

Even if they can filter out the taste of dirt and ash, water treatment managers also worry about the lingering impacts of charred organic compounds mixing with the chlorine used to purify the water so it's drinkable. The Environmental Protection Agency has warned about the health impacts of mixing the two.

All of this is adding more stress to water resources that are already depleting in the West's megadrought. Conservationists and officials are sounding the alarm about yet another impact of a warming climate, massive wildfires and fragile water resources.

"This is not our first megadrought, so we have to make really good use of every drop of water that we store," said Dan Porter, forest program director for the Nature Conservancy. "These megafires are making that very difficult to do."

In September 2014, California's King Fire ripped through over 100,000 acres in El Dorado County. That fire was relatively small by the standards of other megafires, but it burned very hot.

It was "a blast furnace of an event that obliterated everything in its path," Fecko told CNN. "It was nuclear winter up there after that event."

The fire was just the first problem. The following rainy season, more than 300,000 tons of ashy, topsoil sludge ended up in the Rubicon River — normally pristine water that flows out of the Sierra Nevada mountains.

The huge sediment dump caused headaches for Fecko's water agency on two fronts, he said. First was the impact to their hydroelectric power operations, which clogged up with dirt that made it tough to run the water through to generate electricity. The second was drinking water.

"You simply cannot filter out the taste and odor," Fecko said, likening the taste and smell to the earthy smell after it rains. And he said the added sediment doubled the cost of water treatment at his facility, necessitating water filters to be changed out more often. It can take years for that taste and smell to go away. That period only gets longer in the middle of a megadrought.

Original Article: [CBS Sacramento/ CNN](#)

### **Exchange: Water Supply Issue in Casa Grande Takes New Turns**

Nearly a year after the Arizona Department of Water Resources said it won't approve new supply certificates for groundwater use in the Pinal Active Management Area, local



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groups are pushing back on the agency's findings and developers have found a way to keep building homes without the need for certificates.

A report submitted on behalf of a group of Pinal area stakeholders argues that ADWR should revise the model it used for a study that found demand for water will outstrip supply by millions of acre-feet over the next 100 years, the Arizona Capitol Times reported.

Meanwhile, developers have started building homes to rent, rather than sell, which eliminates the need for a certificate of assured water supply from ADWR. In Casa Grande alone, around 700 build-to-rent units have received final permits in recent months, something the city rarely saw before ADWR's decision to cut off new supply certificates. It shows how a cutoff of Certificates of Assured Water Supply doesn't necessarily lead to a change in development patterns – at least not right away.

In June, ADWR officials said the department would stop granting Certificates of Assured Water Supply within the Pinal Active Management Area for applicants that want to use groundwater. "The solutions include non-groundwater importation and direct delivery. ... (T)hose desiring to develop within the Pinal model domain will need to bring their own non-groundwater supplies," said Clint Chandler, deputy director of ADWR.

The move wasn't designed to choke off new groundwater-based development in the area immediately – tens of thousands of lots already had ADWR certificates for building that remained valid. Still, it was a sign that development as usual was no longer viable. The Pinal AMA encompasses about 4,000 square miles in central Arizona between the Phoenix and Tucson AMAs, overlapping substantially with Pinal County. Upheaval in the local development industry would mean big shifts for the area's economy. Pinal is among the fastest-growing counties in the state, attracting workers who commute to metro Phoenix, baby boomers moving into new retirement communities, and the local workforce powering a growing manufacturing sector that now includes companies like electric vehicle manufacturer Lucid Motors.

Since last summer's ADWR report, a stakeholder group led by Pinal County Supervisor Stephen Miller commissioned their own study that challenges ADWR's findings and encourages the department to change the assumptions underlying its water consumption model.

The authors of the report, dated April 4, state they drew up a model that "simulate(s) conditions more accurately representing hydrologic conditions and water provider management practices within the Pinal AMA." And the new model doesn't find any unmet water demand – implying that ADWR could perhaps go on granting more Certificates of Assured Water Supply, after all.

Tom Buschatzke, director of ADWR, cast some skepticism on the outside study, noting it didn't account for issues like maximum well depth, but said it will take the department several months to review the submission.



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“We have to really get down in the weeds and look to determine if what they did is consistent with both the technical modeling requirements, but more importantly the rules and statutes related to assured water supply,” he said.

Miller himself said developers won’t just go on pumping groundwater. Eventually, he said, they’ll provide water for new commercial and residential construction through more-expensive methods like recharging wastewater, buying desalinated seawater, or purchasing water rights from Native American tribes.

But for now, a move toward built-to-rent developments is allowing homebuilders to continue pumping the wells and avoiding the Certificates of Assured Water Supply requirements entirely.

A new certificate is needed when one lot gets split into six or more lots, which is what developers have to do to sell individual properties in a typical residential subdivision that features dozens or hundreds of new homes. But if the same residential development is instead set aside for rental, there’s no lot subdivision, and therefore no need for new certificates.

Casa Grande, which along with Maricopa is one of the two largest cities in Pinal County, has more than 4,500 new proposed rental units across 20 developments in the permitting process; three developments with a combined total of about 700 units have gotten final approval to build.

Joe Horn, a planner for the city of Casa Grande, said there wasn’t much demand for rental development before ADWR’s announcement – all of the rental development proposals have been submitted in the past six months.

Original Article: [US News by Nick Phillips/ Arizona Capitol Times](#)

### **Navajo sign water rights settlement**

Federal officials signed an agreement with leaders of the Navajo Nation, on Friday, that provides funding for clean drinking water infrastructure for reservation residents and resolves questions about longstanding Navajo claims to water rights in the drought-stricken US West.

The signing formalizes the Utah Navajo Water Rights Settlement, which became law, in 2020, as part of President Joe Biden’s bipartisan infrastructure bill. As part of the agreement, the federal government will pay the Navajo Nation \$210 million for drinking water infrastructure in San Juan County — the part of the 27,00-square-mile reservation that lies in Utah.

Many Navajo homes lack running water. Residents often fill containers at public taps or rely on water deliveries from volunteer organizations.

“As we seek to strengthen Indigenous communities and support tribal self-governance, today’s action and all of these investments will help provide the Navajo Nation with autonomy and flexibility to design and build appropriate water projects that will address



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current and future water needs,” US Interior Secretary Deb Haaland said at a signing ceremony on the Navajo Nation.

Utah, which was also party to the agreement, will pay the Navajo \$8 million as part of the settlement.

Original Article: [Antelope Valley Press](#)

### **Column: Drought adds to pressure on U.S. gas inventories: Kemp**

U.S. gas prices have climbed to the highest for more than 13 years as inventories remain well below average while the drought and lack of hydro generation threatens to stretch them even further.

Front-month futures prices for gas delivered at Henry Hub in Louisiana have climbed to around \$9 per million British thermal units, up from \$3 at the same point a year ago.

Prices are the highest after adjusting for inflation since October 2008, when the financial crisis was intensifying and the economy was heading deeper into the great recession (<https://tmsnrt.rs/3asvCwf>).

In real terms, front-month prices are in the 86th percentile for all months since 1990, signalling the need for significant steps to relieve the gas shortage.

Last week, working stocks in underground storage were 348 billion cubic feet (16%) below the pre-pandemic five-year seasonal average (“Weekly natural gas storage report”, Energy Information Administration, May 26).

Inventories increased by just 430 bcf between April 1 and May 20, below the pre-pandemic seasonal average of 461 bcf, so the storage deficit is increasing rather than reducing.

The result is that the one-year calendar spread has moved into a record backwardation of almost \$4 per million British thermal units as traders anticipate stocks will remain tight.

High prices signal the need to reduce consumption, including by switching from gas-fired to coal-fired generation as much as possible, while maximising drilling and production.

The total number of rigs drilling for gas has climbed to 150, the highest since late 2019, and up from just 100 this time a year ago, according to field services company Baker Hughes.

The number of oil rigs, which produce associated gas as a by-product, has climbed to 576, up from 343 a year ago, and the highest since just before the first wave of the pandemic arrived in early 2020.

Increased drilling should ensure gas production continues increasing throughout the rest of this year and into the first quarter of 2023.

But the last two months have been hotter-than-normal for the time of year boosting air-conditioning and refrigeration demand.

The Lower 48 states have experienced a total of 171 population-weighted cooling degree days so far this year compared with a long-term seasonal average of 124.



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At the same time, the worsening drought across the western states is cutting power generation from hydro-electric sources and increasing reliance on gas-fired generators.

In California, drought could cut hydro to just 8% of total generation, from a median of 15% in recent years, according to the EIA.

Increased gas-fired generation is likely to make up around half the shortfall ("Drought effects on California electricity generation and western power markets", EIA, May 2022). Large volumes of gas will also continue to be exported in the form of LNG to Europe and Asia to cover high demand in those regions, especially for alternatives to Russian gas, tightening the market further.

Traders expect the market to remain tight, with exceptionally high prices signalling the need for even more drilling and running non-gas generation units for as many hours as possible this summer.

Original Article: [Reuters by John Kemp](#)

## GLOBAL WATER NEWS

### **Experts attribute of uprooting of trees to concretisation, declining groundwater level in Delhi**

As a severe thunderstorm uprooted hundreds of trees in Delhi on Monday, experts attributed the extensive damage to increasing concretisation and declining groundwater level.

Noted environmentalist Pradeep Krishen said extreme weather conditions have damaged trees in the past too.

"However, the declining groundwater levels and concretisation around the base of the trees have compounded the impact of such events," he added.

The roots of a tree tend to spread as much as the canopy spreads and concretisation around its base does not allow water to reach the side roots, which shrivel and weaken the tree as well, Krishen said.

Many of the trees are not able to reach the water table that has gone down over the years. This makes them weak and vulnerable, he said.

Environmentalist and founder of New Delhi Nature Society Verhaen Khanna said gulmohar trees attract termites that make them hollow.

Such trees become the first casualty of severe weather, he said.



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"Many times, people tie cables and ropes to support structures around the tree trunk which hampers the growth of that particular part. Strong winds snap such trees from these points," he said.

Two people were killed and several injured as a fierce thunderstorm packing winds of up to 100 kilometres per hour and heavy rains battered the national capital on Monday evening, uprooting hundreds of trees, disrupting road and air traffic and damaging vehicles and buildings, including the iconic Jama Masjid.

Police and fire brigade personnel responded to scores of rescue calls while commuters went through a harrowing time as they were caught in massive traffic jams in many areas, including Lutyens' Delhi, ITO, Kashmiri Gate, MB Road and Rajghat, caused by waterlogging and uprooting of trees.

Original Article: [Devdiscourse](#)

### **Soaring costs offset revenue boost for South West water giant Pennon**

South West water giant Pennon labelled 2021 a year of “resilient performance” as soaring costs and inflation offset a 22 per cent surge in revenues last year.

The Exeter based utilities firm reported a 3.3 per cent fall in pre-tax profits to £127.7m for the full year, down from £132.1m in 2020.

Inflation and rising cost pressures choked off any lift from the revenue boost, which analysts said today had been felt across utilities firms.

“Despite lifting revenues from £644m in the previous year to £792, an increase of 22.9 per cent, Pennon Group’s increased interest charges on index-linked debt were enough to offset any growth in revenue,” said Neil Shah, Director at Edison Group.

“The group’s rival, United Utilities, was hit with similar interest rate bills in its results recently, and with 26 per cent of Pennon Group’s regulated water businesses’ gross debt of £3.1bn being index-linked, recent spikes in inflation have impacted the utility provider significantly.”

Shareholders are in line for a boost in payouts however, with the firm still to deploy £200m of a £400m buy-back scheme, while dividends have also risen eight per cent to 38.53p .

Pennon’s results for the full year come fresh on the back of a £425m tie-up with its smaller rival Bristol Water which got the go-ahead from regulators in March, after the competition watchdog began an investigation last September.

Bosses said the newly merged firms were now looking to double down on investment across the South West in the years ahead.

“We’re investing more where it matters most,” said Susan Davy, Group Chief Executive.

“With our largest ever environmental programme in 15 years, we are accelerating plans to make a step change in river and sea health, building on our track record of 100% coastal bathing water quality, with WaterFit, delivering a tangible difference to



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communities and customers in the region over the next 3 years, and with no impact on bills.”

Pennon has been among the worst-rated water firms for environmental performance by the Environment Agency in recent years.

Original Article: [City A.M by Charlie Conchie](#)

### **Private water donations may help restore Australian wetlands – and prove collaboration possible**

The largest private water donation in Australian history could help restore wetlands in the Murray-Darling Basin thanks to a new financial model benefiting investors, farmers, First Nations people and the environment.

The Australian natural capital investment company, Kilter Rural, has announced it will donate 5.4 gigalitres of water to 21 wetlands covering approximately 1,600 hectares in the southern Murray-Darling Basin next financial year – in addition to 3.8 gigalitres donated this financial year.

The environmental water is being bought through Kilter’s \$85m Murray-Darling Basin Balanced Water Fund and delivered through the company’s partnership with The Nature Conservancy (TNC), the Murray Darling Wetlands Working Group (MDWWG) and four First Nations communities.

Prof Sue Jackson, of the Australian Rivers Institute at Griffith University, says the donation was significant because “most of the environmental watering that goes on in the Murray-Darling Basin is done by government environmental water managers ... so this brings another set of players from the private sector into the restoration of rural landscapes”.

Jackson says it provided a progressive social impact model of investment for people that wanted to see environmental as well as economic gains.

Euan Friday, the chief investment officer at Kilter Rural, says “this is the largest voluntary private donation of water to threatened wetlands in history and it has been made while delivering exceptional returns to investors”.

The Kilter Balanced Water Fund delivered 19.4% to investors in the past 12 months and has delivered an annualised 14.1% since inception, according to Friday.

The company generates income by renting the permanent water entitlements they own and a portion of the profit that is made on the water trades is then used to buy water for the environment.

Friday says they developed the model with TNC, who suggested water donations be made on a countercyclical basis, meaning they can make “bigger donations when it’s wet because ... the allocation price is low and therefore the opportunity cost is low”.

The fund has been donating water since 2015 but, off the back of an abundance of water in the system, is set to make its biggest donation.



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Dr James Fitzsimons, the director of conservation and science at TNC, says “the way that fund works is it sort of mimics the natural flows in the Murray-Darling Basin – the basin’s renowned for its boom and bust cycles for climate and water”.

“In dry times, less water gets delivered to the environment and more is made available back on to the market for farmers and irrigators to purchase,” Fitzsimons says.

“And then wetter times a larger donation to the environment is made. And that might seem counterintuitive, but there are many wetlands that actually don’t receive water in very wet years. They might be disconnected from the floodplain, they might not have the connections to the river system that they did in the past.”

Original Article: [The Gaudian by Natasha May](#)

### **View: Water is key to our economic future: Why aren’t we investing in it like we should?**

Water ripples through many sectors of the global economy. Whether companies are in the business of hygiene or hamburgers, phones or pharmaceuticals, they all have water in their supply chain.

It takes 12,000 litres of water to produce a single smartphone and 15,000 litres to produce a kilogram of beef – that is how connected so many aspects of our lives are to water.

But those connections also mean risk, especially as climate change disrupts the water cycle with longer droughts, more frequent flooding, and continued sea-level rise.

Take General Motors’ operations in Brazil for example. In 2015 the company experienced €2.1 million in extra water costs and €5.9 million in extra electricity costs due to drought in a country heavily reliant on hydroelectric power. Or Kellogg’s, which has reported a 300 per cent surge in water prices across its factories in Mexico since 2012.

Analysis by World Resources Institute (WRI) reveals that 17 countries – home to one-quarter of the world’s population – face “extremely high” levels of baseline water stress. In these countries, agriculture, industry and municipalities use, on average, more than 80 per cent of available surface and groundwater every year.

Businesses and jobs all over the world are under threat if water risks are not addressed – and so too are lives. More than two billion people lack safely managed access to water. Many human crises flow from water crises.

There is currently a €200 billion annual funding gap and the best way to bridge it is through combined public and private investment.

In the past, investment in water was seen as complicated and difficult, but that is now starting to change. Data from emerging markets shows that already 9 per cent of water funding comes from the private sector. While this is far behind the 87 per cent for telecoms and 45 per cent for power, the case for direct investment in water is getting stronger by the day.



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There is a compelling business case, as a new analysis by WaterAid and Blended Finance Taskforce reveals. Funding water infrastructure would unlock €500 billion in benefits annually to the global economy.

Currently, poor and marginalised communities in South Asian, Latin American and African cities without access to piped water services pay more per litre than wealthy urban residents. Now business is responding to solve this inequality.

Original Article: [Euronews Green by Ani Dasgupta & Tim Wainwright](#)

### **Severe Water Shortages Strain Wheat Harvest in Iraq**

Salah Chelab crushed a husk of wheat plucked from his sprawling farmland south of Baghdad and inspected its seeds in the palm of one hand. They were several grams lighter than he hoped.

“It’s because of the water shortages,” he said, the farm machine roaring behind him, cutting and gathering his year’s wheat harvest.

Chelab had planted most of his 10 acres (4 hectares) of land, but he was only able to irrigate a quarter of it after the Agriculture Ministry introduced strict water quotas during the growing season, he said. The produce he was growing on the rest of it, he fears, “will die without water.”

At a time when worldwide prices for wheat have soared due to Russia’s invasion of Ukraine, Iraqi farmers say they are paying the price for a government decision to cut irrigation for agricultural areas by 50%.

The government took the step in the face of severe water shortages arising from high temperatures and drought — believed to be fueled by climate change — and ongoing water extraction by neighboring countries from the Tigris and Euphrates rivers. All those factors have heavily strained wheat production.

Wrestling with the water shortage, Iraq’s government has been unable to tackle other long-neglected issues.

Desertification has been blamed as a factor behind this year’s relentless spate of sandstorms. At least 10 have hit the country in the past few months, covering cities with a thick blanket of orange dust, grounding flights and sending thousands to hospitals.

“We need water to solve the problem of desertification, but we also need water to secure our food supplies,” said Essa Fayadh, a senior official at the Environment Ministry. “We don’t have enough for both.”

Iraq relies on the Tigris and Euphrates rivers for nearly all of its water needs. Both flow into Iraq from Turkey and Iran. Those countries have constructed dams that have either blocked or diverted water, creating major shortages in Iraq.

Water Resources Minister Mahdi Rasheed told The Associated Press that river levels were down 60% compared to last year.

For Chelab, less water has meant a smaller grain size and lower crop yields.

In 2021, Chelab produced 30,000 tons of wheat, the year before that 32,000, receipts from Trade Ministry silos show. This year, he expects no more than 10,000.



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His crops are both rain-fed and irrigated via a channel from the Euphrates. Due to low precipitation levels, he has had to rely on the river water during the growing season, he said.

Government officials say change is necessary.

The current system has been inefficient and unsustainable for decades. Water scarcity is leaving them no choice but to push to modernize antiquated and wasteful farming techniques.

“We have a strategic plan to face drought considering the lack of rain, global warming, and the lack of irrigation coming from neighboring countries as we did not get our share of water entitlements,” said Hamid al-Naif, spokesman at the Agriculture Ministry.

The ministry took measures to devise new types of drought-resistant wheat and introduce methods to increase crop yields.

“We are still dealing with irrigation systems of the 1950s. It has nothing to do with the farmers,” he said. “The state must make it efficient, we must force the farmer to accept it.”

Iraqi farmers have historically been heavily dependent on the state in the production of food, a reliance that policymakers and experts said drains government funds.

The Agriculture Ministry supports farmers by providing everything from harvesting tools, seeds, fertilizers and pesticides at a subsidized rate or for free. Water diverted from rivers for irrigation is given at no cost. The Trade Ministry then stores or buys produce from farmers and distributes it to markets.

Wheat is a key strategic crop, accounting for 70% of total cereal production in the country.

Original Article: [VOA News by Associated Press](#)

### **Fixing the water and climate change nexus**

Pakistan is inherently a water-dependent country. The country’s water and climate policy nexus is mired in deep, endemic and systemic challenges, most notably poor governance.

In practice, Pakistan has historically relied upon structural, infrastructural and engineering solutions. However, Pakistan’s climate change and water security challenges have a much larger domain than merely technical or infrastructure issues.

Water governance involves a set of political, administrative and institutional policies, processes, and practices that enable decision making and their implementation after extensive consideration of stakeholders’ concerns and holding the decision-makers accountable for water management.

Governance holds the key to addressing most of the climate-water issues though Pakistan has ignored the role of good governance in addressing most of its natural resource problems.



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The major governance challenges are political disinterest in issues like climate change and water management, absence of robust policies, lack of effective institutional frameworks, ineffective engagement of stakeholders, lack of data and poor service delivery.

One of the major pathways to addressing the water and climate policy nexus is by addressing the usage of freshwater for agriculture in Pakistan. This issue must be seen from the lens of economic water security.

Agricultural water governance can significantly help in the sustainable use of economically scarce water resources to contribute to food and water security. This is easier said than done as agriculture uses around 88–92 per cent of the available water resources.

It contributes 19.5pc to the national GDP, employs over 42pc of the labour force, provides the raw material for about 30pc of its industry and is the largest source of foreign exchange earnings in Pakistan.

However, at the cost of providing fresh water to agriculture, Pakistan's rising urbanisation population faces acute issues of meeting their water demands, hygiene services, domestic water supply and sanitation facilities.

To address this trade-off, Pakistan must leverage non-tradition water management and governance pathways that involve active engagement of stakeholders through participatory development, including public and private institutions for disaster management and mitigation of extreme weather losses.

The government of Pakistan has expressed its strong commitment to adopting the global Sustainable Development Goals (SDGs) as a national agenda, both at the federal as well as provincial levels. Within this framework, the achievement of food security is emphasised as a top priority for Pakistan, with the commitment to pursue the goal of “ending hunger, achieving food security and improved nutrition and promoting sustainable agriculture” (SDG 2) and the related targets.

Despite a strong agricultural base, the country fares poorly concerning indicators of food security. Despite net food surpluses, Pakistan has been facing a paradox of widespread food insecurity and malnutrition.

Globally, Pakistan ranks among the top 15 extreme water-stressed countries in the world. Climate change has exposed the geographic, economic, social, and environmental vulnerabilities of the water sector in Pakistan.

The Indus River Basin System (IRBS) — a complex hydrologic system — receives more than 70pc of its water from the melting of glaciers located in the Hindu Kush Karakoram Himalaya (HKKH).

Given the significant vulnerability of the Indus Basin to climate change, integrated river basin management by ensuring climate resilience is the most significant governance area for sustainable management of the IRBS in Pakistan.



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Another key pathway is to understand that water and climate do not respect administrative or national boundaries. Therefore, Pakistan and regional countries and particularly India due to Indus Basin Treaty, have to develop transboundary water management and this is one of the most challenging water governance areas.

Original Article: [Dawn by Abdul Rehman Cheema](#)

### **Maharashtra dams record 38.47 per cent water level in last week of May, 1.47 per cent higher compared to last year**

Dams in Maharashtra have registered an average water level of 38.47 per cent in the last week of May this year. This figure is 1.47 per cent higher compared to the water level in dams during the same period last year, said sources in the state administration. They added that if monsoons arrive in Maharashtra by June 10, the state is unlikely to face any water crisis.

There are 3,267 dams in Maharashtra. The cumulative water storage capacity of dams in the western state is 40,604,000 million litre, whereas the dams, at present, have 15,622,150 million litre water.

With the India Meteorological Department (IMD) predicting timely arrival of monsoons, the agriculture department was hopeful of experiencing a normal Kharif season from June to August. However, sources in the water resources department said a lot will depend on the rain pattern. A senior officer in the water resources department said, "At 38.47 per cent, the live water stock is manageable. But if the water level drops by 10 to 15 per cent, then things can get worse. Even now, several districts across Vidarbha, Marathwada and north Maharashtra are facing water shortages. A prolonged summer extending beyond the month of May could turn out to be a cause of anxiety."

According to data from the water resources department, the water level in drought-prone Marathwada region was higher compared to the level in the Vidarbha region.

The water level in Marathwada dams showed an increase of 9.67 per cent compared to last year. Last May, the water level in 964 dams in Marathwada region was 38 per cent. At present, the water level is 47.67 per cent.

The biggest dam in Marathwada region, Jayakwadi in Aurangabad district, has 43.98 per cent water, compared to 40 per cent a year ago.

However, the water level in eastern Vidarbha region with 384 dams is 35.84 per cent, 6.16 per cent lower than the same period last year.

Notably, western Vidarbha region dams with 48.02 per cent water level have provided the much-needed relief to the agriculture sector. Last year, this region with 446 dams had 42 per cent water level.

The biggest national irrigation dam, Gosikhurd in Bhandara district in Vidarbha region, has recorded 23 per cent water storage in the last week of May this year. Whereas the water level in the dam was only 15 per cent at this time last year.



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In north Maharashtra, which houses 571 dams, the water storage level is 38.39 per cent, 1.61 per cent lower than last year's 40 per cent.

In western Maharashtra with 726 dams, the water storage level this year is marginally higher at 30.94 per cent in comparison to last year's 30 per cent.

The level of water in coastal Konkan region dams is 46.06 per cent. Almost the same as last year's 46 per cent.

Original Article: [Indian Express by Shubhangi Khapre](#)

## Why a Global Price on Freshwater Might be Needed in the Climate Change Era

Do you pay for the water you use? The answer may seem like an obvious “yes”—you probably get a water bill every month, charging you a cent or two for every gallon that comes out of the taps in your home. In the U.S., an average family of four, consuming 100 gallons of water each per day, paid \$73 a month for water in 2019 (accounting for wide variations across states and cities). But those dollar and gallon amounts are almost completely divorced from the true impact of our lives on the world's water resources. For one thing, residential water prices in the U.S. are based largely on delivery costs—with utilities charging for the cost of getting water to you and not for the actual resource. More importantly, your residential water use represents only a tiny fraction of the water that goes into the products and infrastructure that make your life possible. Depending on where they operate, the businesses that use that water to make their products pay almost nothing for it, or they may pay only for the right to use a water source, not for the actual volume of water they use. When that indirect water use is taken into account, the average U.S. resident consumes nearly 2,000 gallons of water every day, according to estimates by water-monitoring campaign group the Water Footprint Network.

“We still operate the world economy with freshwater largely as a free resource,” says Johan Rockström, co-director of Germany's Potsdam Institute for Climate Impact Research, and a specialist in water resources. That doesn't make sense, Rockström argues. A massive body of evidence, he explains, shows that this same global economy is disrupting the water cycle—through greenhouse gas emissions, the destruction of ecosystems, and pollution—and therefore making the essential resource increasingly scarce. “We're not factoring that into the economy, and therefore not into governance or management of water either. It's a market failure.”

The solution to that disconnect may lie in a global water market—in which businesses or governments trade credits for water use or doing things which affect water supplies, effectively paying a unified price for freshwater. Water experts argue that such a system, echoing the way some regions trade credits for carbon dioxide emissions, would encourage firms to reduce their water use. It could also incorporate economic incentives to protect a healthy water cycle, for example, by offering a country like Brazil payments



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if it protects the Amazon rainforest, whose trees generate large amounts of South America's rainfall through evapotranspiration.

Rockström says a water market is one of the ideas under a “very early phase” of discussion at the Commission on the Economics of Water, which launched last week with him as one of its co-chairs. The initiative aims to persuade policymakers and businesses to redesign global water management and will deliver its recommendations during a U.N. summit on water in New York in March 2023.

Water is the latest front in economists' confrontation with market capitalism's failure to take into account both how it impacts the environment, and how it depends on favorable environmental conditions. That process was kickstarted in 2006 by a report commissioned by the U.K. government to assess the economic costs of climate change. Economist Nicholas Stern calculated that failing to address climate change would shave off around 20% of annual global per capita GDP, and that the actual economic cost of emitting a metric ton of carbon dioxide stood at \$85. Stern's insights (along with a blooming field of climate economics research) have encouraged governments representing 46 nations to introduce carbon emissions markets or carbon taxes.

More recently, hundreds of programs around the world have tried to address the economic cost of the destruction of nature by introducing so-called “payments for ecosystem services.” For example, farmers are paid in the U.K. to rewild or reforest a certain amount of their land, to reflect the economic value of things like biodiversity and natural flood defenses.

Rockström says a water market—or some other mechanism to regulate water use—could combine elements of both the carbon and ecosystem services approach: it could assign a value to a cubic meter of freshwater, and offer incentives, such as paying landowners who protect forests that help trigger rainfall, while also delivering penalties like charging businesses that use excessive amounts of water.

As a concept, water markets have been around for a while. A few places already have some form of a water market: the most well established is in Australia's Murray–Darling Basin, where authorities operate a cap-and-trade system. Water trading also takes place in a handful of irrigation districts in western U.S. states. But according to a 2021 U.N. report, the small scale of existing water markets and “the absence of standardized approaches to valuation leads to considerable divergence in water values,” which undermines their impact on water efficiency.

In 2014, a group of U.S.-based economists said that a regional water trading system was the key to dealing with increasing water scarcity in the American West. They pointed out that, despite that year's punishing drought, growers of alfalfa—“a low-value and high-water-use crop”—had produced enough crops to export millions of tons to Asian countries, while producers of higher value crops had been forced to leave hundreds of thousands of acres of land fallow. “If there were ways to trade water, some farmers



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could cut back on the production of more water-intensive, lower-value crops and lease or sell the conserved water to desperate fruit and nut growers or thirsty cities,” the researchers wrote in a Wall Street Journal op-ed at the time.

Original Article: [Time by Ciara Nugent](#)

***Note the attachment is not an inducement to trade and Veles Water does not give advice on investments.***