

Veles Water Weekly Report

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June 30th 2022

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VelesWater



WATER FUTURES MARKET ANALYSIS

Welcome to ***WATERTALK***

by Joshua Bell

CLICK THE LINK BELOW

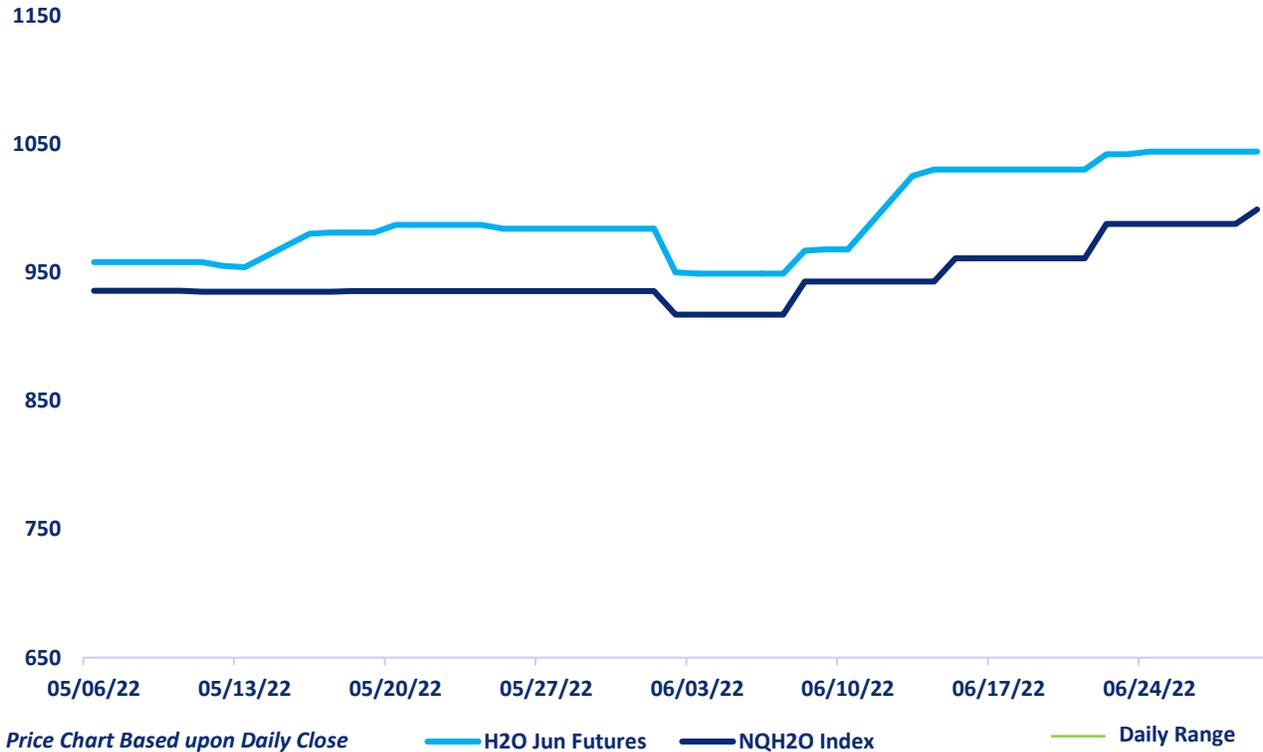
"A 2 minute technical analysis video of H2O futures"

<https://vimeo.com/725548279>



NQH2O INDEX PRICE vs H2O FUTURES PRICE

1 Month Price Performance NQH2O Index vs H2O Futures



The new NQH2O index level of \$998.95 was published on the 29th of June, up \$11.16 or 1.13%, which sets another new all-time high for fourth week in a row. The July contract has been trading at premium of \$45.05 - \$56.19 over the past week.

NQH2O is up 41.42% Year to Date.

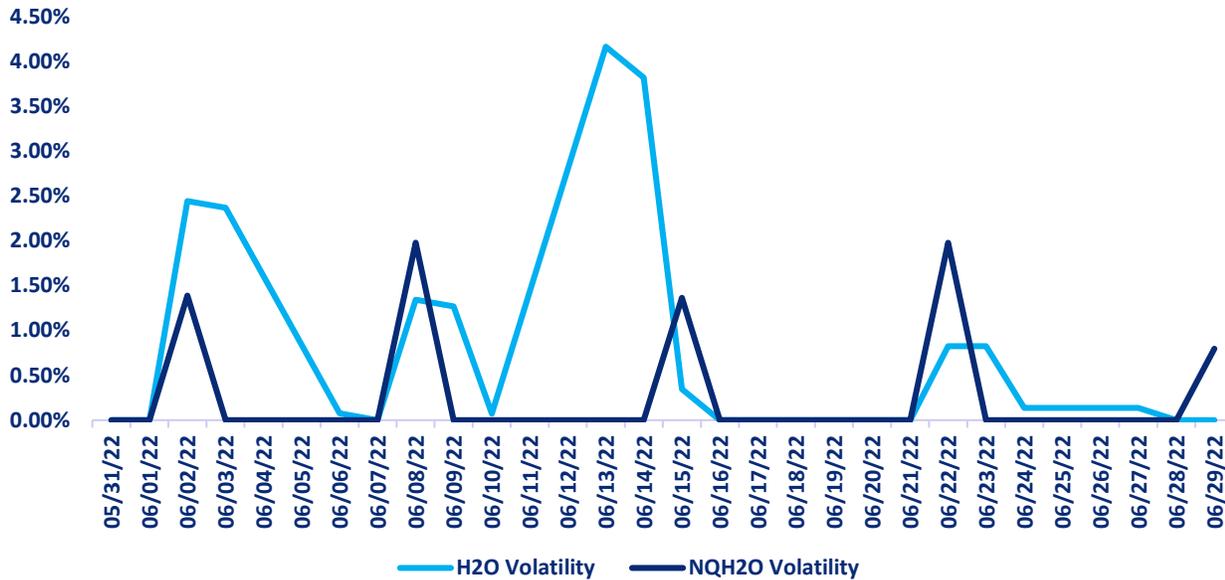
Below are the bid offer prices on different expiries being quoted in the market.

July 22	1042@1050
Aug 22	1043@1075
Dec 22	880@965
Jun 23	1035@1085



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 0.82% on June 23rd and a low of 0 % on June 28th.

ASSET	1 YEAR (%)	2 MONTH (%)	1 MONTH (%)	1 WEEK (%)
NQH2O INDEX	22.03%	5.34%	1.60%	1.670%
H2O FUTURES	N/A	7.74%	7.26%	0.00%

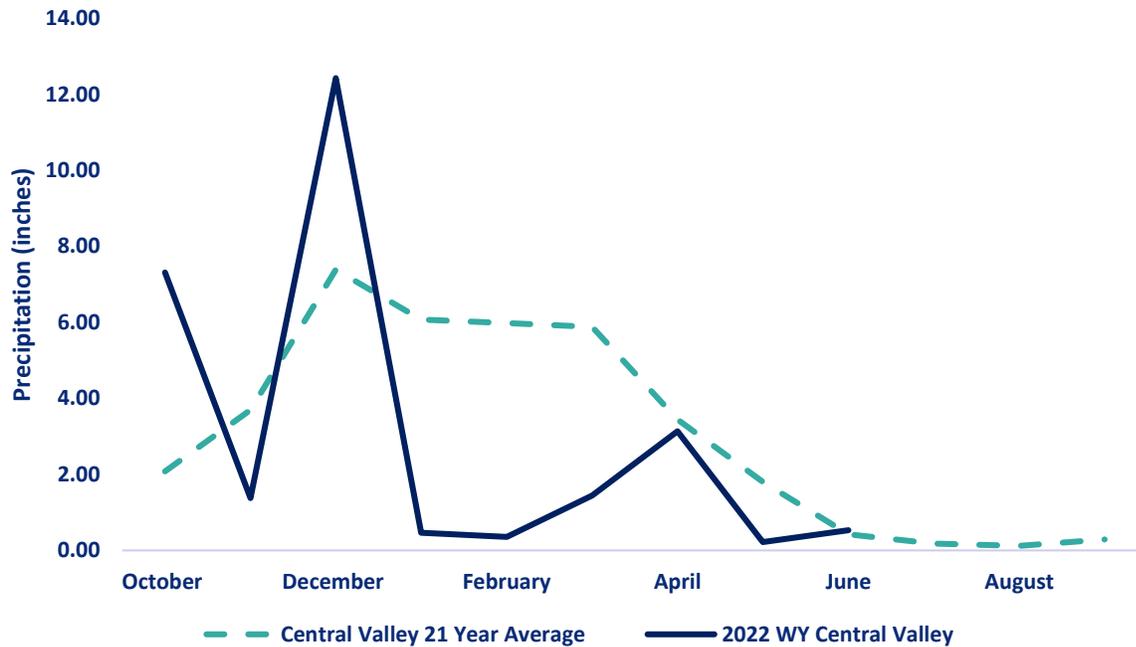
Once again, mixed signals for the week ending on the June 29th the two-month futures volatility is at a premium of 2.40% to the index, a reversal of 6.97% from the previous week. The one-month futures volatility is at a premium of 5.65% to the index, up 2.92% from last week. The one-week futures volatility is at a discount of 1.67% to the index, up 1.97% from the previous week. We expect futures volatilities to converge to the index volatilities.

*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 29/06/2022

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)	0.06	0.00	18.72	47	62
TULARE 6 STATION (6SI)	0.18	0.18	103.00	35	58
NORTHERN SIERRA 8 STATION (8SI)	1.36	0.02	175.86	44	79
CENTRAL VALLEY AVERAGE	0.53	0.07	99.19	42	66

RESERVOIR STORAGE

RESERVOIR	STORAGE (AF)	% CAPACITY	LAST YEAR % CAPACITY	HISTORIC ANNUAL AVERAGE CAPACITY %
TRINITY LAKE	718,306	29	48	38
SHASTA LAKE	1,785,055	39	39	50
LAKE OROVILLE	1,751,528	50	33	65
SAN LUIS RES	806,672	40	34	71

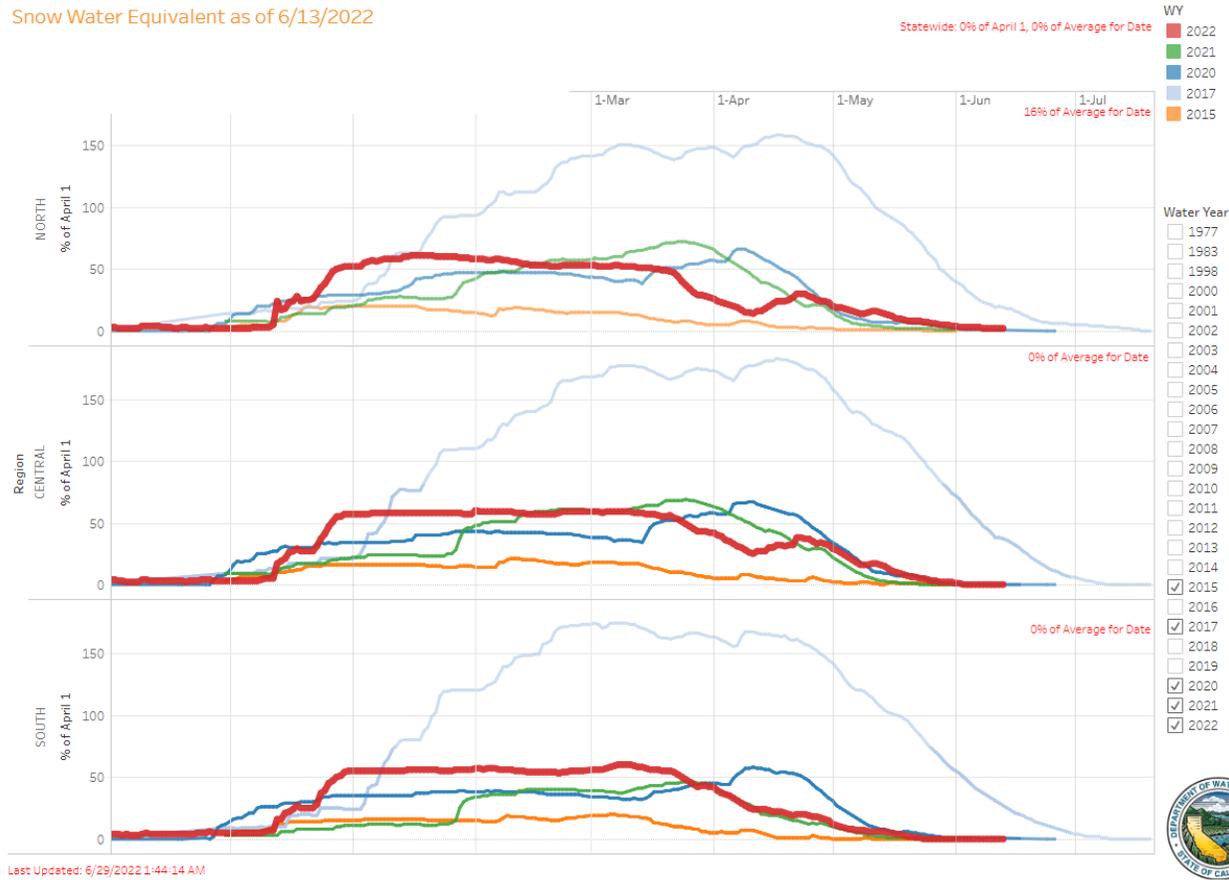
Reference: [California Water Data Exchange](https://www.waterdataexchange.com/)



SNOWPACK WATER CONTENT

Snow Water Equivalent Dashboard

Snow Water Equivalent as of 6/13/2022



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	0.4	0.00	0	16	2
CENTRAL SIERRA	0	0.00	0	0	0
SOUTHERN SIERRA	0	0.00	0	0	0
STATEWIDE	0.1	0.00	0	0	0

*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 1st 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.

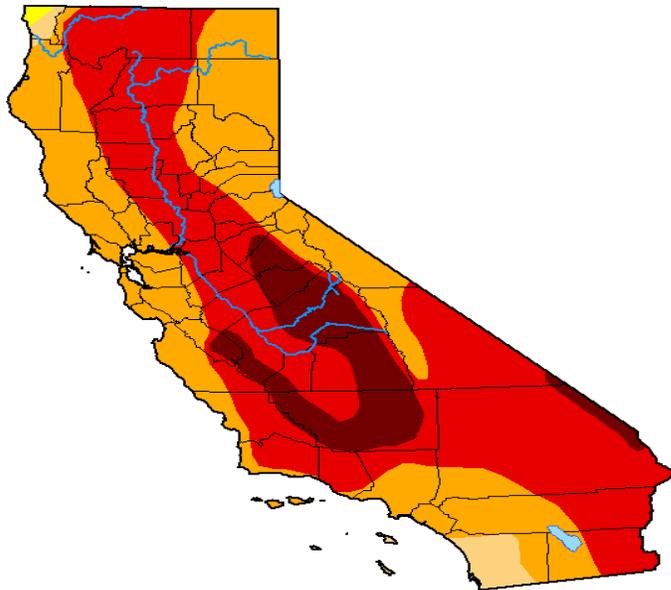


DROUGHT MONITOR

U.S. Drought Monitor California

June 21, 2022

(Released Thursday, Jun. 23, 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	99.79	97.48	59.81	11.59
Last Week 06-14-2022	0.00	100.00	99.79	97.48	59.81	11.59
3 Months Ago 03-22-2022	0.00	100.00	100.00	93.65	37.69	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 06-22-2021	0.00	100.00	100.00	94.73	85.44	33.32

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>

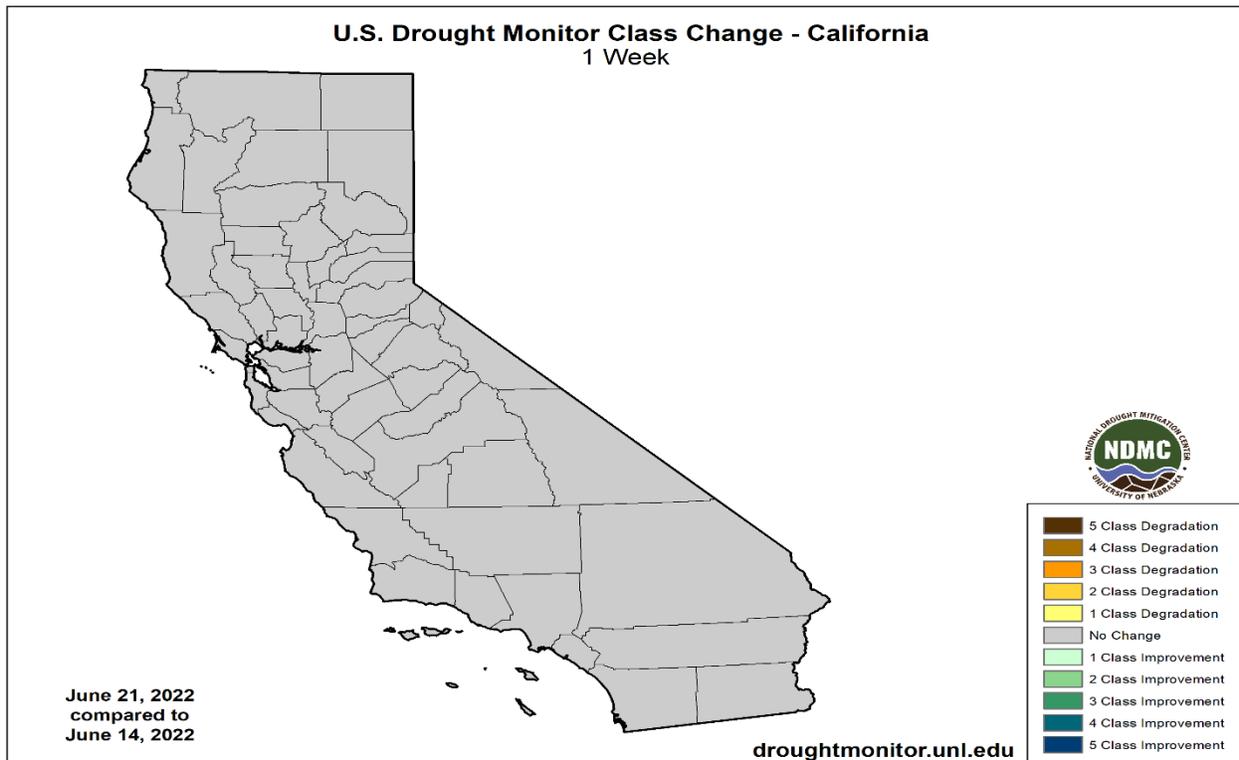
Author:

Adam Hartman
NOAA/NWS/NCEP/CPC



droughtmonitor.unl.edu

U.S. Drought Monitor Class Change - California 1 Week

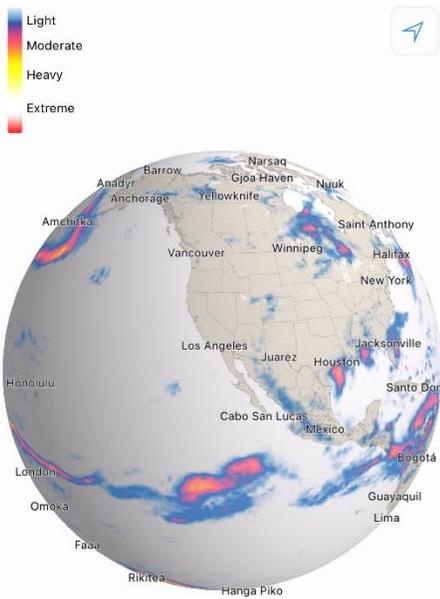


The US Drought Monitor release their statistics with a 1-week lag to this report. Over the past week the has been 0% change in Drought conditions in California.

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



Map: Dark Sky

The current satellite picture shows a dry Western US. There is a frontal system in the far Northwestern Pacific which may bring some precipitation to the Northwestern US next week. It is not expected to reach as far south as California.

There is some cloud cover and associated rainfall over the Great Lakes area stretching upwards into Canada.

There are areas of cloud cover and moisture over parts of the Gulf of Mexico including the Houston and Jacksonville areas plus further activity off the East coast of Florida.

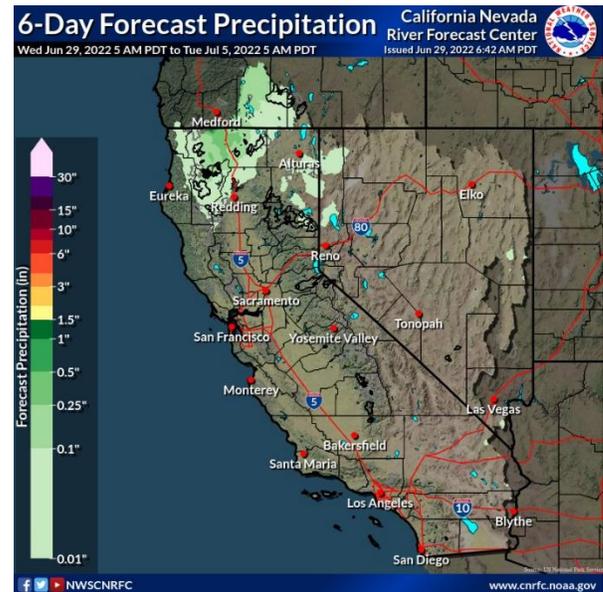
There has been considerable Monsoon moisture inflow into the Southern US along the California border and into Arizona with accompanying precipitation. This moisture inflow is bringing precipitation and cloud cover into the

Mid-West and moving Eastwards. We expect this to develop further and strengthen over the next few months.

10 Day Outlook

Isolated showers/t-storms possible today over far SE CA and Srn and Ern NV with some moisture (VEF PW 1.03 in and VBG 0.94 in) and instability over the region. Upper level trough deepens off the west coast bringing cooler temperatures and a chance of precipitation around the ORCA border this weekend and possibly into the Fourth of July. Max temperatures generally near to around 10 degrees above normal today cool down to near to 15 degrees below normal this weekend and remain below normal for the Fourth of July. Light precipitation is possible around the ORCA border with precipitation amounts generally expected to be less than a half an inch this weekend, with the highest amounts expected near the crest of the Srn OR Cascades.

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





WESTERN WEATHER DISCUSSION

Much of the Northern Tier of the U.S. from the Pacific Northwest to the Northern Plains has seen marked improvements in recent months due to a persistent storm track and near to below-normal temperatures. That same pattern continued this week, leading to 1-category improvements from the Pacific Northwest eastward to Montana. Improvements in Montana are the result of 7-day precipitation surpluses of more than 1 inch for many locations and near to below-normal temperatures. In the Pacific Northwest, long-term indicators continued to improve due to the recent storminess and below-normal temperatures leading up to this week. In the Four Corners region, heavy rainfall was observed in a large swath stretching across western New Mexico, due to a robust Southwest Monsoon circulation. However, there were no marked improvements to drought indicators this week to warrant improvements. Given drought is strongly entrenched in the Four Corners, an active Southwest Monsoon circulation will need to persist for conditions to improve.

Reference:

Adam Hartman, NOAA/NWS/NCEP/CPC

Brad Rippey, U.S. Department of Agriculture



WATER NEWS

CALIFORNIA WATER NEWS

California's 'broken' water supply forecast to be audited

There'll be an audit of California's water supply forecast after the state overestimated and prematurely released 700,000 acre-feet of water last year, officials announced Monday.

A news release from Assemblymember Adam Gray (D-Merced) announced that Gray's request for audit was approved. It aims to examine the impacts of the flawed forecasts and the Department of Water Resources (DWR) and State Water Board.

"Errors on this scale have real and measurable consequences," Gray said in the news release. "The managers of the largest local, state, and federal reservoirs use this information to determine when to let water accumulate and when to let water out to make room for the coming snowmelt. Growers use the information to predict how much water they can expect for their farms and how many acres they can afford to plant. The estimates are used to inform everything from flood control to power generation and water quality standards."

California's water operations overestimated the forecast by 68% for the Sacramento River region, 45% for the San Joaquin River region and 46% for the Tulare Lake region, according to a state report. Those overestimations left the operators with less stored water than was necessary, according to Gray's news release.

Gray said the state's error was contrasted by other agencies and local irrigation districts who didn't make the same mistakes in their own forecasts.

"No one expects DWR or any of these organizations to get the number exactly right," Gray said. "But when the state's best forecasts are demonstrably inferior to local and federal forecasts we need to ask why, and we need to fix the problems as soon as possible. Until we understand what has gone wrong with the agencies charged with managing California's water, we cannot understand how to fix the problem."

The audit is expected to take six to seven months to complete.

DWR Director Karla Nemeth provided the following statement regarding the audit:

The requested audit by Assemblymember Adam Gray continues to promote two important inaccuracies: DWR did not release 700,000 acre-feet of water for flood control purposes during the spring or summer of 2021. Also, the State Water Resources Control Board is not responsible for forecasting.

Original Article: [abc10 by Staff Writers](#)



California's drought means less water to go around. Who is winning the pursuit for water — and who is losing?

After three years of drought, the massive state and federal water projects that serve California's cities and farms have less water to distribute, forcing water managers to increasingly ration supplies.

This year, squeezed extra tight by the prolonged drought conditions, both the state and federal water projects are expecting to deliver mere fractions of what cities and farms are asking for. Water suppliers relying on project water must figure out how to cut use accordingly. For many smaller farms without backup, that could mean fields left fallow without crops. Scarce supplies also lead to water rate hikes.

Everyone gets less water during a drought. But the breakdowns of the state and federal projects' water allocations show some groups — particularly farmers who have longtime rights to divert water — faring better than others.

They also reflect the overwhelming thirst of Southern California towns and cities — some of the most arid, and populous, parts of the state. The Chronicle analyzed this year's expected water allocations from the California State Water Project and the federal Central Valley Project, and how they break down and compare to previous years. The State Water Project, which includes the 444-mile long California Aqueduct and the Oroville Dam, supplies water to some 27 million Californians and 750,000 acres of farmland, according to the state water department, its operator. It also generates power and provides for recreational areas in the state.

The project has 29 long-term contractors — smaller, regional water providers, including cities, towns and irrigation districts, that sell the water to customers. For the past two decades, about a third of State Water Project water was for agricultural use and two-thirds for municipal, industrial or residential uses, state officials said.

For the second year in a row, the State Water Project is expected to deliver only 5% of the amount requested from contractors. The last time allocation was that low was in 2014 — the third year in that drought spell.

"We're not going to expect much additional precipitation on the horizon," said Molly White, the project's water operations manager.

The 2022 cuts were deep across the board among the 29 contractors, but some cuts were less harsh than others. Most were approved for just 5% of their requested amounts, but the state awarded larger percentages to communities with critical health and safety needs.

"Folks at the Department of Water Resources have been very clear that they're not going to reduce allocation to 5% if that supplier's going to have to turn off water to residences," White said.



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Napa and Solano counties' water districts were approved for 15% of their requested amounts, compared with the 5% contractors in the Central Valley and Southern California received. But these Bay Area communities requested far smaller amounts to begin with.

Original Article: [San Francisco Chronicle by Yoohyun Jung and Kurits Alexander](#)

From The Sewage To Your Cup. Can Recycling Water Save Southern California?

To state the obvious: California has a water problem. That's why more than 6 million Southern Californians can water outside only once or twice a week as of June 1.

But experts say conservation alone can't solve our water woes. So what does water security look like in a drier future? This story focuses on one piece of the puzzle: recycling wastewater. Let's dig in.

I'm standing in front of a steel sink at the headquarters of the Orange County Water District, holding a cup of water.

"This water," said Mehul Patel, the operations director, "probably about 30 hours ago was raw sewage coming through the sewer collection system."

So why the heck am I about to drink it?

Most of the water we use in cities in the Southland is piped hundreds of miles from reservoirs in Northern California and the Colorado River. In good years, those reservoirs are filled by snowmelt and rain. But after the driest winter ever recorded, they're at historically low levels.

If society doesn't dramatically reduce emissions and slow the climate emergency within this decade, as much as 65% of the snowmelt that feeds those northern reservoirs could be lost by the end of the century. And the Colorado River is being stretched thin by an ongoing "megadrought" — the worst in 1,200 years, made even worse by humanity's pumping of greenhouse gases into the atmosphere.

"Our main water supply right now, which is imported, is only going down," said Dan McCurry, an engineering professor at USC.

It's clear our main sources of water are in peril. That's why millions of Southern Californians are under strict new drought rules. But experts say conservation alone can't solve our water woes — we need to reuse more water ... even for drinking.

In L.A., all of the water that goes to houses, apartments, and businesses is potable (drinkable, in other words), including the water used to irrigate lawns and plants outside, according to the L.A. Department of Water and Power (LADWP).

That's because it all has to go through the same pipe system. And nearly all of that water is imported from up north, the eastern Sierra and the Colorado River.

So it can feel jarring to drive around town and see sprinklers feeding lush parks, golf courses and even street medians when you're being asked to drastically cut your own



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water use. But many of these areas are exempt from the watering restrictions because they use non-potable, recycled wastewater to irrigate, according to LADWP. That water is distributed through a separate pipe system built just for that purpose.

Wastewater is all the water that goes down our drains or is flushed down our toilets. In other words, it's a more palatable way of saying "sewage."

Only about 2% of L.A.'s water is recycled. Across the state, about 24% of cities' water is recycled, according to the Pacific Institute. Most of that recycled water irrigates places such as farms, parks, and golf courses. Less than a third of it is treated to be drinkable, according to the State Water Resources Control Board.

But as extreme drought becomes increasingly common and traditional water supplies dwindle, cities will need to recycle more of that water for drinking, McCurry said. That's the focus of his research.

"Recycled wastewater is the most secure option we have in the long term for ensuring a steady water supply," he said.

Original Article: [LAist by Erin Stone](#)

Water districts race to protect groundwater amid drought

Sonoma Water held its first town hall this month, part of a new series to review the ongoing drought, local water conservation measures and guidelines for well users.

Groundwater in the Sonoma Valley basin has declined approximately 900 acres of water per year from 2012 to 2018, fueled in part by the drought and a "general upward trend in groundwater use," according to Ann Dubay, the administrator of the Sonoma Valley Groundwater Sustainability Agency.

The local water basin is approximately 44,000 acres, and its groundwater makes up just over half of the water used in Sonoma Valley, Dubay said. Due to less reliable rainfall over the past decade, the SVGA has started planning projects designed to sustain the region's remaining groundwater.

There are four sources of water for residents of Sonoma Valley: groundwater through wells, transported water from the Russian River watershed, recycled water from waste that is purified, and surface water from rivers and streams.

Streams and small ponds have dried up during stretches of drought in recent years. The largest declines in groundwater can be seen in the areas of the El Verano and Eighth Street East, Dubay said, where a deep aquifer is losing water quicker than other parts of the region.

"The declines are in the deeper aquifer, that means the aquifer that's greater than 200 feet deep, is where we're seeing issues," Dubay said. "And that is much older water it takes a lot longer for water to get down into that really deep aquifer."

The deep aquifer is of concern because it takes longer to recharge than shallow ones. This could be a problem in the near future as drought conditions continue to plague



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California, forcing residents to use greater amounts of groundwater to supplement other sources, according to Christopher Watt, the senior engineering geologist for the North Coast Regional Water Board.

“As we see changes in the availability and surface of water, there's definitely going to be a higher demand on groundwater,” Watt said in the June 2 town hall. “And that only increases the need to make sure that the quality can serve all of its beneficial uses.”

Declines in the aquifers in El Verano and Eighth Street East are likely caused by local wells being pumped, Dubay said, however it's unclear which wells or users are responsible for the decline. Piecing together information about how the hydrology system of Sonoma Valley functions will be key for the Sonoma Valley Groundwater Sustainability Agency's plans in the coming decade.

“Are we having problems with seawater coming into the basin down near San Pablo Bay because of pumping groundwater? We don't think we're having problems,” Dubay said, “but we don't know for sure because we don't have very good measurements down there.”

The next five years will be used to fill in those “data gaps” and to plan for and engineer projects to help sustain the groundwater of Sonoma Valley. Questions remain about how groundwater pumping affects Sonoma Creek and the animals that need it for water and breeding, Dubay said.

Some of the initiatives to protect groundwater and replenish the aquifer are already underway.

Last year the state water board called for a 20% reduction of water use by all residents of Sonoma County; Valley of the Moon Water District customers exceeded that mark with a 26% reduction in 2021 compared to the previous year, said General Manager Matt Fullner. The Valley of the Moon Water District has also been approved for \$3 million in Drought Relief Project funds from California Department of Water Resources to create two aquifer storage and recovery wells, Fullner said.

Original Article: [Sonoma News by Chase Hunter](#)

Huge reservoir near Bay Area could be expanded to store more water

Motorists zooming along Highway 152 through Pacheco Pass between Gilroy and Los Banos notice an unusual site amid the parched, oak-studded hills: A vast inland sea.

The shimmering body of water, San Luis Reservoir, is 7 miles long and a key part of California's modern water supply created when President John F. Kennedy pushed a dynamite plunger there in 1962 to kick off its construction. Today water from the massive lake irrigates farmland across the Central Valley and also provides drinking water for Silicon Valley, including San Jose.

Last Friday, a major new construction project started at San Luis — a \$1.1 billion plan by the federal government to strengthen the huge earthen dam and raise it 10 feet to reduce the risk of it collapsing in a major earthquake.



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But more than earthquake safety work is afoot.

Water officials in increasingly drought-plagued California have been hoping another project can be attached to the seismic upgrade — an effort to build the 382-foot-high dam even higher to expand the size of the reservoir.

Raising the dam 20 feet instead of 10 would cost another \$1 billion. But it also would create 130,000 acre-feet of new storage, enough water to supply the needs of at least 650,000 people for a year.

“Any investment in California water infrastructure is vitally important,” said Cannon Michael, a 6th generation farmer in Los Banos who is pushing to expand the reservoir. “The population has really increased in California, but we haven’t kept up with our water investments.”

Michael is no ordinary farmer. The great-great-great-grandson of Henry Miller, a famous cattle baron in the late 1800s, he has a degree in English from UC Berkeley and serves as chairman of the board of the San Luis Delta Mendota Water Authority, an influential agency of 29 water districts that purchase water from the federal government, most of them in the Central Valley, but also including the Santa Clara Valley Water District.

In an interview, Michael said that 10 of the authority’s water agencies have agreed in concept to help fund the \$1 billion project to raise the dam.

“We have a group of investors. We’re not far off,” he said. “Our goal is to get everybody signed and agreed to by the end of the year.”

California is famous for battles over dams — especially new dams on existing rivers. Most of the best spots which yield the most water — like Shasta Lake near Redding or Oroville reservoir in Butte County — were already taken generations ago. Other rivers, which run through places like Big Sur or the wild forests near the California-Oregon border, are off-limits to dams, protected by the National Wild and Scenic Rivers Act.

But when water agencies propose expanding existing reservoirs, environmentalists often don’t put up a fight. A \$1 billion plan to expand Los Vaqueros Reservoir in Contra Costa County, now about two years from breaking ground, has received no environmental opposition.

“I don’t think this is a hill that very many people want to die on,” said Ron Stork, policy director at Friends of the River, a Sacramento environmental group, of the proposal to raise San Luis dam.

When the huge earthen dam, which is 3.5 miles long on its crest — twice the length of the Golden Gate Bridge — was built 60 years ago, engineers were most concerned about shaking from the San Andreas Fault.

As earthquake science expanded, however, researchers realized that the Ortigalita fault, which crosses San Luis Reservoir, had the potential for a major quake of roughly 7.0 magnitude.

A dam failure, although unlikely, could put 200,000 people downstream at risk. Flood waters would devastate the nearby communities of Santa Nella and Los Banos, and



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would submerge 7 miles of Interstate 5. Water would go as far as Discovery Bay and Brentwood in Contra Costa County and cause damage to parts of Modesto, Manteca and Stockton.

Plans call for the earthquake retrofit to take roughly 9 years, with crews working 24 hours a day starting later this year. More than 10 million cubic yards of rock, gravel and soil will be moved from the hills near the dam — roughly the equivalent of 1 million dump trucks full — to harden the dam. The reservoir will not have to be drained.

The project is being funded mostly by the federal government with some state contributions. But if the other project to raise the dam height is going to happen, it would have to be funded and approved by 2027 so work could be done as part of the broader seismic job.

Original Article: [The Mercury News by Paul Rodgers](#)

US WATER NEWS

Feds seek ideas on how to manage a drier Colorado River

For many decades, the Colorado River was managed with the attitude that its water levels would remain roughly stable over time, punctuated by alternating wet and dry periods.

But in the face of possibly the river's driest period in 1,200 years, a new approach is now needed to managing the river's reservoirs — one that can account for "deep uncertainty" about future climate and runoff conditions, says the U.S. Bureau of Reclamation. And for the next two months, the bureau wants to hear from the public about how it should go about operating reservoirs including Lake Mead, Lake Powell and other parts of the river system under such conditions.

The bureau announced last Friday in the Federal Register that it wants written, public comment on what issues should be covered for revising operating guidelines for the reservoirs that date back to 2007 and expire at the end of 2026. It's also looking for public guidance on how the feds can best insure that the process used to conduct the revisions is "inclusive, transparent, and encourages meaningful engagement." The entire effort will be carried out under the strictures of the National Environmental Policy Act, with a formal environmental impact statement expected in the future.

Publication of the bureau's announcement kicks off what's expected to be a prolonged, difficult and contentious effort to develop new guidelines, in which the seven river basin



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states including the numerous interest groups operating in each state pursue an elusive consensus for future river management.

The 2007 guidelines were developed after the river had experienced a five-year period of extreme drought that drove the reservoirs to what were seen at the time as extremely low levels from 2000 through 2004. But the guidelines, while allowing for cuts in deliveries of water to the Lower River Basin states when Lake Mead fell below specified levels, were based primarily on the assumption of a “stationary” climate, the bureau said in its Federal Register notice last week.

While a formal, federal review found the 2007 guidelines were effective at meeting their overall purpose, the drought’s increasing severity since then showed the guidelines weren’t “robust” enough to protect reservoir levels, the bureau said.

A new set of agreements, developed in 2019, were aimed at shoring up the management of the reservoirs to adapt to their continued declines. They were approved as separate drought contingency plans for the river’s Upper and Lower Basin states. Arizona, Nevada and California comprise the Lower Basin. Utah, New Mexico, Colorado and Wyoming make up the Upper Basin.

But those measures have also proven “demonstrably insufficient to address the ongoing drought and low runoff conditions,” the bureau said.

As a result, the federal agency was forced, starting in 2021, to take a series of emergency measures to protect reservoir levels. They culminated with this month’s announcement that it wants Arizona and the other river basin states to cut their river water used by 2 million to 4 million acre-feet starting next year. The bureau says if the states don’t approve their own plans for such cuts by mid-August, the agency will impose its own cuts on the system.

In half of all years since 2000, the river has carried less than 11 million acre-feet annually at Lee’s Ferry, just downstream of Lake Powell, compared to a 20th century average of around 15 million acre-feet, the bureau noted. The river has had less than 8 million acre-feet at Lee’s Ferry in 13% of those years, said the bureau.

Overall, the river has been 20% drier in the 21st century than in the 20th century, and 5-year average river flows have dropped by 33% in 23 years.

“Future strategies should consider these conditions and the likelihood of continued declines in supply,” the bureau said.

In its notice last Friday, the bureau added, “With increasing temperatures across the basin, predictions of commensurate decreases in reliable supply, and uncertainty in future demands, Reclamation believes that future policies must be tested across a wide range of potential future conditions, including drought sequences that are longer and more severe than those that have been observed.”

The latest projections of future climate change agree that temperatures will continue warming, but a wide range of potential futures are possible for both precipitation and overall impacts on river flows, said the bureau.



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Experts can't say with a high degree of confidence or specificity what's most likely to happen, meaning "the question 'what will future runoff be?' cannot be answered, the bureau said. That, combined with uncertainty about future growth patterns and water use, mean "it is impossible to assign probabilities to any given future and the basin is experiencing conditions of deep uncertainty," the bureau said.

Original Article: [Tucson.com by Tony Davis](#)

Thirsty Arizona taps cash, bonds in hunt for new water sources amid drought

Arizona is earmarking \$1 billion over three years to protect and expand its precious supply of water as persistent drought conditions shrink the output of the Colorado River, decreasing allocations for it and other parched states.

The money was included in a fiscal 2023 budget passed by the legislature, which also approved a bill that empowers a state agency to issue bonds for water supply development projects, including the importation of water.

"We are now in the second decade of the worst drought in recorded history, which, coupled with dramatic population growth in our state, makes the situation extremely serious," Arizona Department of Water Resources Director Tom Buschatzke told a state House committee last week.

Arizona is one of seven states that depend on the Colorado River to provide water for 40 million people. That water supply is drying up and the U.S. Bureau of Reclamation warned earlier this month that states will face more reductions.

The ongoing drought led the bureau to declare its first-ever Colorado River water shortage for the lower basin in August 2021 as storage in federal reservoirs Lake Mead and Lake Powell fell to 40% of capacity from 49% in 2020.

Water allotments to Arizona and Nevada were reduced, with the Central Arizona Project, which delivers Colorado River water to Maricopa, Pinal, and Pima counties — where more than 80% of the state's population resides — seeing its normal supply cut by about 30%.

Buschatzke said he expects a tier 2 shortage to be declared later this summer for 2023, which will further reduce Arizona's supply, making passage of the bill imperative.

"There are no other options," he said.

The legislation, which passed with bipartisan votes in the House and Senate on Friday, makes Arizona's Water Infrastructure Finance Authority — currently part of the Arizona Finance Authority — a standalone agency.

It would allow WIFA to sell long-term water augmentation bonds, enter into public-private partnerships for water-related facilities, and oversee water-related revolving fund programs. WIFA could also pursue bringing desalinated water to Arizona from Mexico, a plan Gov. Doug Ducey outlined in his January State of the State address..



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In S&P Global Ratings' ESG credit indicator report card, released in March, risks due to drought contributed to moderately negative environmental indicators assigned to Arizona, California, Colorado, Nevada, and Utah.

"This could necessitate long-term resource planning and require states to undertake more substantial capital investments that could affect its debt and liability profile to mitigate the effects of drought and other related natural resource pressures," the rating agency said.

Utah's score, which was largely based on long-term water supply challenges, drew a sharp rebuke in April from State Treasurer Marlo Oaks, who blasted S&P for politicizing the ratings process.

Ironically, Gov. Spencer Cox at the same time declared a state of emergency due to "dire drought conditions affecting the entire state."

And state lawmakers in the 2022 session appropriated almost \$500 million for water conservation.

While Arizona looks for water from other sources, bond-financed projects elsewhere in the Southwest are targeting Colorado River water despite its shrinking volume.

Original Article: [The Bond Buyer by Karen Pierog](#)

Pipelines? Desalination? Turf removal? Arizona commits \$1B to augment, conserve water supplies

The Colorado River's precipitous decline pushed Arizona lawmakers to deliver Gov. Doug Ducey's \$1 billion water augmentation fund — and then some — late Friday, their final night in session.

Before the votes, the growing urgency for addressing the state's oncoming water shortage and the long timeline for approving and building new water projects nearly sank the legislation.

Just over a week after the federal government warned that the seven states that use the Colorado must make major new cutbacks by next year, Democrats held out until they got an additional \$200 million commitment for water conservation, which they argued could help Arizonans much faster than the costlier seawater desalination plan that the governor has touted.

Some of the water importation schemes that had been discussed would require multiple billions of dollars and interstate or international partnerships, making this three-year investment effectively a fund for down payments for big-ticket pipes or treatment plants. The water conservation measures, such as grants to help cities reduce turf grass, could be cheaper.

One after another, a bipartisan stream of legislators picked up a microphone in a two-day blitz for the package to say that spending to plug the emerging holes in Arizona's water supply was critical to the state's future. They eventually passed it as Senate Bill 1740 with just one dissenter in each chamber.



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"We're going to need it," Republican House Speaker Rusty Bowers told colleagues, "and we should all get used to the idea that we're going to have to pay what water costs in order to stay here."

"Arizona is putting our money where our mouth is," said Rep. Gail Griffin, R-Hereford. Sen. Lisa Otondo, D-Yuma, said the effects of a two-decade drought are "frightening" and farmers in her district need a legislative fix as they're asked to take voluntary reductions in river water.

"The situation is real," she said. She offered the amendment adding a conservation fund. The U.S. 100 years ago split the Colorado's bounty from headwaters to sea among seven states and, ultimately, Mexico, based on the assumption that it would supply at least 20 percent more than it has so far in this century. The result has been plunging reservoirs in the face of major population growth.

Arizona is not in imminent danger of failing to supply its residents, though a first-ever mandated cutback of Colorado River water through the Central Arizona Project canal has inflicted economic pain and fallowed farm fields in Pinal County this year.

Before this year, Arizona could take from the river 2.8 million acre-feet, a water-measuring unit of roughly 326,000 gallons apiece. An acre-foot could supply about three households for a year, though much of the water goes to farms. The river typically accounts for about a third of the state's water supply.

Original Article: [AZ Central by Brandon Loomis](#)

The drought-parched West wants to take Mississippi River water? Fat chance! Or is it?

Leave it to the Westerners to come up with solutions to their problems by causing problems for others.

Las Vegas resident Bill Nichols' June 22 suggestion of diverting Mississippi River water to the Southwest to help solve the Southwest's drought problem is nothing more than a plan to steal, under federal-government oversight at taxpayers' expense, water that belongs to the Midwest.

Bill doesn't say what the Midwesterners who are deprived of this diverted water will do for their water needs. If Bill wants Mississippi River water, let him move to somewhere along the Mississippi. Or install desalinators along the 1,360 miles of Pacific Ocean mainland coastline. There are desalinators that use sun-distillation instead of electricity to produce fresh water, only needing external power for the pumps.

Another sin for Sin City. Think outside the drought, Bill.

Rod Rom, Butler, Missouri

Midwesterners won't allow West to take Mississippi River water

Regarding the letter by Bill Nichols. Don't you feel any obligation to educate your readers about how things work? Why was this letter even published? Water rights are a contentious and highly defined area of law



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There is no way the states bordering the Mississippi River would allow for the diversion of water to the Colorado River.

Were I Californian, I'd be looking into desalination a lot more, especially in the face of rising sea levels.

Richard Layman, Salt Lake City

A pipeline to the West isn't such a bad idea

The forest fires in the West continue to burn out of control and increase in scale each year. The water supply situation has dramatically decreased in the western region, increasing the difficulty of fighting the fires as well as supplying water to farms, municipalities, and industry. Nature alone cannot fix this situation. California and other western states are experiencing more and more droughts and reduced winter snows further reducing the needed water.

One possible solution would be to build a pipeline from the Missouri River somewhere between Chamberlain and Yankton, South Dakota, to Poudre Pass Lake in Colorado. Sending water from the Missouri River westward to the beginning of the Colorado River would help parts of the Southwest region meet their increased water needs. The pipeline could also reduce the flooding both along the Missouri and the Mississippi River basins that occur quite frequently.

Regulations for when the water could be sent would need to be set up to ensure the plains states are not deprived of their water needs. Every drop sent westward would benefit the regional needs for this precious commodity. The project would also add jobs to the economy.

Paul Marx, West Windsor, New Jersey

Moving water West could help the Mississippi River basin, too

For years I have been promoting the diversion of excess water from the Mississippi River basin. A number of benefits would ensue:

Ocean levels are rising with the Mississippi dumping millions of gallons into the gulf every day; diversion would reduce that amount.

The Mississippi basin faces annual flooding that is catastrophic to millions, including farms.

We have the means to tunnel through mountains where necessary.

Providing water to the southwest could provide a positive impact on climate change

You might note from my name that I am of Dutch heritage and the Dutch know how to manage their limited land resources as well as the real danger of flooding.

The water resources are there; they exist in excess where they are not needed. Perhaps the media can provide focus on a real-life solution that is a win/win for all stakeholders.

Ray DeJong, Redmond, Washington

Mississippi floods make me wonder

I've often wondered when the Mississippi floods due to storms and heavy rainfall — thus flooding towns, destroying land and homes — why not take trucks and water



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tanks/trailers and suck up the excess water, and drive it across the country to places like Lake Mead. Big expense in fuel, but it's possible the loss in the several states without the water is greater.

Shawn Houk, Oklahoma City

Original Article: [Yahoo News by Reader Submissions](#)

Saudi water deal threatening water supply in Phoenix

Arizona is leasing farmland to a Saudi water company, straining aquifers, and threatening future water supply in Phoenix. Fondomonte, a Saudi company, exports the alfalfa to feed its cows in the Middle East. The country has practically exhausted its own underground aquifers there. In Arizona, Fondomonte can pump as much water as it wants at no cost.

Groundwater is unregulated in most rural areas of the state. Fondomonte pays only \$25 per acre annually. The State Land Department says the market rate is \$50 dollars per acre and it provides a 50% discount because it doesn't pay for improvements. But the \$25 per acre price is about one-sixth of the market price for unimproved farmland with flood irrigation today, according to Charlie Havranek, a Realtor at Southwest Land Associates.

Although there are no records for how much Fondomonte is pumping out of the aquifer, a State Land Department report estimates the company is swallowing as much as 18,000 acre-feet every year – enough water to supply 54,000 single-family homes.

Using the average rate at which groundwater on state trust land is auctioned – as the report suggests — the value of the water Fondomonte uses could be anywhere from \$3 million to \$3.9 million a year.

Here's What Rob O'Dell Had to Say:

One of the things being grow on the farmland is alfalfa, which is being sent back to Saudi Arabia to feed their cows. However, alfalfa can be very water intensive which is being supplied by the ground water coming from Western Arizona.

"It's one of the most water intensive crops there are and just with the conditions out there, they're able to do eight to nine cuts, harvests a year of alfalfa."

A side note to why is because Saudi Arabia has exhausted a lot of their ground water supply. A lot of companies in Saudi Arabia have been searching around the world for a location to get their water from, which one of them is Western Arizona.

Is this Ground Water from Western Arizona?

"Absolutely, this ground water that was laid down probably 70 to 80 thousand years ago, that's almost nonrenewable."

As for the leases for the land, both of them were conducted by the State Land Department. One of the farms is located in Vicksburg and the other is in Butler Valley.

How Much are These Leases?



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“They pay about 86 thousand dollars a year. Some reports show that the water could be worth up to three to four million dollars a year that they are putting on the field every year” O’Dell went onto say this about Phoenix and their water supply “because that could be a potential water supply for Phoenix.”

Original Article: [Arizona PBS by Rob O’Dell](#)

GLOBAL WATER NEWS

Ofwat extends sewage dumping inquiry to include South West Water

The regulator Ofwat has expanded its investigation into the dumping of raw sewage to include South West Water after finding “shocking” failures in the way the majority of water companies run their waste treatment works.

Ofwat said on Tuesday it had extended its inquiry after heightened concerns about South West Water’s environmental performance and suggestions it was not complying with its legal obligations.

The enforcement action being taken by the regulator is part of a large inquiry into potentially illegal dumping of raw sewage by privatised water companies. Six out of nine companies – Anglian Water, Northumbrian Water, Thames Water, Wessex Water, Yorkshire Water and now South West Water – have been served formal notices to gather further information for enforcement purposes, the regulator said.

In 2020 the Guardian revealed that water firms had discharged raw sewage into England’s rivers 200,000 times the previous year. And in 2021 Ofwat and the Environment Agency announced an investigation into potentially illegal dumping of raw sewage into rivers and coastal waters by water companies.

The inquiry began after water companies admitted they may have illegally released untreated human effluent into rivers and waterways.

Water companies are allowed to self-report breaches of permits that allow them to release raw sewage in exceptional circumstances via storm overflows.

The six companies are being investigated because of concerns they have a significant number of wastewater treatment works that may not be compliant with the permits – and are therefore dumping sewage potentially illegally – as well as concerns about how each company manages its compliance with its environmental obligations and whether it has provided the information required to the regulator or withheld data.



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David Black, Ofwat's chief executive, said: "As we gather and analyse more information, including data on storm overflow spills, our concerns have grown further about South West Water's operation of its wastewater assets and environmental performance. As a result, we have opened an additional enforcement case into South West Water.

"We have now opened enforcement cases against the majority of wastewater companies in England and Wales. From what we have seen so far, the scale of the issue here is shocking – companies must resolve any problems at wastewater treatment works and do so quickly. Where they have breached their obligations, we will not hesitate to act."

Alongside the Ofwat investigation, the Environment Agency is involved in a criminal investigation into potentially illegal sewage discharging by water companies.

It involves more than 2,000 sewage treatment works, nearly a third of the total number in England and Wales, with any company caught breaching their legal permits liable to enforcement action, including fines or prosecutions.

Feargal Sharkey, a campaigner on clean rivers, said: "That makes six of the nine English water companies under investigation for widespread and serious non-compliance. Makes you wonder what the regulator has been doing all these years."

Mike Keil, a senior director of policy at the Consumer Council for Water, research and campaigns, said: "It's a betrayal of customers' trust and expectations if a sewerage company fails to comply with its basic duties and puts at risk the health of rivers and habitats for wildlife that the majority of people have told us they want to see improved, not undermined.

Original Article: [The Guardian by Sandra Laville](#)

Milan turns off fountains as Italy warns of more water rationing to fight drought

Authorities in Milan are turning off public fountains amid warnings of daytime water rationing as Italy battles one of its worst droughts in decades.

The measure, which comes after the wider Lombardy region declared a state of emergency, targets about half of the city's 100 decorative fountains, with the plug already pulled on several over the weekend and the rest to be switched off in the coming days.

Fountains hosting fish and plants are exempt from the rule, as are drinking fountains. Residents in the business and fashion hub have also been urged to reduce water use at home as much as possible.

In addition, inhabitants and business owners have been told not to set their air conditioning units below 26C in order to conserve energy, after parts of the city were last week hit by power cuts, believed to have been caused by a surge in the use of air conditioners amid high temperatures.



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“We must take action and we believe it is right to do our part,” said Beppe Sala, the mayor of Milan.

Italy is experiencing an intense, protracted heatwave with temperatures forecast to eclipse 40C in parts of the country by the end of the week.

The drought has hit northern regions particularly hard, where a parched Po River, Italy’s longest waterway, is wreaking havoc on everything from farming and hydroelectric power to supplies of drinking water.

Fabrizio Curcio, the chief of Italy’s civil protection department, said on Monday that the Po was up to 80% lower than usual as a result of rainfall being 40-50% beneath the average of recent years and snowfall being down by 70%.

Original Article: [The Guardian by Angela Giuffrida](#)

Mexico eyes incentives for firms that save water amid drought in northern state

Mexican President Andres Manuel Lopez Obrador said on Monday he would be willing to give fiscal benefits to companies that lower their water consumption in the northern state of Nuevo Leon in order to help tackle a drought in the region.

Speaking at a regular news conference, Lopez Obrador said a solution to the water shortage must be found by local authorities, but added that the federal government is willing to help.

Original Article: [Nasdaq by Valentine Hilaire / Reuters](#)

Environment Agency faces legal battle over water removal in Norfolk Broads

A couple are taking the Environment Agency to the high court in a landmark case to stop the abstraction of water damaging internationally important wetlands in the Norfolk Broads.

In a sign of the growing struggle over the allocation of scarce water resources in the dry south-east, Tim and Geli Harris are seeking to reduce the removal of groundwater to irrigate potatoes and other crops farmed next to three protected wetlands, including Hickling Broad national nature reserve.

The couple, who are farmers themselves, have spent £1m on legal challenges, winning a key battle six years ago when a public inquiry proved that abstraction licences were damaging critically endangered plants such as the fen orchid at Catfield Fen, a site of special scientific interest (SSSI), which they in part own.

This victory forced the Environment Agency to assess how much abstraction reduces the flow of groundwater and pledge to keep reductions in groundwater flows in the protected section of the Ant valley to less than 5% rather than more than 50%, as was routinely occurring.



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But the agency's own data revealed that abstraction continued to reduce groundwater flows by more than 50% at more than two dozen locations close to three nearby SSSIs: Smallburgh Fen, Potter Heigham marshes and Hickling Broad, which is renowned for being the richest area for stoneworts in Britain.

The Harrises are taking the agency to a judicial review next month, arguing that it is legally obliged under the habitats directive – the EU protections enshrined in British law – to protect these sites by reducing abstraction.

“Once you damage a calcareous fen it's gone – you can't mend it. It's like a rainforest,” said Tim Harris.

The Harrises fear that the Environment Agency's refusal to take action will weaken the protections provided by the habitats directive in Britain – with an appeal to the European courts no longer available after Brexit.

Tim Harris said: “This is such an important case because if we lose, the Environment Agency can do whatever it likes in terms of abstraction ... If we lose this case, God help nature.”

The Broads is Britain's largest protected wetland, with a quarter of its species internationally protected, including the swallowtail butterfly and Norfolk hawker dragonfly, but the region has half the annual rainfall of Sydney, Australia.

Farmers obtain licences from the Environment Agency to extract water from the Broads' river systems, irrigating high-value crops such as potatoes. Since 2004, farmers have been able to sell their abstraction licences to neighbours, ensuring that every licence is fully exploited.

A Natural England study in 2019 found that the major cause of extinctions in the Ant valley over the past 50 years had been due to abstraction, which has reduced the flow of calcareous groundwater, leading to more acidic rainwater, the acidification of the fen and the loss of rare plants that thrive in alkaline conditions.

Farmers argue that given the cost of living crisis and war in Ukraine it is more important than ever to grow food in Britain.

But Tim Harris, who with Geli turned arable fields on their 460-acre farm to pasture when they bought it 30 years ago to help protect their 100 acres of fen, where bittern, crane and swallowtails breed, said this was not an argument over food security.

“We are farmers. This is not about whether you can farm or not, it's about yields and crop choice. Abstraction raises the value of land by 15-20% so we say: is it right that we destroy Britain's premier wetland for a 15-20% increase in yield? It's not about food security, it's about yield and profit. And by far the biggest employer in the area is tourism.”

The Environment Agency's plans to reduce abstraction include closing public pumping facilities, with Broadland villages supplied with water piped in from Norwich.

A spokesperson from the Environment Agency said they could not comment on the legal challenge, but added: “Since 2018 when our technical work began we have invested



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significant time in seeking long-term environmental protection for the Ant valley, through identifying and implementing sustainable solutions for water and businesses.

“We have achieved this by working with farmers, businesses and in collaboration with other agencies. This activity has been conducted in addition to us performing our legal duties as regulator.”

Original Article: [The Guardian by Patrick Barkham](#)

India-Bangladesh relations: Cross-border diplomacy crucial for water management

In April 2022, in a bid to increase connectivity between the two neighbours, Bangladesh Prime Minister Sheikh Hasina offered the use of the Chittagong seaport to India. The move opens up new transit points for the landlocked North East region, particularly for Assam and Tripura – and new opportunities to build the region’s economy. Unlike the nearest Indian port, Chittagong port has easier connectivity and access for states in the region and the opening up of the port for use will open greater trade and export opportunities for the region.

India being the second largest trading partner of Bangladesh, the nation is keen to strengthen its connectivity with India. Both the countries have also signed a Coastal Shipping Agreement in 2015 and a Standard Operating Procedure allowing direct regular shipping between the ports on India’s east coast and Bangladesh’s ports, particularly Chittagong. Reopening the pre-Partition trade routes would reduce the cost and time of transportation for Northeast India and generate revenue for Bangladesh. The deal is a move towards greater diplomatic cooperation between the two countries, improving Indo-Bangladesh bilateral ties. Crucially, it opens up new avenues for greater cooperation on water management in the region: an issue of critical importance and interest to both the nations.

Negotiating water-sharing in a changing climate

In 1996, India and Bangladesh signed the landmark Ganges Treaty for managing this shared watershed between the two countries. Intending to end the difference between Bangladesh and India, the principal objective of the Ganges Treaty was to determine the amount of water to be released by India at the Farakka Barrage dam over the Ganges river. However, studies show that Bangladesh has had trouble receiving the guaranteed share of water during critical dry periods about 65% of the time.

The Ganges Treaty is set to expire in 2026. In the face of the many on-going coastal and riverine natural disasters faced by Bangladesh, hopes are high that the new agreement will be improved and aligned with advancements in water-governance and nature-based solutions amidst the rapid environmental degradation, presenting opportunities to explore beneficial mechanisms for river basin and watershed management.



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The Teesta river which also stretches through Sikkim and Bengal in India, before meeting the Brahmaputra (as the Meghna) in Bangladesh cuts through deep ravines and is the main cause of flash floods, landslides and earthquakes downstream. About 90 per cent of the river basin of the Meghna is located in India. Several haors or wetland ecosystems of Bangladesh are affected by the sediment flow from the Indian side, creating major problems for the biodiversity of the haors and downstream communities. However, agreements on managing the Teesta's resources have been stuck in limbo, with both India and Bangladesh unable to find middle ground on the issue.

Looking to the future

The opening up of Chittagong port is an opportunity for both India and Bangladesh to move towards a cooperative model of diplomacy where natural assets are concerned. Both countries face shared challenges in climate change disrupting water security and extreme flooding, leading to rising costs for damage repairs and an increasing number of displaced people. These challenges will only increase in the coming decade. Cooperative approaches to managing transboundary watersheds will be key to meeting these challenges in a way that meets security needs for both countries, while benefiting their citizens.

It is critical to collaborate towards water dialogues that allow both countries to engage in joint management of the forests and wetlands, maintenance of complex hydrological systems across political borders that share the same geography and transboundary natural resources, as well as mitigate the issues faced by the populations dependent on the rivers as a lifeline. Transboundary conservation organizations like the IUCN are facilitating joint research and data sharing on land use, socioeconomic change and the opportunities for benefit-sharing especially in the Meghna river basin. Among the steps to develop benefit-sharing agreements, it hopes to identify the various benefits provided by the basin, build benefit and distribution-enhancing scenarios to tackle the harsh environmental expenses and marginalisation of the local communities.

Consolidated nature-based solutions to unresolved political issues among these nations will benefit them economically as well as build resilience and productivity of the livelihood of people. A burgeoning on-going and unresolved problem such as the water-sharing of the Teesta between India and Bangladesh needs strong bilateral relations and cooperation to meet water shortages that are affecting economic growth. Both countries will be able to strengthen alliances and diplomatic partnerships by focussing on mutual benefit-sharing opportunities, that also recognises the socio-economic damage of existing and vulnerable bilateral water-sharing practices. The sharing of Chittagong Port must not be the end: it must be the start of a new cooperative diplomatic approach that recognizes our mutual challenge of climate insecurity.

Original Article: [DNA India by DNA Web Team](#)



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