

Veles Water Weekly Report

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WATER FUTURES MARKET ANALYSIS

Welcome to ***WATERTALK***

by Joshua Bell

CLICK THE LINK BELOW

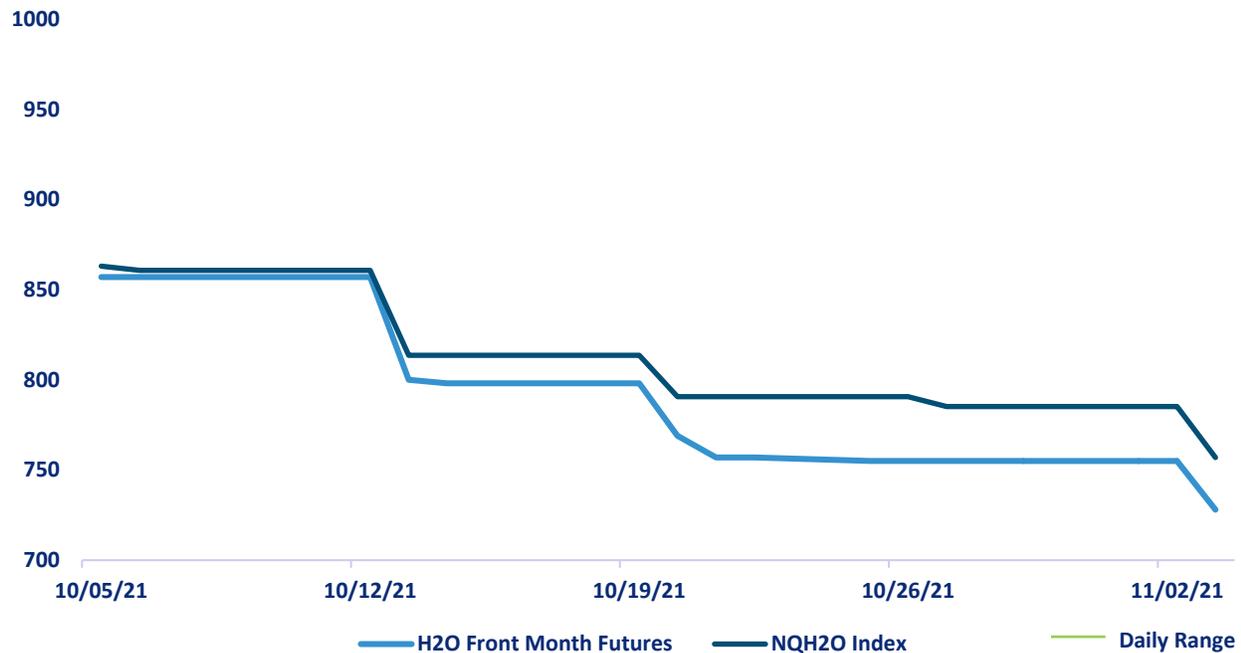
“A 2 minute technical analysis video of H2O futures”

<https://vimeo.com/642213460>



NQH2O INDEX PRICE vs H2O FUTURES PRICE

1 Month Price Performance NQH2O Index vs H2O Futures



Price Chart Based upon Daily Close

The latest index price on November 3rd is \$758.93, down \$26.26 or 3.34%. Over the past week the Futures have been closing at a discount to the index of \$28.93 - \$30.19. The Futures have closed at low of \$728 and a high of \$755.

NQH2O is up 51.84% YTD.

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

November 710@728

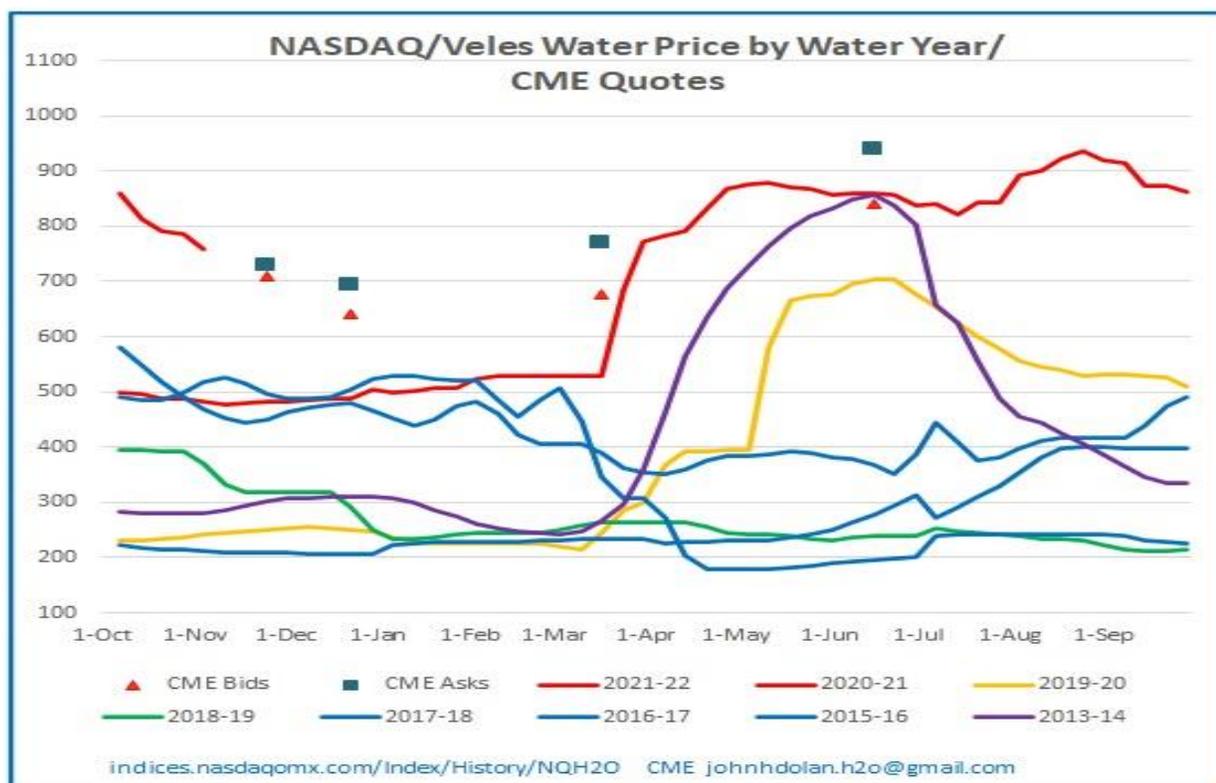
December 640@693

March 22 677@770

June 22 840@940



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.

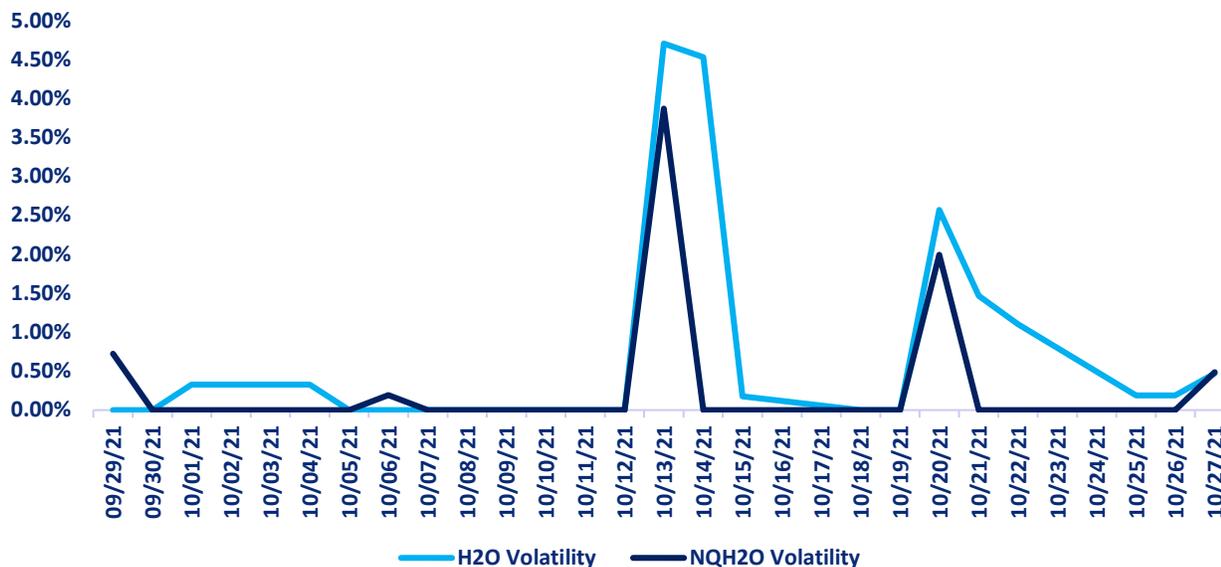
Current bids and offers in the market are still higher than historic prices showing that expectations are that this is an exceptionally dry year and prices may not fall seasonally as much as they have in prior dry years.

(Reference: 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 November future volatility high has been 2.53% on November 3rd with lows of 0% for the rest of the week.

ASSET	1 YEAR (%)	2 MONTH (%)	1 MONTH (%)	1 WEEK (%)
NQH2O INDEX	34.57%	5.35%	3.93%	2.654%
H2O FUTURES	N/A	9.54%	7.95%	3.26%

For the week ending on the November 3rd the two-month futures volatility is at a premium of 4.19% to the index, up 1.14% from the previous week. The one-month futures volatility is at a premium of 4.03% to the index, up 1.40% from last week. The one-week futures volatility is at a premium of 0.61% to the index, down 2.67% from the previous week. With the near term futures and index volatilities converging it would appear the sentiment is that the market moves in the short term may be less than previous moves as the price starts to find a level and stabilize.

*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 3/11/2021

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%	267	299
TULARE 6 STATION (6SI)	0	0.00	0.00%	265	199
NORTHERN SIERRA 8 STATION (8SI)	0.59	0.59	11.41%	514	425
CENTRAL VALLEY TOTAL	0.59	0.59	3.80%	349	308

RESERVOIR STORAGE

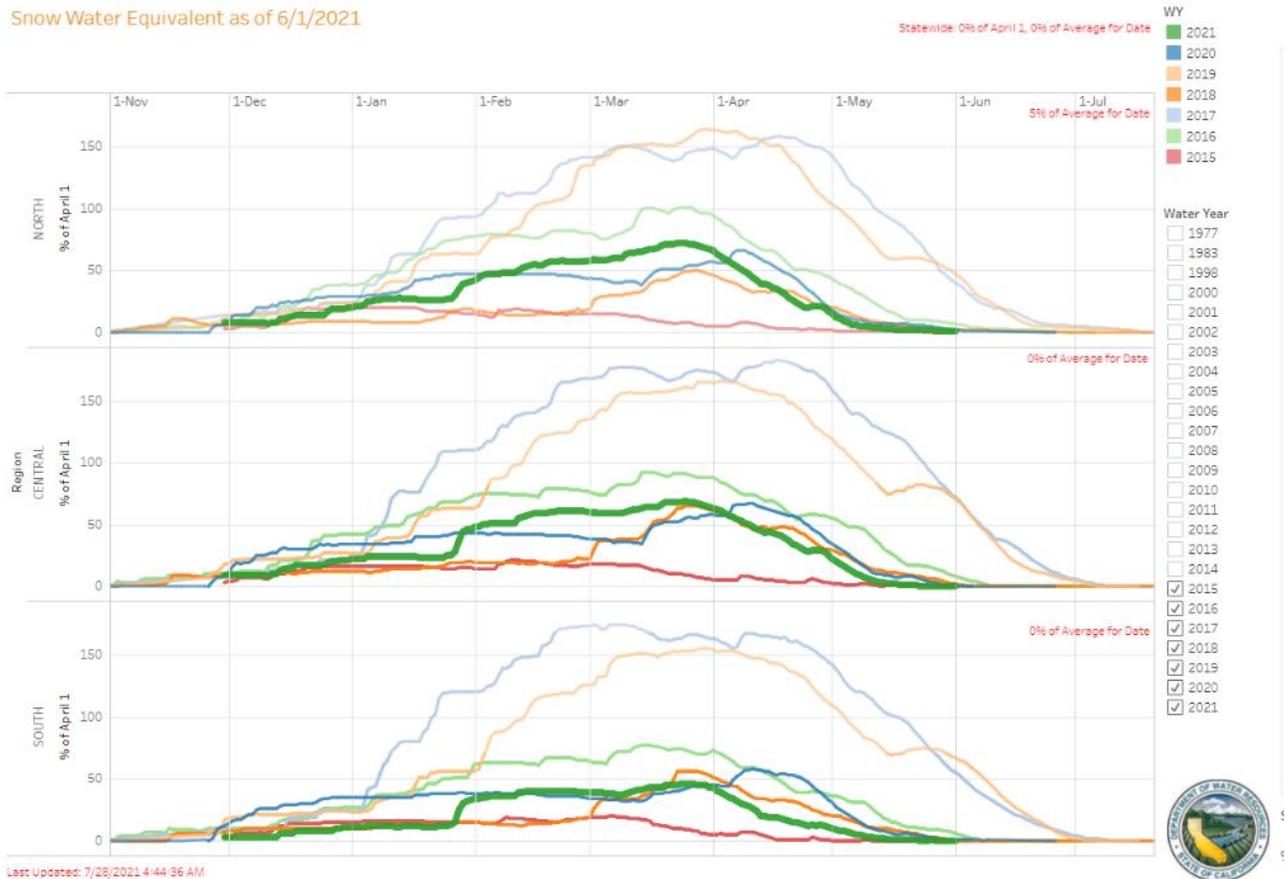
RESERVOIR	STORAGE (AF)	% CAPACITY	LAST YEAR % CAPACITY	HISTORIC ANNUAL AVERAGE CAPACITY %
TRINITY LAKE	672,930	27	53	47
SHASTA LAKE	1,001,879	22	46	41
LAKE OROVILLE	982,263	28	42	54
SAN LUIS RES	302,242	15	46	33

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



SNOWPACK WATER CONTENT

Snow Water Equivalent as of 6/1/2021



Last Updated: 7/28/2021 4:44:36 AM



REGION	*SNOWPACK WATER EQUIVALENT (INCHES)	WEEK ON WEEK CHANGE %	% OF AVERAGE LAST YEAR	% OF 20 YEAR HISTORICAL AVERAGE	% OF HISTORICAL **APRIL 1ST BENCHMARK
NORTHERN SIERRA	0	0.00%	0	0	0
CENTRAL SIERRA	0	0.00%	0	0	0
SOUTHERN SIERRA	0	0.00%	0	0	0
STATEWIDE	0	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.

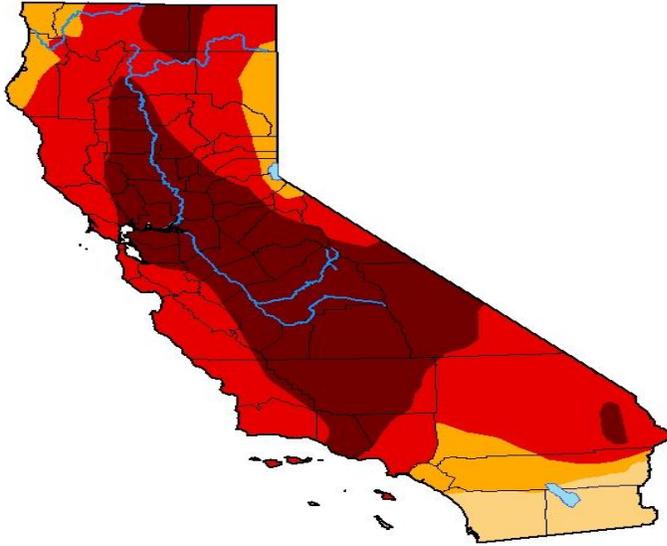
** April 1st is used as the benchmark as it when the snowpack in California is generally deepest. It has been used the benchmark date since 1941 by DWR and can be used to predict spring river flow.



DROUGHT MONITOR

U.S. Drought Monitor California

October 26, 2021
(Released Thursday, Oct. 28, 2021)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	100.00	93.81	83.33	38.74
Last Week 10-19-2021	0.00	100.00	100.00	93.81	87.18	45.66
3 Months Ago 07-27-2021	0.00	100.00	100.00	95.09	88.59	46.49
Start of Calendar Year 12-29-2020	0.00	100.00	95.17	74.34	33.75	1.19
Start of Water Year 09-28-2021	0.00	100.00	100.00	93.93	87.88	45.66
One Year Ago 10-27-2020	15.40	84.60	67.54	35.61	12.74	0.00

Intensity:
 None (White) D2 Severe Drought (Orange)
 D0 Abnormally Dry (Yellow) D3 Extreme Drought (Red)
 D1 Moderate Drought (Light Orange) D4 Exceptional Drought (Dark Red)

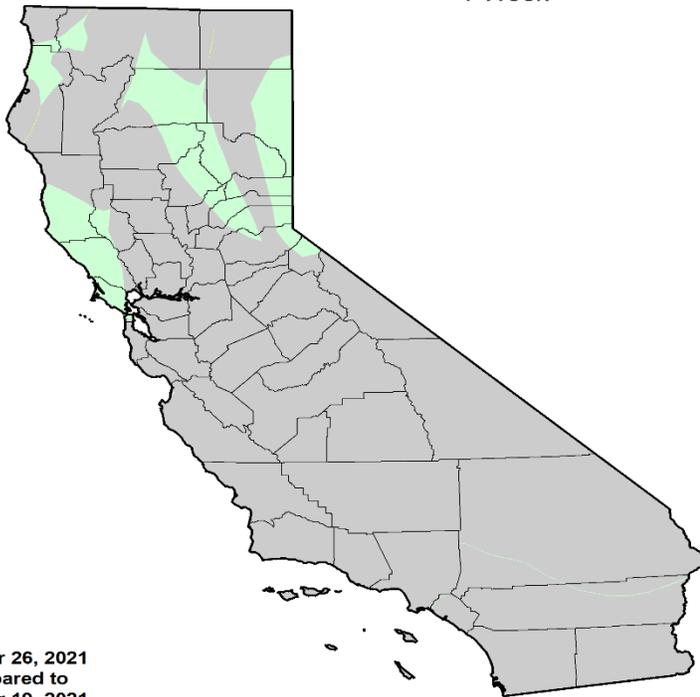
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:
Richard Heim
NCEI/NOAA



droughtmonitor.unl.edu

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



October 26, 2021
compared to
October 19, 2021

droughtmonitor.unl.edu

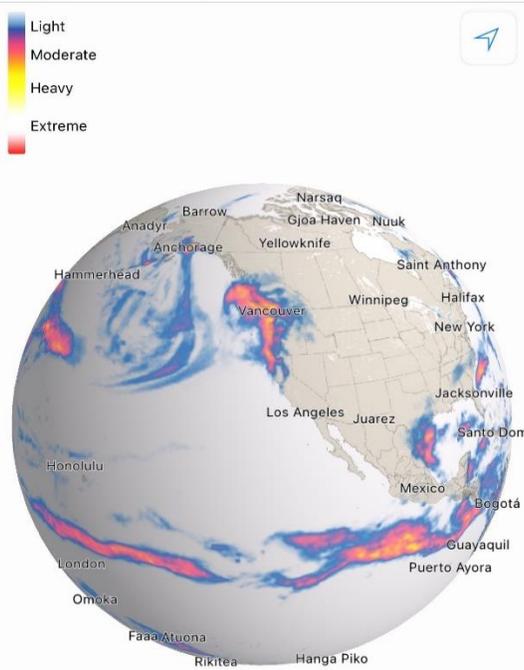


The US Drought Monitor release their statistics with a 1-week lag to this report. Over the past week there has been 6.92% improvement in Exceptional Drought Levels (D4) and a 3.85% improvement in Extreme Drought Levels (D3).

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 current satellite picture shows a frontal system from the NW that has hit landfall and is bringing precipitation to the Northwestern region of the US including Northern California.

This is followed by a further 2 frontal systems brewing over the NW Pacific and expected to bring further precipitation to the NW US. The second and third frontal systems may bring rain to the San Francisco area and there is the possibility that rain may reach as far south as the LA later this week.

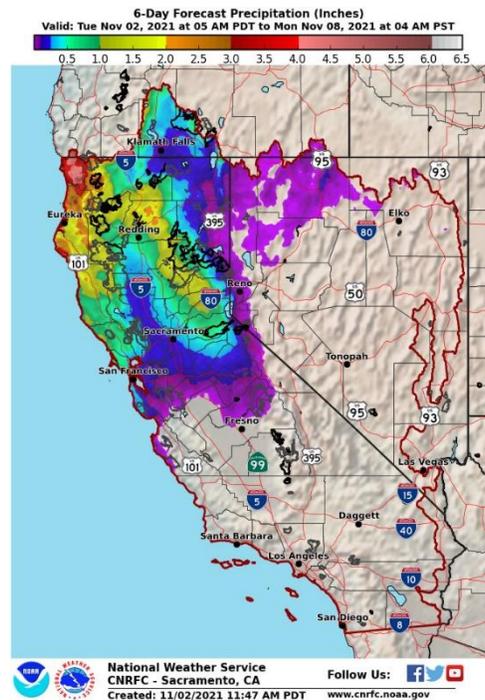
Once again Monsoonal effects are not prevalent on this satellite picture at present as it appears this moisture inflow from the South may have ceased for the year. Our long-term models are still showing

Ref. Dark Sky the potential for greater precipitation to reach the SW and Western US this winter.

10 Day Outlook

An upper level low off the Pac NW coast Saturday morning moves NE into B.C. Saturday evening. The associated front clips Northern CA bringing mainly light with locally moderate precipitation to Southern OR and Northern CA especially along the NW CA coast and over the Shasta Basin and the Northern Sierra. Freezing levels around 4500 ft near ORCA border and around 6500 ft and higher for the Northern Sierra. Sunday should mainly be dry except a few showers possible along the NW CA coast and Southern OR Cascades. Forecast is mainly WPC.

A stronger low pressure system approaches the Pacific NW coast Monday with a weak shortwave rotating into Northern/Central CA. The GFS shows a better moisture tap than the EC with this system and still differ in timing and



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VELES WATER WEEKLY REPORT

details. Forecast mainly a mix of latest WPC (which was quite a bit lower) with some of the previous forecast for Monday/ Monday night. Freezing level around 5000 ft to 6000 ft near ORCA border and 7000 ft and higher over the Sierra Monday.

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

WESTERN WEATHER DISCUSSION

Two inches to over 10 inches of precipitation fell across the West from the coast to the Sierra Nevada and Cascade ranges, over 2 inches was widespread across central Idaho and in parts of Nevada and Utah, with over half an inch over the rest of the Pacific Northwest into southern California, most of Nevada, and western and northern sections of Utah. Less than half an inch to no precipitation fell over the deserts of southern California and southern Nevada, over southeast Utah, and most of Arizona. New Mexico and parts of Montana were dry this week. A volunteer observer west of Reno, Nevada, recorded 6.83 inches of precipitation from the storm, while South Lake Tahoe measured 7.07 inches for the USDM week. Some all-time daily precipitation records were broken October 24 in northern California. These include 5.44 inches at Sacramento City (breaks the previous record of 5.28 inches from April 20, 1880), 5.41 inches at Sacramento Exec Airport (previous record was 3.77 inches on October 13, 1962), and 10.40 inches at Blue Canyon (exceeded the previous record of 9.33 inches from December 22, 1964). The heavy rains which fell over a short period of time resulted in transient rises on local creeks, ponding of water, mud and rock slides, and some debris flows over recent burn areas. So much rain falling so quickly likely mostly ran off and had little chance to soak into the soil. But the rain wetted the soils prior to the building of the winter snowpack which will help in the future. While beneficial, the precipitation improved hydrological conditions only marginally. In the Sacramento area, there were limited inflows into the major flood control and water storage reservoirs, which remain well below normal storages. The water level at Lake Tahoe rose only about 7 inches. In southern California, Big Bear Lake was two feet away from the record level of 18 feet below, and avocado production was reduced roughly 22% in the southern California growing belt.

Topsoil moisture improved considerably from the rains this week, according to USDA statistics. California went from 75% of the topsoil moisture short or very short last week to 40% this week, Oregon improved 16% to 53% short or very short this week, Washington improved 9% to 78%, and Idaho improved 17% to 45%. But Montana still had 96% of the topsoil moisture short or very short. The rain was not enough to replenish significantly low reservoirs. From October 21 to 26, reservoirs rose very little. Some examples for larger reservoirs: in Idaho, American Falls reservoir went from 15% full to 17% full, while Palisades stayed at 6% full; in California, Shasta rose from 21% of total capacity to 22%, Lake Oroville from 22% to 27%, Trinity Lake from 26% to 27%, and



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Folsom rose from 22% to 31%; in Oregon, Wickiup went from 4% full to 7%, while Owyhee stayed at 11%; and in Washington, Cle Elum went from 21% full to 22%.

D3 and D4 (exceptional drought) were pulled back in northern California, northwest Nevada, and parts of Idaho where the heaviest rains fell; D0, D3, and D4 contracted in Washington; and D3 and D4 contracted in Montana. The contraction of D3-D4 in eastern Montana reflected cumulative effects of above-normal precipitation over the last 2 to 4 weeks. However, D4 expanded along the east slopes in western Montana and D3 expanded in north central Montana to reflect intensifying dry conditions over the last 2 months.

Reference: Brad Rippey, U.S. Department of Agriculture
Richard Heim, NOAA/NCEI

WATER NEWS

CALIFORNIA WATER NEWS

California drought: Key talks over water use break down, S.F. may face tighter regulation

For nearly three years, some of California's biggest water users, including San Francisco, have been quietly meeting with the state to figure out how much water they should be taking from the San Joaquin River and its tributaries.

The talks were launched to prevent some of California's mightiest rivers from drying up, and keep fish populations from disappearing, while still allowing cities and farms to draw the supplies they need. The vision was nothing short of a grand compromise on divvying up California's water.

But late last week, the state conceded the negotiations had failed. In a letter to San Francisco and the other mostly agricultural water agencies involved in the discussions, state regulators told the parties they had made insufficient concessions on water use. The breakdown in talks means the state will begin directly regulating river draws, a move that could significantly squeeze the water users, and one they're bound to fight.

San Francisco gets about 85% of its water from the Tuolumne River in and around Yosemite National Park, one of the most stressed of the rivers in the San Joaquin River basin.

"We can't wait any longer," Wade Crowfoot, secretary of the California Natural Resources Agency, told The Chronicle this week. "It's literally been years and there's a need to improve environmental conditions in the rivers, not only for the fish but for the communities downstream that rely on the water."



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The conflict stems from a 2018 plan put forward by the State Water Resources Control Board to rescue the ailing Sacramento-San Joaquin River Delta and the rivers that feed it. The sprawling watershed at the center of the state's water supply chronically runs short of fresh water, largely because of how much is being drawn out. The result is shallow, polluted waterways and ravaged wetlands and wildlife, including the collapse of the state's prized salmon runs.

Under the plan, sometimes called the Bay Delta Plan, 40% of the natural flow of the Tuolumne, Merced and Stanislaus rivers would have to remain in these waterways during peak flows — not pumped out — to salvage the basin. This would leave 60% of the water for cities and farms, which compares to the 90% they currently draw at times. With San Francisco and five big irrigation districts in the San Joaquin Valley opposed to these terms, state regulators, at the urging of former Gov. Jerry Brown and later Gov. Gavin Newsom, began working with the parties to come up with “Voluntary Agreements” in lieu of the plan.

The city and the water districts pitched alternative proposals, though their options involved only slight reductions in river draws. They wanted to revive the rivers by improving fish passage and restoring native habitat. The state, however, joined by environmental groups and fishermen, said the alternatives didn't go far enough to rescue the languishing delta watershed.

Original Article: [The San Francisco Chronicle by Kurtis Alexander](#)

More rain heading for Bay Area, forecasters say

Just days after a historic storm soaked the drought-stricken Bay Area, more good weather news is on the way.

Two new storm systems are expected to bring rain Monday and next Thursday to much of Northern California. They won't be nearly as soaking as last weekend's atmospheric river, which shattered rainfall records across the region and opened the Sierra ski season nearly a month early. But the rain shows that the “storm door” is still open, meteorologists say, a promising trend building on the wet start to this year's winter rainy season after the last two years of severe drought.

“It looks to be another good wetting rainfall, but nothing too crazy like the last storm,” said Sean Miller, a meteorologist with the National Weather Service in Monterey.

“Monday morning, you'll need to turn on your wipers,” he said. “There are going to be some showers.”

The first storm is expected to deliver about 1 inch in the North Bay on Monday and half that in the Santa Cruz Mountains as it moves south. Cities around the Bay Area are forecast to receive about .25 inches.

Because the rain, part of a cold front from Alaska, isn't expected to arrive until early Monday morning, clear but chilly weather should be in store for trick-or-treaters on Halloween Sunday evening, with temperatures in the high 40s to low 50s across the region.



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Meanwhile, ski season at Lake Tahoe is beginning very early Friday after the area received 3 feet of snow last week. Palisades Tahoe, formerly Squaw Valley and Alpine Meadows, will open in October for only the 3rd time in 72 years.

Two other resorts, Boreal in the Tahoe area and Mammoth Mountain farther south, also will open this weekend.

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

Climate Change Magnified Recent California Deluge

A record-breaking storm that swept through California in recent days was made worse by climate change, experts say.

And not just because of additional rainfall that's a symptom of a warmer climate. Adding to the misery was what preceded the deluge: months of dry conditions and devastating wildfires.

That seesaw in weather conditions—from bone dry to sopping wet—is a taste of what's to come as the Earth heats up, scientists say.

The volatility carries an additional danger. The storm triggered several rock slides and mudflows when sheets of rain hit parts of California that had been stripped bare by repeated wildfires.

“The record-setting precipitation in Northern California follows near-record dry conditions,” said Alex Hall, director of the Center for Climate Science at UCLA’s Institute of the Environment & Sustainability. “It is an example of the type of increasing variability in precipitation, and swings between dry and wet, that we expect with a warming climate.”

The water blast came via an atmospheric river, a band of wet air from the Pacific Ocean powered by strong winds.

While that phenomenon isn't new, the storms now contain more water in part because a warmer atmosphere can hold more moisture, said Alexander Gershunov, a research meteorologist at the Scripps Institution of Oceanography at the University of California, San Diego.

“Atmospheric rivers certainly are more potent with warming, in a warmer atmosphere and over a warmer ocean,” Gershunov said. “There's more moisture in warmer atmospheric rivers, and this is a particularly warm one.”

As the climate continues to warm, he said, “atmospheric rivers will become more moist, more potent and produce more precipitation.”

Storms started in Northern California over the weekend, moved down the coast, and then hit Los Angeles and San Diego. Before heading south, the storms caused widespread havoc. Flooding was reported across the San Francisco Bay Area, closing streets in Berkeley, inundating Oakland's Bay Bridge toll plaza and causing rivers to overflow in Napa and Sonoma counties.



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About 782,000 San Francisco-based Pacific Gas and Electric Co. customers lost power because of the weather, a number that's about 14 percent of the utility's 5.5 million electric ratepayers. Most have been restored.

Original Article: [Scientific American by Anne C. Mulkern](#)

Historic rain and snow begin to refresh California lakes and mountains

Between historic drought and a lively fire season, California has experienced a troublesome year. Now, the state may have received the first sign of major relief: 8 trillion gallons of rain.

Like an epic fire hose, a long, narrow band of water vapor located in the lower atmosphere — known as an atmospheric river — doused California with record-setting rains Sunday and Monday. The event unloaded upward of 12 inches of rain on the northern Sierra Nevada mountains, almost a quarter of the annual average precipitation for the region.

The deluge comes only days after a record-breaking dry spell — what some scientists call precipitation whiplash. Sacramento had its wettest calendar day on record Sunday, just six days after the conclusion of its longest precipitation-free streak observed. Northern California and much of Nevada are experiencing their wettest October in decades.

“It is great that we received this much rain early in the season, which helped with wildfires and air quality,” wrote Helen Dahlke, associate professor in Integrated Hydrologic Sciences at the University of California at Davis, in an email. “The more these precipitation events are spread out over the rainy season the more chance the rain has to infiltrate and replenish soil moisture storage.”

The precipitation triggered flooding, particularly in coastal areas. The Navarro River reached 21.36 feet, about two feet shy of flood stage. Dahlke said the flooding meant quite a bit of the rain became runoff and flowed out to the ocean before it could seep into the ground.

“Longer storms of lower intensity would be better for groundwater recharge since dry soils often have a hard time infiltrating water quickly,” Dahlke said. “But luckily many reservoirs were empty and therefore most of the runoff will be captured in reservoirs.”

The storm managed to increase water levels in many reservoirs. Millerton Lake and Lake Perris have both exceeded their historical average for this time of the year, but those proved to be exceptions. On the whole, most are still below the historical average for this time of the year even with the bump.

Lake Tahoe received about 61,000 acre-feet of runoff in 48 hours, rising about six inches above the rim since Sunday. Last week, water levels on Lake Tahoe sank to a critical low at an inch below its natural rim. The lake is still about five-and-a-half feet away from capacity.



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Earlier this summer, water levels at Lake Oroville dropped to such low levels that officials shut down a nearby hydroelectric plant. After Sunday and Monday's storm, the lake rose 26 feet. The lake is still more than 130 feet below water levels from two years ago.

California's largest reservoir, Lake Shasta, is at 41 percent of its historical average for this time, as of Oct 26.

Original Article: [The Washington Post by Kasha Patel and Zach Levitt](#)

Climate challenges mount for California agriculture

California agriculture has experienced just about every form of climate change-induced calamity: Heat, drought, fire, floods. None bodes well for the future of farming in this state that is the U.S. king of agriculture.

But there are a couple of less headline-worthy factors that may determine what crops will survive if climate change trends don't at least slow down. One is the state's winters – yes, winters – and the other is its management of groundwater.

Challenges ahead for sure. In the end, however, there for some is optimism that the California agriculture communities' ability to continue adapting gives reasons for hope. "Wintertime lows have gotten warmer," says Dan Sumner, the Frank H. Buck, Jr. Distinguished Professor of Agricultural and Resource Economics at the University of California, Davis and a California farming region native. "We all talk about it in the middle of the summertime because it's hot outside, but the real news is the wintertime lows." The reason? Perennial crops, comprising the bulk of California's top farm commodities, need off-season dormancy to regenerate, so temperatures must remain below a certain threshold for at least a minimum amount of time. That concept is called "chill hours." It's crop-specific, and the fruits and nuts that are among the bedrocks of California agriculture are the ones most needing the right number of chill hours. Otherwise fewer buds, smaller fruits, lower yields.

According to the most recent census data from the U.S. Department of Agriculture, California still provides more agricultural product than any other state, accounting for 11% of the national total. That output includes more than two-thirds of the nation's fruits and nuts and more than one-third of the nation's vegetables.

California's top 10 agricultural commodities among its more than 400 in order are: dairy products, almonds, grapes, pistachios, cattle, lettuce, strawberries, tomatoes (largely for processing), floriculture, and walnuts.

Those are largely perennials needing their chill hours to make them as productive as they need to be, and therefore worth growing. Crops such as nut trees and grapes are large investments, so low yields may make them money losers.

A 2018 publication – "Climate Change Trends and Impacts on California Agriculture: A Detailed Review" – provides an overview of the prevailing research around temperature,



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precipitation, and other factors and how they are likely to affect the state's agriculture over time.

The report, led by University of California Merced climate change extension specialist Tapan Pathak, indicates that higher minimum and maximum temperatures are resulting in lower numbers of chill-hours.

The authors of that study say that by around 1950 “growers in the Central Valley could rely on having between 700 and 1,200 chilling hours, depending on the location of their orchard.” But currently, they say, for crops requiring more than 700 hours – apricot, kiwifruit, peach, nectarine, plum, and walnut – only between one-quarter to one-half of the valley is suitable. By 2080-2095, they project, only about 10% of the valley will remain viable for those crops.

Fruits such as apples, cherries, and pears needing chill hours of at least 1,000 hours were already barely suited to Central Valley conditions 20 years ago, according to the publication.

Perennial crops also make agricultural systems less flexible and therefore less able to deal with whatever climate change throws at them. Annual crops, on the other hand, can be changed year-to-year to accommodate climatic changes.

“You really don't want to miss a year,” says Nathan Mueller, an assistant professor of ecosystems science and sustainability and soil and crop sciences at Colorado State University. “Diversification in general is going to help diffuse that risk,” says Mueller, who studies world-wide climate risk agricultural trends,

And, he says, it all intersects with water. Not having enough makes everything worse. Drought and heat exacerbate themselves and each other. When it's hot, whatever precipitation there is evaporates faster, often not making it into the soil to become groundwater. The warming climate also likely means precipitation will come in the form of rain rather than snow, even high up in the Sierras so crucial to California's water supply.

The result can be a smaller snowpack, which in turn means that what Mueller calls a “free giant reservoir” will melt earlier and at higher elevations than long has been the case. So there will be less of that gradual melting that in “normal” years constantly re-supplies surface and groundwater without wasting too much of those resources.

Add to the equation that heat spells, now more frequent than previously in winter months, can result in more off-season melting. Furthermore, extended dry conditions may mean that when it does rain, the water may simply run off hard-packed soils without helping parched crops or soaking into groundwater supplies.

Original Article: [Yale Climate Connections by Jan Ellen Spiegel](#)

**Judge won't validate water deal for California farm supplier**

A California judge has declined to validate a contract granting permanent access to federally controlled water for the nation's largest agricultural water supplier, a move that means the U.S. government is not bound by terms of the deal.

Environmentalists had blasted the contract between the U.S. Bureau of Reclamation and the Westlands Water District as a sweetheart arrangement designed to benefit corporate agricultural interests over environmental needs and taxpayers. It was crafted during the Trump administration under then-Interior Secretary David Bernhardt, a former lobbyist for Westlands, a public entity based in Fresno that supplies water to private farmers.

"This was an effort to basically steal public resources and put them into private pockets," said Stephan Volker, an attorney for the Winnemem Wintu Tribe, the North Coast Rivers Alliance and several other groups.

Westlands is evaluating the court's ruling and may appeal if the case is dismissed, spokesperson Shelley Cartwright said. The water district rejects claims it received special treatment, with Cartwright saying it has "acted transparently" and followed the steps required by law.

Fresno County Superior Court Judge D. Tyler Tharpe declined Wednesday to validate the contract between Westlands and the federal Bureau of Reclamation. The federal government is not bound by the terms of the contract until it is validated, though the two sides have already moved forward. Tharpe scheduled another hearing on Dec. 2 to weigh dismissing the case.

The water Westlands doles out to its agricultural customers comes from the Central Valley Project, a federally run network of dams, tunnels and canals that brings water from California's wetter north to the farm-rich San Joaquin Valley and heavily populated Southern California.

The case raises questions about how much water major districts that serve corporate interests should be entitled to at the expense of tribes and environmental interests that rely on certain water flows, said Patricia Schifferle of Pacific Advocates, a natural resources consulting firm.

"The argument really is: Are we going to allocate that much water to Westlands Water District without conditions?" she said.

The contract gives Westlands permanent access to 1.15 million acre-feet of water for irrigation and other purposes, though it doesn't guarantee all of that water in drier years like the one California is now experiencing. Since 1988, Westlands has only received its full allocation from the Central Valley Project six times, according to the district's website.

An acre foot is 325,851 gallons (about 1.23 million liters). An average household uses one-half to one acre-foot of water a year, according to the Water Education Foundation,



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meaning the contract gave Westlands access to enough water to serve up to 2.3 million households.

Original Article: [Associated Press by Kathleen Ronayne](#)

Here is a plan to create more water for California

There is an answer to Jim Wunderman’s position that “state and federal governments should commit to creating 1.75 million acre feet – about 25% of California’s current urban water use – of new water from desalination and wastewater recycling by the end of this decade”: the Water Infrastructure Funding Act of 2022, a constitutional initiative proposed for the November 2022 state ballot.

This initiative, submitted in August, has been analyzed by the Legislative Analyst’s Office, which predicted “increased state spending on water supply projects and potentially less funding available for other state activities.” Notwithstanding the multibillion-budget surplus California’s Legislature currently enjoys, this redirecting of spending for water projects is what the initiative proponents intend. The state of California has neglected its water infrastructure for decades.

This initiative requires 2% of the state’s general fund be used to construct new water supply projects, and it doesn’t sunset until new projects add 5 million acre feet per year to the state’s water supply. That would be about 2 million acre feet coming from recycling and desalination, another 1 million from conservation programs, and the rest from runoff capture into off-stream reservoirs and aquifers. It also revises the California Environmental Quality Act and the Coastal Act to streamline project approval.

Instead of identifying specific projects for funding, this initiative carefully defines eligible projects to include everything that would produce more water, from conservation and water recycling, aquifer recharge, new reservoirs and aqueduct restoration to runoff capture and brackish/ocean water desalination. It also funds remediation projects, such as replacing the pipes in public schools in Los Angeles.

The initiative is attracting broad based and bipartisan support. Some of the opponents that have already emerged apparently have not read the measure, because they’re criticizing it for not funding projects which in fact it will fund.

This initiative aims to replace water scarcity with sustainable water abundance. Its benefits translate not only into more water, and hence more options to maintain and improve ecosystems throughout the state, but also an economic boom. Lower prices for water will translate into more affordable food, affordable water for every industry reliant on water, widely available water supplies to enable more home construction, and the creation of tens of thousands of high-paying construction jobs.

Original Article: [CalMatters by Shawn Dewane, Edward Ring, Stephen Sheldon, Geoffrey Vanden Heuvel, and Wayne Western Jr.](#)



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Virginia Beach could spend a half-billion dollars dealing with rising water, worsening storms

Voters in the sprawling coastal city of Virginia Beach will decide whether to approve one of the larger municipal bonds in the U.S. that would be used to protect against rising seas and intensifying hurricanes.

If it passes Tuesday, the \$568 million would fund anything from elevating roads to closing a 100-acre city golf course to collect stormwater.

If it fails, economists say the city could lose billions of dollars in the next half-century as recurrent flooding inundates roads, businesses and homes.

The referendum underscores the mounting costs of adapting to climate change for U.S. cities. But it will also be a measure of Americans' willingness to approve such bonds as more communities seek funding.

"I'm not confident that it will pass," said Virginia Wasserberg, whose Virginia Beach home was among 1,400 houses and businesses flooded by heavy rains from the remnants of Hurricane Matthew in 2016.

Wasserberg, 41, is a conservative Republican who homeschools her children and supports the bond. She's campaigned for more flood protections ever since her neighborhood's drainage systems were overwhelmed by weeks of rain that culminated with Matthew.

Homes that are miles from the city's beaches on the Atlantic Ocean and Chesapeake Bay were inundated for the first time. Wasserberg said she and her family fled to the second floor and called 911 – only to be told that responders couldn't reach them.

"I like to say it took a disaster to wake me up," Wasserberg said.

Voter approval is far from guaranteed in this city of nearly half a million people, which some political observers say can lean libertarian. If the bond passes, property taxes would rise by \$115 to \$171 a year for a home of median assessed value, city officials say. The need for money to protect communities against climate change is growing across the globe, particularly in the world's poorest countries. It will be an area of discussion at an upcoming UN Climate Change Conference, which starts Sunday in Glasgow.

In the U.S., 26% of ZIP codes are "highly exposed to floods," according to Moody's ESG Solutions, which tracks climate risks and sustainable finance.

Original Article: [Penn Live Patriot News by Ben Finley, The Associated Press](#)

Despite Objections, State Water Board Votes to Increase Fees

The State Water Resources Control Board (SWRCB) recently voted to further increase fees related to water quality and water rights. President and CEO of the Western Agricultural Processors Association (WAPA), Roger Isom explained that fees are going up across the board. Producers are going to be seeing increased costs in several areas moving forward.

"Directly, they're going to see an increase on the irrigated lands fee that every grower pays. That's going to be a little over a 15 percent increase," Isom noted. "That's done,



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it's adopted and will be on their next bill. If they belong to or send their product to a processor, like a tomato processor or a pistachio plant, something that uses water, their fees are also going up I believe an additional nine percent."

During the most recent meeting, SWRCB voted to increase the Waste Discharge Requirement (WDR) fee by nearly 17 percent. WDR fees have risen 112 percent between 2011 and 2020. A fee increase of 15.6 percent was also approved for Confined Animal Feeding (CAF) operations. Isom also pointed out further potential to increase fees related to regulatory requirements for public water systems.

Several agricultural groups and associations weighed in on the economic impact fee increases would have on the industry. Isom pointed out that the increased fees far outweigh other environmental fees that the industry also has to pay. During testimony, WAPA joined the Agricultural Council of California in calling for an outside evaluation of the SWRCB's finances.

"We've pointed out how out of line they are compared to other regulatory agencies, how they do little to address water quality, and yet they're the highest fees of any regulatory agency that we pay," Isom explained. "They don't look at it from zero-based budgeting. They simply say, 'this is what the cost is' with little justification and the Board has just simply rubberstamped it."

Original Article: [Ag Net West by Brain German](#)

California's atmospheric river storms dropped 7,600,000,000,000 gallons of rain, but it was no drought buster

Federal forecasters estimate that the atmospheric river storms that hit parts of northern and central California from October 23-26 dropped 7.6 trillion gallons of rain — which can also be expressed as 7,600,000,000,000.

"That's enough water for over 244 million people for an entire year," the National Weather Service's Western Region Headquarters in Salt Lake City said in a statement.

"However, existing drought conditions have resulted in extremely dry soils, which absorbed much of this precipitation, leaving only a fraction for use."

Comparatively little of the rain fell in greater San Diego, where the soil also is unusually dry. The atmospheric river fell apart as it moved south.

And forecasters say that the North Pacific storm that reached the Bay area on Monday, and the one expected to arrive on Wednesday, will not move into Southern California.

"The jet stream is positioned to mostly go into the Pacific Northwest and northern California right now," said Stefani Sullivan, a forecaster at the weather service office in Rancho Bernardo. "But eventually some rain should come down here."

Original Article: [The San Diego Union Tribune by Gary Robbins](#)



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What California's fading cotton crop in favor of almonds reveals about premium farmland and a warming planet

Cotton was big in California by the 1950s. Now the crop's diminished foothold in the state, on land reeling from the worst drought since the late 1800s, reflects how climate risks are shaping the future of farmland across the globe.

"The Central Valley, historically, has been a place where cotton was quite widely grown," said Martin Davies, president and chief executive officer at global farmland owner Westchester Group Investment Management, a part of Nuveen.

"But the era of cotton has dimmed," Davies said, in a phone interview, of California's agricultural core, a highly irrigated stretch of interior farmland that has been moving away from cotton to growing almonds, table grapes, raisins and other, higher value crops, especially as water shortages grow stark.

The drought-prone Central Valley grows a quarter of the nation's food on 1% of its farmland, including about 40% of its fruits, nuts and vegetables. But it relies on rivers, reservoirs and still badly depleted underground aquifers, despite recent heavy rains and flooding, to irrigate much of its farmland.

"What you do see are areas where water is migrating to these higher value crops and some land being left fallow, and some land in the Central Valley being used, or set aside, to recharge aquifers," Davies said.

The value of U.S. land farmed for crops jumped 7.8% this year from a year ago to an average \$4,420 per acre, compared with annual gains of roughly 4.5% over the past two decades. Low interest rates, improving commodity prices and broader inflation are factors.

Commodity prices, including for cotton CT00, -0.67% also soared as extreme heat and drought across much of the U.S. often led to scaled back production.

Higher commodity prices help farmers who've been able to reckon with a tough year by growing and harvesting crops that command top dollar. But they also can push up grocery bills and impact what households can afford.

Farmers in California planted only 111,000 acres of cotton this year, a more than 38% decline from the year before, according to the U.S. Department of Agriculture.

"That's not just happening in the U.S." said Mark Long, equity portfolio manager at Homestead Funds, pointing to Brazil, a South America agricultural heavyweight, which has been experiencing its worst drought in about 90 years.

But Long said the year's lower crop yields combined with higher commodity prices could be "a blessing in disguise" for some farmers, particularly since the USDA's latest estimates peg farm incomes as 19.6% higher this year from a year ago at \$113 billion, on track for its highest level in seven years.

"As folks look out to the next 20-30 years," as the world population grows and questions linger about the arability of land as climate disasters potentially accelerate, he expects the U.S. to ramp up efforts to get "the most out of each acre of farmland," through "less



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focus on chemicals and more on machinery and precision agriculture,” big data and other new technologies as part of the coming “Fourth Agricultural Revolution.”

Original Article [Market Watch by Joy Wiltermuth](#)

US WATER NEWS

DeWine announces \$93 million in water projects across Ohio. See the list

In the state's latest infrastructure investment, Gov. Mike DeWine announced that 54 water projects across 60 Ohio counties would be funded with \$93 million through the Broadband, Utilities, and Infrastructure for Local Development Success (BUILDS) initiative.

These grants, which target drinking water, wastewater and sewer projects, are a continuation of the governor's H2Ohio program that began in 2019 with the goal of providing clean and safe water to all Ohio communities.

The \$93 million allocation is the first of a total of \$250 million set aside by the legislature to use for water infrastructure. The funding for the effort came from the federal government through the American Rescue Plan Act.

Standing outside the soccer fields in Devola, a Washington County community outside of Marietta, DeWine greeted folks gathered to hear about the state's \$10 million investment in re-sewering the town.

"I know this is something that's been hanging over people's heads," the governor said.

"How are you going to pay for it? But this funding takes a big, big bite."

The projects were chosen by the Ohio Department of Development with the intention of helping communities reduce the financial burden Ohioans bear to address these critical infrastructure in the absence of state or federal funding.

DeWine also said this funding will construct new water systems, replace decrepit water lines, install new water wells and also prevent sewer system backup and replace failing sewage treatment systems.

The governor said the state chose to fund initiatives where the most need was, particularly in Appalachian Ohio communities such as Devola.

Still, the list of projects also included a rehauling of sewer infrastructure in parts of Franklin, Licking and Fairfield counties, as well as other areas throughout Greater Columbus and across rural Ohio.

"But it does come back to need," DeWine added. "There has been an upped emphasis on Appalachia in this administration."

Original Article: [The Columbus Dispatch by Ceili Doyle](#)



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Groundwater Flow to Colorado River May Decline by a Third over Next 30 Years

A new study projects that a hot and dry future climate may lead to a 29% decline in Upper Colorado River Basin “baseflow” at the basin outlet by the 2050s, affecting both people and ecosystems.

Baseflow is the movement of groundwater into streams and, on average, accounts for more than 50% of annual streamflow in the Upper Colorado River Basin. It is vital for sustaining flows in the Colorado River during dry periods. Scientists from the U.S. Geological Survey and the Bureau of Reclamation modeled temperature, precipitation and runoff data to understand more about how baseflow may change under three future climate scenarios.

“Many studies project streamflow and runoff response to climate change in the Upper Colorado River Basin, but this is the first to look at the baseflow component of total streamflow,” said USGS hydrologist Olivia Miller, lead author of the paper. “Understanding how baseflow may respond to climate change is particularly important for water managers when it comes to ensuring sufficient water supply outside the spring runoff period and has critical implications for ecosystem health.”

The Upper Colorado River Basin has a drainage area of about 114,000 square miles, covering portions of Colorado, Wyoming, Utah, Arizona and New Mexico. The Continental Divide marks the eastern boundary of the basin whereas the western boundary is defined by the Wasatch Mountains. The Wind River and Wyoming Ranges form the northern border and the southern portion includes the San Juan Basin. From 1984 to 2012, total streamflow deliveries from the upper basin’s outlet at Lees Ferry, Arizona, to the Lower Colorado River Basin averaged 10.3 million acre feet/year (maf/yr). Baseflow accounted for nearly a third of this (2.8 maf/yr).

The study predicts that baseflow deliveries to the Lower Colorado River Basin may decline overall by the end of the 21st century despite potential increases in precipitation and baseflow in some areas. Three climate scenarios were modeled: under a warm, wet scenario, total baseflow at Lees Ferry is projected to initially increase by up to 6% (0.162 maf/yr) in the 2030s but then level out in the 2050s and ultimately decline by 3% from today’s levels (0.089 maf/yr) by the 2080s. Under a hot, dry climate scenario, baseflow is predicted to decline by up to 23% (0.657 maf/yr) in the 2030s and continue to worsen over time, reaching 29% (0.835 maf/yr) in the 2050s and 33% (0.940 maf/yr) in the 2080s. An intermediate climate scenario also showed a steady decline over time.

The study authors hypothesize that baseflow declines would occur due to increases in stream water loss from processes such as evapotranspiration. The largest declines in the model occur in the Rocky Mountains and in the headwaters of the Green River.

Declines in baseflow have major downstream and basin-wide effects in an area where water demand often exceeds supply. In addition to the 40 million people that rely on the Colorado River for recreational, agricultural, municipal, spiritual and hydropower uses, baseflow decline has major impacts on riverbank, water and land ecosystems.



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“This region is experiencing exceptional drought conditions and record-low reservoir levels at Lake Mead and Lake Powell,” said Katharine Dahm, USGS Rocky Mountain Region Senior Scientist. “Information from this study can be used by resource managers to understand impacts of water shortages and develop mitigation plans for both people and ecosystems.”

Original Article: [Department of the Interior, U.S. Geological Survey](#)

Upper Colorado River drought measures examined

A program under consideration to voluntarily reduce agricultural water use in the upper Colorado River basin could cause a relatively small loss of income while saving growers money in irrigation and labor costs, according to a University of Wyoming study.

Wyoming, Colorado, Utah and New Mexico are studying the feasibility of demand-management programs that would compensate landowners for voluntarily conserving water on a temporary basis to send more water downriver.

The program would be an effort to keep Lake Powell's water levels from going so low that it triggers a mandatory curtailment under the century-old Colorado River Compact. Under curtailment, Upper Basin states would have to begin regulating water right holders' use.

With a voluntary program, a grower would have the option of enrolling acres that would give them a positive return, while not enrolling the more productive acreage for which the returns for fallowing would be negative, the study's summary explains.

Regional impacts would be felt as participants' decisions rippled throughout the region's economy.

“For example, if a producer receives compensation for irrigating fewer acres in a DM (demand-management) program, they might buy a new truck and/or hire less help for harvest,” said Kristiana Hansen, water resource economics specialist and one of the study's authors. “These impacts are measured in terms of changes in jobs and income that would occur, directly or indirectly, as a result of implementing a DM program.”

Hansen, an associate professor, was joined in the study by Roger Coupal and Ellen Yeatman of UW's Department of Agricultural and Applied Economics and Drew Bennett of the university's Haub School of Environment and Natural Resources.

The researchers found that a voluntary reduction of 25,000 acre-feet in Wyoming would cause between \$2.17 million and \$4.77 million in lost income and 95 to 146 in lost jobs, depending on how producers change their hay and livestock operations in response to the program. This range represents 3.12% to 6.85% of income in the regional agricultural economy and 0.04% to 0.10% of income in the overall regional economy, according to the report.

By contrast, Wyoming's cutback under mandatory curtailment would most likely be 30,000 to 50,000 acre-feet, and it could be more, according to the State Engineer's Office.



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Under Wyoming water law, any water right that isn't used in a five-year period could be forfeited through an abandonment procedure. Thus, landowners who took part in a DM program for fewer than five years wouldn't put their water right in jeopardy, the scientists noted.

The discussions come as Lake Mead and Lake Powell, the Colorado River system's two large reservoirs, are about one-third full after more than a year of drought in the West. Lake Mead hit a shortage trigger earlier this year when the reservoir fell below 1,075 feet in elevation. Now at under 1,070, Lake Mead will be managed in 2022 under a Tier 1 shortfall, necessitating over 500,000-acre feet of water delivery cuts to Nevada and Arizona. California is not required to reduce its take on the Colorado River under Tier 1. Original Article: [Western Farmer Stockman by Tim Hearden](#)

Chicago is at risk as climate change causes wild swings in Lake Michigan water levels

The Great Lakes are often called the nation's third coast, and the past five years in the region have been the wettest on record.

While the lakes don't exactly correlate to rising sea levels, Chicago now sits in just as precarious a position as oceanfront cities. Heavier rainfall and more frequent droughts are now causing extreme swings in the water levels of Lake Michigan and the Chicago River, wreaking havoc on the city and prompting urgent action to find a fix.

In the winter of 2020, the water level in Lake Michigan hit a record high and intense rains just kept coming. Waves crashed over Lakeshore Drive, sending water up to the third floor of some buildings. The Chicago River also began to overflow into downtown.

The balance between the river and the lake has always been delicate, ever since the city dug canals over a century ago to keep waste from flowing from the river into the lake, which supplies the city's drinking water.

A backup system for flooding was also created: locks that reverse the river back into the lake when the river gets too high. Last year's rainfall, however, was so severe that for the first time that backup system didn't work. The lake was higher than the river level, so water could not be reversed.

Lockmasters had to wait until the river rose above the lake before they could start the reversal process. That delay was destructive. Downtown Chicago suffered massive flooding, even knocking out power at the Willis Tower, formerly known as the Sears Tower.

Experts say this was not a once-in-a-lifetime event, but a sign of what is to come, as climate change causes heavier rains and more intense storms.

"The biggest risk is that these changes in the climate, in hydrology, or the water levels are going to exceed the infrastructure or the capacity of cities, coastlines and homes to handle those changes," said Drew Gronewold, an associate professor at the University of Michigan's School for Environment and Sustainability.

Gronewold said Chicago and other cities around the Great Lakes are all in danger of not being able to handle these extreme highs -- and extreme lows. Just seven years before



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that storm, the water in Lake Michigan hit a record low due to a prolonged drought. That threatened the city's water supply as well as shipping, critical to the economy of the Midwest.

Original Article: [CNBC by Diana Olick](#)

Louisiana's freshwater balance sheet - harmonizing supply and demand

Even for those unfamiliar with the field of hydrology (the study of the earth's water and its movement in relation to land), many of the concepts are easily accessible for beginners and commonly found in other areas of everyday life.

To analyze the balance sheet of Louisiana's fluctuating freshwater stocks, we should start with something many of us may have learned in an introductory economics class: the relationship between supply and demand.

Supply:

We can break our freshwater sources into three main categories: rain from above, groundwater from below, and surface water from existing basins and reservoirs.

Rainwater

Louisiana receives more rainfall than any other state, getting drenched with an average of 60 inches of rain per year according to a report by the North Carolina Institute for Climate Studies (NCICS).

Utilizing the United States Geological Survey (USGS) and their rainfall calculator, we can estimate how many gallons of water fall each year on the 52,378 square miles within Louisiana's borders.

The answer: approximately 54.2 billion gallons each year, enough to fill up 82,000 Olympic-size swimming pools!

Groundwater

National Geographic defines an aquifer as a porous body of rock below the earth's surface that catches water as it seeps through the soil, naturally filtering out pollutants as it goes. The water can naturally bubble back up to the top into a spring or a wetland, or it can be pumped into manmade wells. Thirteen major aquifer systems lie under Louisiana's soil, many crossing within the boundaries of the ten parishes comprising central Louisiana.

Surface-water basins

Surface water is everywhere we look in Louisiana. According to the American Geosciences Institute, surface water includes streams, creeks, lakes, rivers, reservoirs and wetlands. There are ten main surface water basins in the state, with six flowing across central Louisiana.

Demand:

According to an annual report by the Louisiana Department of Transportation and Development (DOTD) in partnership with the United States Geological Survey (USGS), approximately 8.7 billion gallons of water per day were withdrawn from ground and surface water sources in Louisiana in 2015.



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This number includes water used by the public for household use, industry operations like manufacturing and power generation, agricultural production, raising livestock, and aquaculture farms harvesting seafood.

The two most water-intensive categories in this list are power generation (withdrawing 4.3 billion gallons per day) and industry (mainly fossil fuel and chemical production, withdrawing 2.2 billion gallons per day).

In 2015, we used about 710 million gallons of publicly supplied water per day, equating to per capita use of 170 gallons per day for Louisiana's 4.7 million residents (according to the U.S. Census Bureau for 2015).

What does this mean?

There are several important takeaways when you look at Louisiana's water balance sheet.

1. . Simply put, the rate at which we are using our freshwater is far faster than it can naturally replenish itself in the hydrologic cycle.

Louisiana's hub status for fossil fuel and chemical production, although important for our state's economic activity, costs us roughly 4.8 billion gallons of water per day.

Calculating these two uses alone, we would need approximately 1.7 trillion gallons of water (4.8 billion x 365 days) to fall each year to balance the current rate of use.

But would more rain really solve the problem?

As highlighted in the Advocate, Louisiana parishes face some of the highest flooding risks in the country. Governor John Bel Edwards and state officials continue to allocate millions toward flood mitigation projects, but these projects take time, and major storms causing hurricanes and flash floods are increasingly unpredictable in their behavior.

2. If we continue exploiting our freshwater supply, we are destined to face harsh consequences long before we hit the bottom of the barrel.

The aforementioned DOT and USGS report found that the greatest proportion of the groundwater withdrawn in the state in 2015 was from the Chicot aquifer system in southwest Louisiana at 48%, followed only by the Mississippi River Alluvial aquifer at 22%.

Years-long research funded by the Louisiana Sea Grant found that each year over 2,300 wells pump water from the Chicot aquifer into farm fields to grow rice, corn, soybeans, and crawfish. Of the 600 million gallons of groundwater pumped into the fields each day, only half of that water returns to the aquifer.

As stated by Tegan Wendland, a seasoned veteran of coastal environmental journalism, we are overdrawing the Chicot aquifer by roughly 350 million gallons a day, a truly unsustainable pattern.

Decades of overdrawing have contributed to a "cone of depression" under the ground, decreasing the water-holding capacity of the aquifer and further risking our future supply.



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The Mississippi River Alluvial aquifer, providing freshwater to seven states, is also in bad shape. Due to over pumping from 1987 to 2014, it has suffered a 7-meter drop in the water table according to the federal Forest Service and Department of Agriculture.

Original Article: [KALB by Loren Ryland](#)

State eyes northern Utah valley to store Bear River water

Outside the northern Utah town of Tremonton, undeveloped lands sit against the West Hills, rolling out toward Idaho. In the coming decades, these hills may also harbor one of Utah's largest reservoirs, filling a place called Whites Valley with water that would feed urban growth along the Wasatch Front.

Whites Valley is shaping up to be the linchpin of Utah's massive proposed Bear River Water Development Project, which would store as much as 220,000 acre-feet of water a year for four northern Utah water districts.

Candice Hasenyager, director of the Utah Division of Water Resources, highlighted this component of the billion-dollar-plus project earlier this month before a legislative appropriations subcommittee.

The water won't be needed for decades, but the division is laying the groundwork for planning and acquisition of land and rights of way. When the project was initially authorized by the Legislature in 1991, it was assumed the water would be needed by 2015.

"But because of water conservation efforts, reducing our water use, implementing secondary meters [on untreated water used for landscaping], that need has been pushed off to 2050," Hasenyager said. "There is definitely a phasing need. The whole complete project is not needed at 2050. That's when the need starts appearing."

Environmentalists and other critics contend the project would not only be a fiscal drag on the water districts receiving the water and that it would threaten the Great Salt Lake. These massive water diversions would never be needed if Utah got more aggressive about reducing water use and smarter about managing its water resources, according to Zach Frankel, executive director of the Utah Rivers Council.

"Bear River Development is a welfare project for water lobbyists and contractors. There is no need for Bear River water on the Wasatch Front. Period," Frankel said. "We are such wasteful secondary water users. We don't even have any idea how much water people are using, much less making sure they're paying appropriately for it."

The state has only just begun installing meters on the secondary water systems in northern Utah, and officials plan to step up these efforts using federal infrastructure grants. Currently, residents and businesses pay a flat annual rate for secondary water they apply to their landscaping, and most have no idea how much they use. Studies show that Utah residents cut their use of secondary water by 20 to 30% if they are simply informed how much they use.



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That suggests water needs would plummet if secondary water were always metered and users were required to pay a rate tied to their level of use, Frankel argued.

The Bear River flows off the north slope of the Uinta Mountains, weaves north in and out of Utah and Wyoming and into Idaho, before making a horseshoe turn back into Utah where it empties into the Great Salt Lake.

Critics say the water project would pound the final nail into the lake's coffin as it continues shriveling into a puddle of its former self, thanks to climate change and unrelenting diversions in the Provo and Weber watersheds.

The project would impound up to three-fourths of the flows of Bear River, the Great Salt Lake's primary source of inflows.

Original Article: [The Salt Lake Tribune by Brian Maffly](#)

Southern Nevadans allowed to water once per week under winter watering schedule

A new mandatory winter watering schedule is in effect for Southern Nevada starting Monday.

The winter schedule goes through Feb. 28, 2022, as residents and businesses are asked to water one day per week based on the property's address, according to a Southern Nevada Water Authority press release.

Anyone unsure which day they're allowed to water can check here, officials advised.

Southern Nevadans are reminded that watering according to the mandated schedule is required by law and those who don't comply may be subject to waste-water fees starting as high as \$80. Those fees double with each violation, officials noted.

The winter restrictions limit both turf and drip irrigation. The water authority offered the following advice to avoid wasting water through runoff while helping the soil absorb more moisture:

- Irrigate grass for no more than 12 minutes per watering day using three watering cycles of four minutes each. Each four-minute cycle should be spaced one hour apart.
- Water during the mid-morning hours to avoid freezing and prevent ice from forming on lawns and sidewalks.
- Drip irrigation should be run every seven to 14 days since trees and plants need less water than grass.

The water authority also advised residents to change the time on their irrigation clocks after daylight saving time begins on Nov. 7.

Winter watering restrictions carry an added importance this year in light of federal restrictions limiting the amount of water Southern Nevada can draw from Lake Mead amid historic drought conditions in the American southwest, according to water officials.



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Beginning Jan. 1, Nevada's water allowance from Lake Mead will decrease by 7 billion gallons.

Original Article: [KTNV Las Vegas](#)

How businesses can help restore water and wildlife in Oregon's rivers

Our rivers are a powerhouse for every living thing. But for how long? With high demand for water and most of Oregon experiencing drought amid a warming climate, the future of our rivers is threatened. This year, the Deschutes River experienced the lowest period of natural flow since irrigation districts began using Wickiup Reservoir to store water in 1949.

In addition to water supply becoming less reliable over time, we also have the inflexible legal tangle that is Western water law — which varies state by state. Western water law is anchored by the principle of prior appropriations, meaning the first person to obtain a right (senior priority) is the last to be shut off in times of shortage, and they are entitled to every drop of their water before any goes to the next priority date in line. This continues until all water is used.

Water rights

Water rights in the West are complicated and have very old, deep roots. Western water law began in the mining camps of the Gold Rush circa the 1850s. Prospectors had to stake a claim for their mine and the water necessary to operate it. The 'prior appropriations doctrine' is at the heart of water laws locked into place at that time. More water rights were handed out than was available in streams, that coupled with persistent drought has compounded the shortages we see now.

Since the Gold Rush, populations have exploded, industries have grown, and agriculture has boomed. This growth has hit hard in arid central Oregon. In Deschutes County, 2021 has been the fourth-driest year in 127 years, and nine of the past 20 years have experienced some level of severe to exceptional drought. Senior water rights near Bend received water all irrigation season, while over 50,000 acres of productive agriculture lands near Madras had to turn their water off in August due to lack of supply. Oregon's rivers also have junior water rights and suffer more during times of shortage; leaving little to no flow to support fish and natural habitats unless it is protected by leasing and other conservation projects.

Water leasing

Water supply constraints and the need for collaboration in addressing watershed-level challenges, are driving the creation and operation of water markets around the Western U.S., facilitating the reshaping of existing water rights. In many places water rights are "use it or lose it," but these water markets create new opportunities to lease or share water without losing rights. Leasing water at a stream-level is the simplest form of the market, but it can also be used to share water to support ecosystems, agriculture and community growth. The Deschutes River Conservancy (DRC) started a water leasing program over 20 years ago and is collaborating to develop a broader water marketplace.



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Corporate and community investments are integral to developing markets and incentivizing flow restoration.

Collaboration with Intel

Intel partnered with the DRC in 2018 to support water leasing. Through grants, Intel has made the longest-term commitment to support the DRC's lease program to date. "Intel has focused on sustainability for decades because it is important to our communities, the environment and our business. We have committed to be 'net positive' water by 2030 through conserving water in our operations, returning water that we use to our communities, and restoring water to our watersheds, at amounts greater than our freshwater use," says Fawn Bergen, corporate sustainability manager for Intel. "The success of this program starts with working with the right partners — they are the experts that develop and implement these projects. This is why we work with non-profits like the DRC."

To date, Intel has funded seven projects in Oregon to help restore water to the McKenzie, Willamette, Tualatin and Deschutes Rivers. In 2020, these combined projects restored 500 million gallons of water to support Oregon's water resources and benefit the people and the ecosystems depending on it. The contribution to the DRC is restoring over 81 million gallons per year to the Deschutes River and projected to restore over 815 million gallons cumulatively by 2028.

Original Article: [Portland Business Journal](#) by [Genevieve Hubert](#)

GLOBAL WATER NEWS

Senate panel rejects Buhari's \$700m loan request for water projects

The Senate Committee on Local and Foreign Debts on Wednesday rejected the President, Major General Muhammadu Buhari (retd.),'s loan request to the National Assembly for Sustainable Urban and Rural Water Supply, Sanitation and Hygiene under the Ministry of Water Resources.

The development happened 24 hours after the Ministry of Health appeared before the Committee to seek approval for \$200m for the procurement of mosquito nets and Malaria medicines.

Members of the panel took a turn to fault the loan for Sustainable Urban and Rural Water Supply, Sanitation and Hygiene.

They asked the officials of the Ministry of Water Resources led by the Permanent Secretary, Mrs Esther Didi Walson-Jack, to furnish the Committee with an update on loans collected so far for the Water Projects in the Ministry.

The Chairman of the Committee, Senator Clifford Ordia said three different loans had been approved for various water projects.

Ordia said, "\$450 million for the Ministry for water project being financed Africa Development Bank and another \$6 million loan under the integrated program for Development also financed by Africa Development Bank and the Gurara Water Project. "You need to tell us what you are doing with \$700 million for water projects."



The Committee, therefore, agreed to summon the Minister of Water Resources, Adamu Suleiman to appear to give an explanation on the loans and state of loans collected so far

Speaking against the loan, Senator Obinna Ogba said that he will be against grant approval for the loan because some loans have been collected for water projects and yet to see the result.

He said, “This particular loan? I don’t support this one again, enough is enough.”

Also kicking against the loan, Senator Ibrahim Oloriegbe demanded the criteria for selecting the benefiting states.

He added that details provided by the Permanent Secretary were not enough to justify the loan.

Original Article: [The punch NG by Aborisade, Abuja](#)

Water firm admits sewage discharge offences

A major water company has admitted unauthorised discharges of sewage into a stream. Effluent came out of a manhole and into Coundon Burn, Bishop Auckland, County Durham on March 13-14 2017.

Northumbrian Water’s defense barrister appeared at Newcastle Crown Court by videolink to admit two breaches of environmental legislation, namely that it caused an unauthorised water discharge activity.

Judge Sarah Mallett said the firm will be sentenced on January 6.

The hearing was listed to take three hours while the prosecution, brought by the Environment Agency and the defense discussed culpability.

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Original Article: [Evening Standard by Tom Wilkinson](#)

What India’s new water policy seeks to deliver

In November 2019, the Ministry of Jal Shakti had set up a committee to draft the new National Water Policy (NWP). This was the first time that the government asked a committee of independent experts to draft the policy. Over a period of one year, the committee received 124 submissions by state and central governments, academics and



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practitioners. The NWP is based on the striking consensus that emerged through these wide-ranging deliberations.

The policy recognises limits to endlessly increasing water supply and proposes a shift towards demand management. Irrigation consumes 80-90 per cent of India's water, most of which is used by rice, wheat and sugarcane. Without a radical change in this pattern of water demand, the basic water needs of millions of people cannot be met. Thus, crop diversification is the single most important step in resolving India's water crisis. The policy suggests diversifying public procurement operations to include nutri-cereals, pulses and oilseeds. This would incentivise farmers to diversify their cropping patterns, resulting in huge savings of water. The largest outlets for these procured crops are the Integrated Child Development Services, the mid-day meal scheme and the public distribution system. Creating this link would also help address the crisis of malnutrition and diabetes, given the superior nutritional profile of these crops. Reduce-Recycle-Reuse has been proposed as the basic mantra of integrated urban water supply and wastewater management, with treatment of sewage and eco-restoration of urban river stretches, as far as possible through decentralised wastewater management. All non-potable use, such as flushing, fire protection, vehicle washing must mandatorily shift to treated wastewater.

Within supply-side options, the NWP points to trillions of litres stored in big dams, which are still not reaching farmers and explains how irrigated area could be greatly expanded at very low cost by deploying pressurised closed conveyance pipelines, combined with Supervisory Control and Data Acquisition (SCADA) systems and pressurised micro-irrigation. The NWP places major emphasis on supply of water through "nature-based solutions" such as the rejuvenation of catchment areas, to be incentivised through compensation for eco-system services. Specially curated "blue-green infrastructure" such as rain gardens and bio-swales, restored rivers with wet meadows, wetlands constructed for bio-remediation, urban parks, permeable pavements, green roofs etc are proposed for urban areas.

Original Article: [Indian Express by Mihir Shah](#)

World leaders urged to prioritize action on water and climate

Countries must step up urgent action to address the water-related consequences of climate change, the head of the World Meteorological Organization (WMO) and nine other international organizations said on Friday in a letter to world leaders issued ahead of the COP26 UN climate change conference.

They appealed for governments to prioritize integrated water and climate action, for the benefit of people and the planet, to ensure availability, and sustainable management, of water and sanitation for all.

"Climate change is dramatically affecting the water cycle, making droughts and floods



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more extreme and frequent and decreasing the natural water storage in ice and snow. Rising temperature and variability in flow patterns of water bodies also strongly affect water quality both in surface and groundwater,” they said.

The ‘climate connector’

The letter listed additional impacts, as changing precipitation patterns are already affecting agriculture, food systems, and livelihoods, as well as ecosystems, and biodiversity. Meanwhile, rising sea levels threaten communities, infrastructure, coastal environments and aquifers.

The partners cited a recent report by the UN Children’s Fund, UNICEF, which found that over one third of the world’s children, some 920 million boys and girls, are currently severely exposed to water scarcity.

They added that the 2020 UN World Water Development Report further emphasized that water is the “climate connector” that allows for greater collaboration across the majority of global targets for climate response, sustainable development, and disaster risk reduction.

Action for governments

The letter was signed by the heads of WMO, UNICEF, the Food and Agriculture Organization (FAO); the UN Educational, Scientific and Cultural Organization (UNESCO); the World Health Organization (WHO); the International Fund for Agricultural Development (IFAD); the UN Environment Program (UNEP); the UN University (UNU); the UN Economic Commission for Europe (UNECE), and the Global Water Partnership (GWP).

They outlined several urgent priorities, such as integrating water and climate through adaptation and resilience planning at the national and regional level, and promoting and financing global water monitoring systems to provide timely information about current and future water availability.

Other recommendations include supporting technical, political and scientific cooperation, and promoting “a proactive approach” to flood and drought management centered around the pillars of monitoring, forecasting and early warning; vulnerability and impact assessment; and preparedness, mitigation and response. — UN News

Original Article: [Saudi Gazette](#)



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Stop canal water theft by private lift irrigation projects: Farmers in Tamil Nadu's Namakkal district

Reiterating their allegation that private lift irrigation projects illegally pumped Cauvery water from Cauvery canals, farmers in Namakkal district have demanded the State government streamline the lift irrigation projects in the river belt areas.

Namakkal Cauvery River Lift Irrigation Welfare Society president K Balasubramani said, "As per norms, the lift irrigation projects are approved to use only 7.5 HP motors to pump water. Also, the government has allowed use of groundwater through lift irrigation projects for agricultural purposes alone. However, most private lift irrigation projects utilise the groundwater for commercial purposes, which is illegal."

The projects are strictly prohibited from pumping river water. Still, they have been extracting water from the Cauvery river through pipelines. This illegal extraction has drastically affected the water rights of lower riparian districts, including Tiruchy, Thanjavur and nearby districts, for years together, he worried.

Claiming that the private projects only intended to exploit the water resources, Subramani suggested the permission for lift irrigation projects be given only to farmers' cooperative societies, and a high-level meeting, chaired by district collector, be organised at least once in three months.

The farmers also sought immediate action against theft of Cauvery water. Raja Canal Irrigation Farmers' Welfare Association president OP Kuppururai said, "There are over 50,000 acres of ayacut lands depending on Raja canal, Mohanur canal, Kumarapalayam canal and Poyeri canal in the district. We have all the rights to utilise the river water for irrigation purposes for decades. Meanwhile, a few lift irrigation projects are trying to create new ayacut lands. Hence, the State government should take immediate action in this matter, considering the farmers' livelihood."

Original Article: [New Indian Express by S Guruvanmikanathan](#)

Rationing of water a must for sustainability

WATER resources in Punjab are dwindling both in terms of quantity and quality. It is mainly because of its increasing demand (fast-increasing population and improved life standards) and non-judicious use, especially in the agricultural sector. The erratic pattern and the decreasing amount of rainfall over the years have added to the increasing scarcity of water. The population of the state (around 3 crore) grew by 8.3% during the past decade with an increase in the population density of 600 persons per square km in 2020 from 551 in 2011. This has burdened the already depleting groundwater resources. On the other hand, the average annual rainfall of 490 mm during the period 1970-2020 has decreased to 444 mm during the past two decades (1998-2020). The erratic rains, coupled with the increasing number of dry spells (no rainfall for 10 consecutive days) even during the years of otherwise normal rainfall, has added to a steep fall in the water table depth (WTD). Presently, the WTD has been falling at the average rate of 65-70 cm in the state. The non-judicious use of water for paddy



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and the increased area under paddy over the past two decades have been playing a major role in the depletion of groundwater.

The water table data in the state indicates that by 2030, the water table in 10 blocks of Barnala, Moga, Patiala and Sangrur districts will deplete beyond 50-m depth, Sangrur being the worst affected district with almost all blocks depleting to below 50-m depth. In addition, 16 blocks in different districts are expected to deplete below 40-m depth by 2030. The WTD in almost half of the state is expected to go below 30 m by 2040 if the groundwater extraction goes unabated at the present rate. Further, about 8% and 19% of the area is expected to have WTD below 50 m by 2030 and 2040, respectively.

Punjab has an annual utilisable water availability of 35 billion cubic metres (BCM) — canal water (14.6 BCM) and groundwater resources (20.5 BCM). The surface water supply has declined over the years due to uncertain and ill-distributed rainfall. The dependence on groundwater has increased more than two times during the past 20-year period, as indicated by the substantial increase in the number of tubewells to 15 lakh. The annual water demand of all sectors, including domestic, industrial and power generation, is about 66 BCM, with a major chunk of it being consumed in the agricultural sector. The rains constitute about 21 BCM of water. Thus, a water deficit of 10 BCM, which is met through over-extraction of groundwater, needs to be minimised by improving the existing water availability and reducing water withdrawals.

Apart from depleting groundwater resources, the energy requirement in terms of electricity and diesel has increased manifold. The electricity subsidy in the state increased from Rs 693 crore in 1997-98 to more than Rs 6,500 crore in 2020. In addition, the farmers spend about 620 crore on diesel generator sets for pumping out groundwater. The energy requirement for groundwater extraction is expected to increase with further depletion of groundwater, apart from the huge amount of expenditure incurred by the farmers for deepening of their tubewells. Thus, there is a dire need to use water judiciously in different sectors, especially in the agricultural sector, so as to sustain water availability for all.

Original Article: [The Tribune India by Surinder S Kukal](#)

‘Catastrophe’ faces Jordan’s water sector as climate heats up

When Aida Deissat started farming with her husband 30 years ago, she says life was easy. “There was water. A box of Jordanian tomatoes was eight dinars,” Deissat recalled. “We were blessed and things were good. Right now, nothing.”

Deissat explained that now, four boxes of tomatoes would earn her just one Jordanian dinar.

“These last years [it has been worse] but this year we really felt it,” she said.

Deissat, the former head of the local council for South Ghor Municipality in the southern Jordan Valley, shares a water spring with her neighbouring farms. The farmers take turns to pump groundwater from the spring to supplement the limited government supply, which runs for about 17 hours every two days.



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She explained the extra water source has made a difference, however, the spring requires cleaning and maintenance, and when the electricity cuts out, they cannot pump the water.

Amal Um Radaat, who runs a neighbouring farm with her husband in South Ghor, said even this extra groundwater is not enough. “Today I might farm and there will be water. Another day, I can’t farm because there is no water,” she said.

Um Radaat added she and her husband are currently losing money from their farm, and have had to take out loans to finance their business. “We can’t leave the land empty just like that,” she said, shaking her head.

“No one knows what to grow any more. The tomato yield is bad, and onions are the same. Every farmer in Al Ghor is at zero.”

As world leaders meet in Scotland at COP26, the issue of increasing water scarcity is high on the agenda. According to UNICEF, Jordan is the second most water-scarce country in the world, and water levels have been falling in recent years.

Original Article: [Aljazeera by Melissa Pawson](#)

Why water is the next net-zero environmental target

To date, the discussion around companies and governments moving to net-zero has mostly centered on greenhouse gas emissions goals. Also known as carbon neutrality, it requires entities to remove as much carbon dioxide and other greenhouse gases from the atmosphere as they release into it through efforts like restoring forests, using carbon capture technologies, or buying carbon offsets.

At the UN Climate Change Conference, also known as COP26 and which begins today, the topic of how world leaders plan to reduce emissions and meet the goals set by the 2015 Paris Agreement to reach net-zero emissions by 2050 will be front and center.

But there is another environmental pledge that several companies are now taking, focused on water.

Often called “water positive,” it centers on making water-intensive processes more efficient and putting more water back into a geographic area where a company operates than it takes out, something that is becoming more of a focus as water crises like shortages, overuse, and droughts impact areas across the globe, including across the western United States. The UN is currently predicting a 40% shortfall in freshwater resources by 2030.

That has led companies from BP to Facebook to Gap to all make pledges to replenish more water than used in their direct operations in the coming years. Water conservation is also a focus for a new color-dyeing process created by Ralph Lauren and Dow for a fabric-dyeing industry that uses trillions of gallons of water a year.

PepsiCo announced a plan in August that includes replenishing more than 100% of water used at all high-water-risk sites by 2030, while also reducing water use by 50%.



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“The goal is really twofold,” Jim Andrew, PepsiCo chief sustainability officer, said at CNBC’s ESG Impact summit on Thursday. “We’re looking at the entire value chain. It’s really about how do we reduce across the whole system, the absolute amount of water that’s used. Everywhere in that chain. And then second, how do we replenish more than we end up using?”

Pepsi’s plan would cover more than 1,000 company-owned and third-party facilities globally, and Andrew said its partners “understand the business case and the imperative.”

For example, Pepsi’s Mexican brand Sabrita worked with a franchise bottler to take processing water used in ingredient processing and treat it so it became drinkable and then used it in a different food plant to wash potatoes. Andrew said that was able to reduce freshwater demand by 50%.

“This is the kind of example where we can work as a system; we can collaborate and we’re looking to replicate that in as many places as we can.”

Original Article: [CNBC by Ian Thomas](#)

Water stress drives investor interest to address supply shortage

As heat and wildfires ravaged the US in the summer of 2020, Wall Street spotted an opportunity. In December last year, Nasdaq and the CME Group launched a new futures index that allowed farmers, hedge funds and municipalities to bet on the forward cost of water in California — and hedge against any price rises. The Nasdaq Veles California Water Index Futures is not the first time that finance and water have become intertwined. But it is a further indication that the ability to take water for granted in the developed world has been halted by climate change.

Now, with half of the world’s population expected to be living in water-stressed regions by 2050, the question is how to protect the world’s most coveted resource. While some believe that clean water is an essential human right and should be paid for by the state, others believe that private models of ownership can be the best way of ensuring its conservation. And the battle has already started. “Scarce clean water is the resource defining this century, like oil and gas defined the last,” says Matthew Diserio, the president and co-founder of Water Asset Management, an investment manager investing in both physical water assets and water equities. There are obstacles to trading water between locations, not least because of its weight. In 2008, reservoirs serving Barcelona ran dry and the Spanish city was forced to import by ship enough drinking water for 180,000 people. But it is a rare and unsustainable exception. “Water isn’t like oil — the location matters,” says Christopher Gasson, chief executive of Water



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Intelligence, a magazine. “Owning an iceberg in Greenland is not going to make you rich but owning it in Reno, Nevada, will.”

Water is traded most actively in the US and Australia. In Australia’s Murray-Darling river basin, there is an A\$2bn-a-year market where farmers are given a water allocation to draw from the rivers, which they can either use or sell. The value of the water rises and falls according to the price of agricultural produce and the weather: if rain is forecast, it drops; if there is a drought, it increases. On the west coast of the US, the Nasdaq Veles California Water Index tracks the spot price of water on many of the region’s groundwater basins, where there is an active trading market. A lack of melting snow on the Sierra Nevada has pushed up prices this year — from \$529.58 per acre-foot (the volume of water required to cover one acre of land to the depth of a foot) in March to \$813.60 by mid-October.

Original Article: [The Financial Times by Gill Plimmer](#)

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