Veles Water Weekly Report

October 20th 2022

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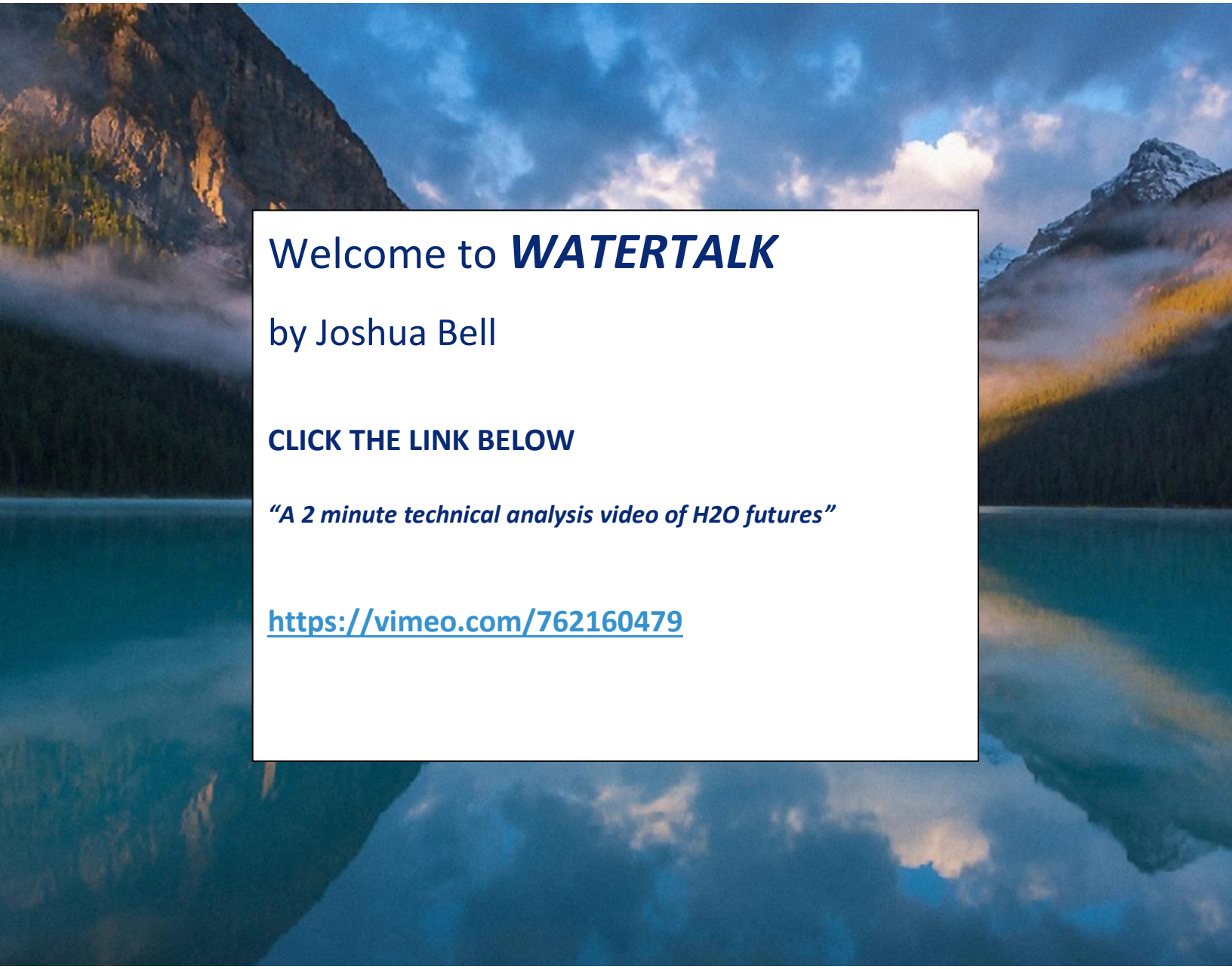
VelesWater

WATER FUTURES MARKET ANALYSIS



Welcome to ***WATERTALK***

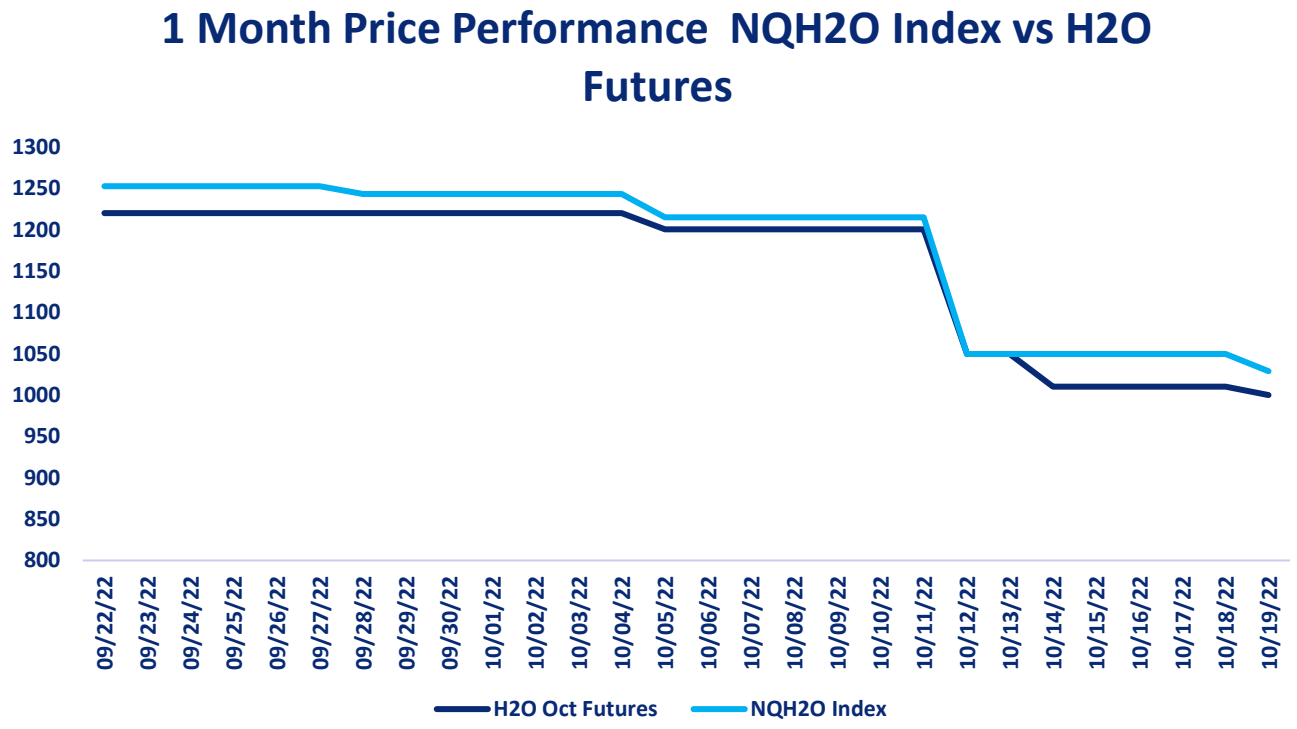
by Joshua Bell

CLICK THE LINK BELOW

"A 2 minute technical analysis video of H2O futures"

https://vimeo.com/762160479

NQH2O INDEX PRICE vs H2O FUTURES PRICE



Price Chart Based upon Daily Close

The new NQH2O index level of $1028.86 was published on the 19th October, down $20.91 or 1.99%. The October contract has settled at the new index level and the November contract is now considered the front month contract.

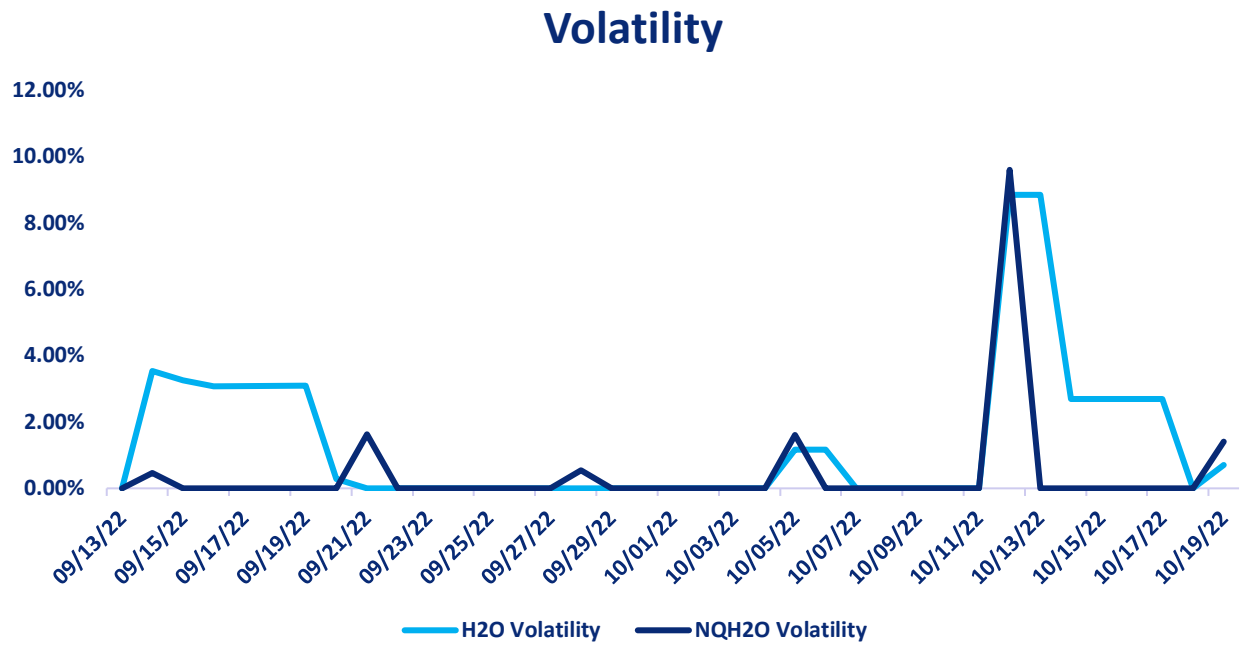
The futures have been closing at a premium of $0.23 to a discount $39.77 to the index. This discount between the futures and index narrowed over the week.

NQH2O is up 40.19% Year to Date.

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

Nov 22	980@1000
Dec 22	935@965
Jun 23	1210@1260

H2O FUTURES AND NQH2O INDEX VOLATILITY ANALYSIS



DAILY VOLATILITY

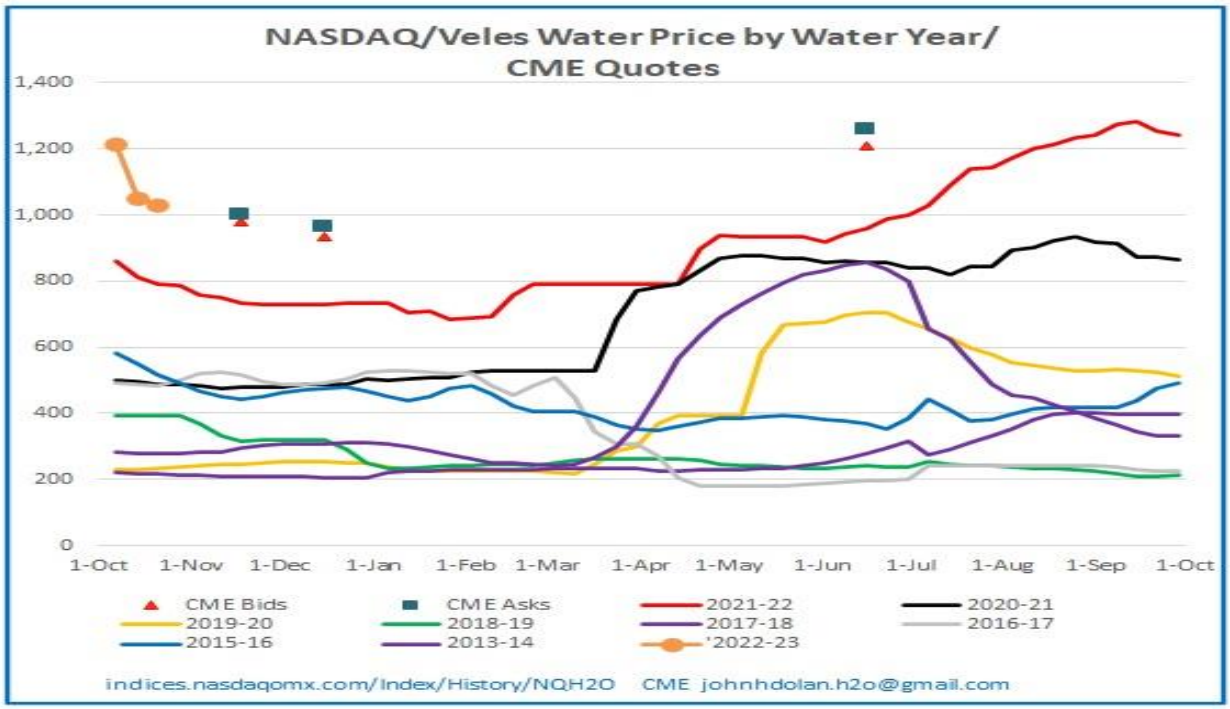
Over the last week the October daily future volatility high was on the October 13th 8.84% and a low of 0% on October 18th.

ASSET	1 YEAR (%)	2 MONTH (%)	1 MONTH (%)	1 WEEK (%)
NQH2O INDEX	25.61%	12.96%	13.20%	11.57%
H2O FUTURES	N/A	15.11%	12.83%	3.69%

The index and futures volatility have converged. For the week ending on October 19th, the two-month futures volatility is at a premium of 2.15% to the index, up 0.91% from the previous week. The one-month futures volatility is at a discount of 0.37% to the index, down 0.63% from last week. The one-week futures volatility is at a discount of 7.88% to the index, up of 6.81% from the previous week.

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

VELES WATER WEEKLY REPORT
NQH2O INDEX HISTORY



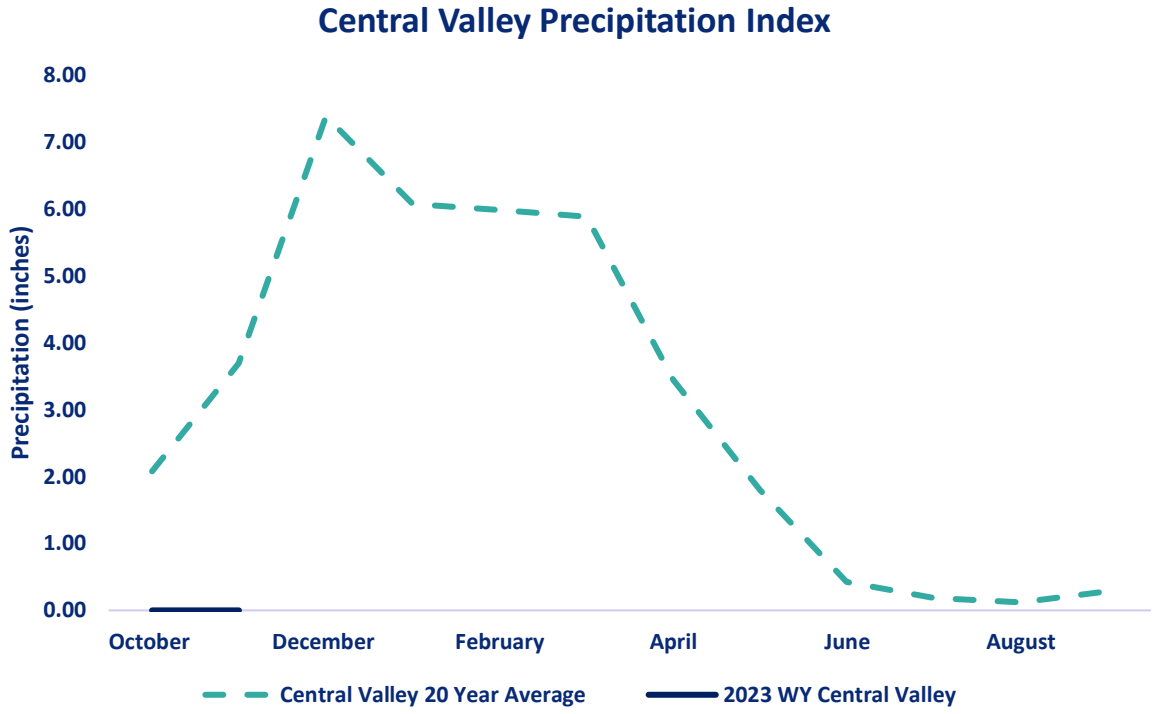
The graph above lays out the Nasdaq Veles water index by year, showing 2013- 2022. In very dry years, prices clearly rise through the spring, peaking in May to July (with the exception of 2015) as demand for water from farmers peaks. Prices then taper off heading into the winter on reduced demand, and 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 2021-2022 is highlighted in red. It shows the same seasonal climb, but at record-high values above each of the last eight years since February.
Current bids and offers in the market are still higher than historic prices showing that expectations are that this is an exceptionally dry year and prices may not fall seasonally as much as they have in prior dry years.

(John H Dolan, CME Market Maker)

VELES WATER WEEKLY REPORT

CENTRAL VALLEY PRECIPITATION REPORT



Central Valley average is calculated using data from 19 weather stations in the Central Valley, California.
Data as of 19/10/2022

STATION	MTD (INCHES)	WEEK ON WEEK CHANGE (INCHES)	% OF 20 YEAR AVERAGE MTD	2023 WYTD VS 2022 WYTD %	2023 WY VS 20 YEAR AVERAGE TO DATE %
SAN JOAQUIN 5 STATION (5SI)	0	0.00	0.00%	0	0
TULARE 6 STATION (6SI)	0	0.00	0.00%	0	0
NORTHERN SIERRA 8 STATION (8SI)	0	0.00	0.00%	0	0
CENTRAL VALLEY AVERAGE	0.00	0.00	0.00%	0	0

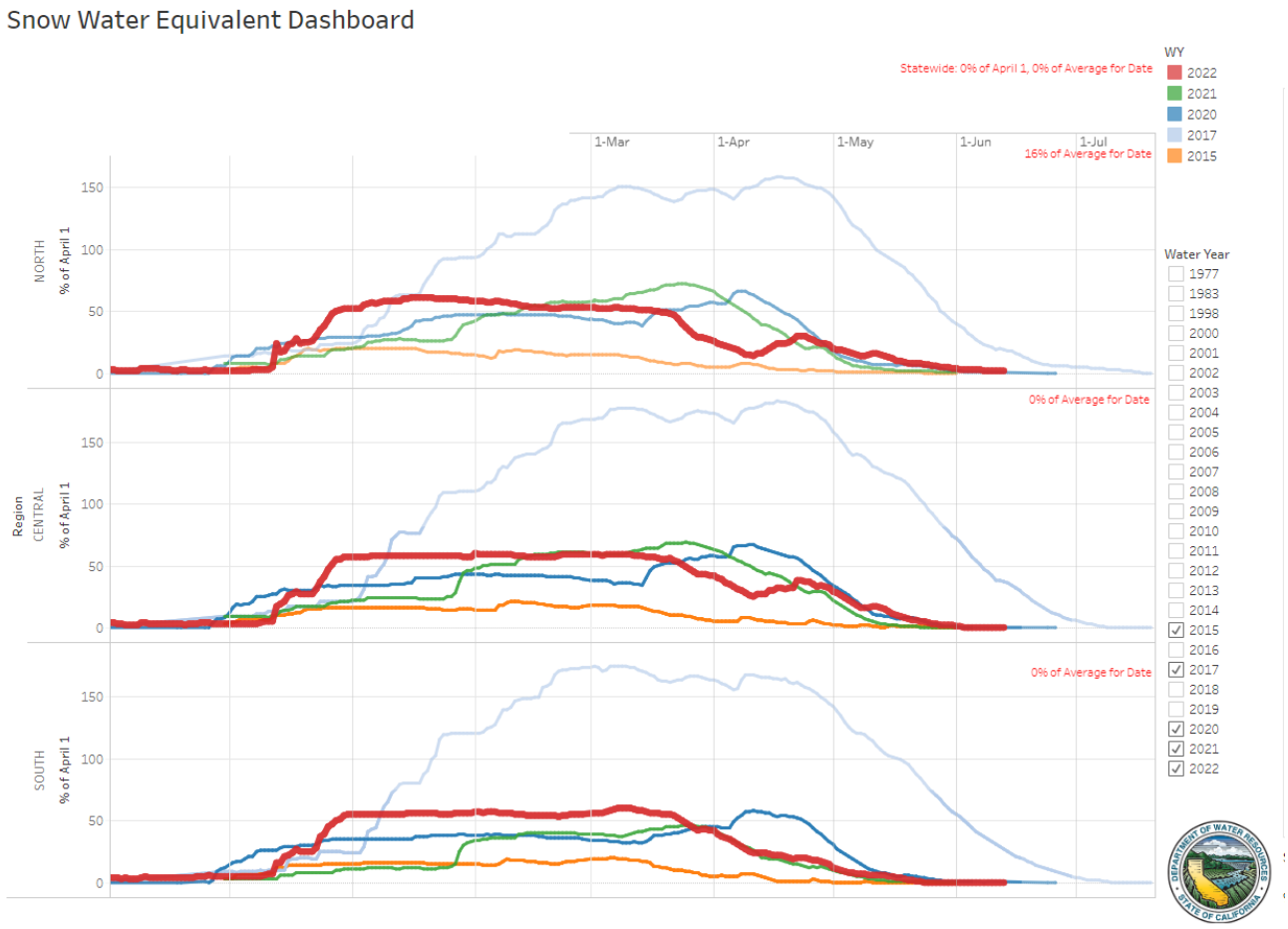
RESERVOIR STORAGE

RESERVOIR	STORAGE (AF)	% CAPACITY	LAST YEAR % CAPACITY	HISTORIC ANNUAL AVERAGE CAPACITY %
TRINITY LAKE	541,117	22	27	37
SHASTA LAKE	1,455,667	32	22	59
LAKE OROVILLE	1,169,714	33	22	63
SAN LUIS RES	531,437	26	10	59

Reference: California Water Data Exchange

VELES WATER WEEKLY REPORT

SNOWPACK WATER CONTENT



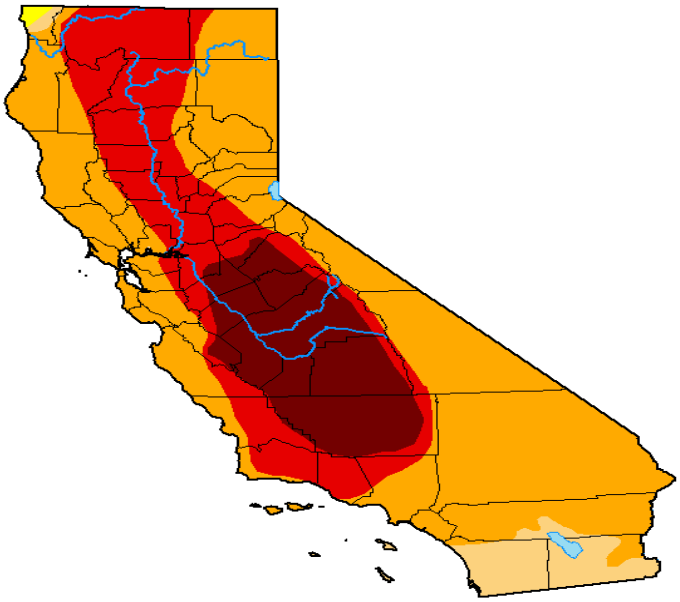
REGION	*SNOWPACK WATER EQUIVALENT (INCHES)	WEEK ON WEEK CHANGE (INCHES)	% OF AVERAGE LAST YEAR	% OF 20 YEAR HISTORICAL AVERAGE	% OF HISTORICAL **APRIL 1ST BENCHMARK
NORTHERN SIERRA	0.4	0.00	0	16	2
CENTRAL SIERRA	0	0.00	0	0	0
SOUTHERN SIERRA	0	0.00	0	0	0
STATEWIDE	0.1	0.00	0	0	0

****Snow Water Equivalent*, or SWE, is a commonly used measurement used by hydrologists and water managers to guage 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.**

VELES WATER WEEKLY REPORT

DROUGHT MONITOR



October 11, 2022
(Released Thursday, Oct. 13, 2022)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	99.77	93.99	40.91	16.57
Last Week 10-04-2022	0.00	100.00	99.77	94.02	40.91	16.57
3 Months Ago 07-12-2022	0.00	100.00	99.80	97.48	59.81	12.74
Start of Calendar Year 01-04-2022	0.00	100.00	99.30	67.62	16.60	0.84
Start of Water Year 09-27-2022	0.00	100.00	99.76	94.01	40.91	16.57
One Year Ago 10-12-2021	0.00	100.00	100.00	93.93	87.18	45.66

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

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

Author:
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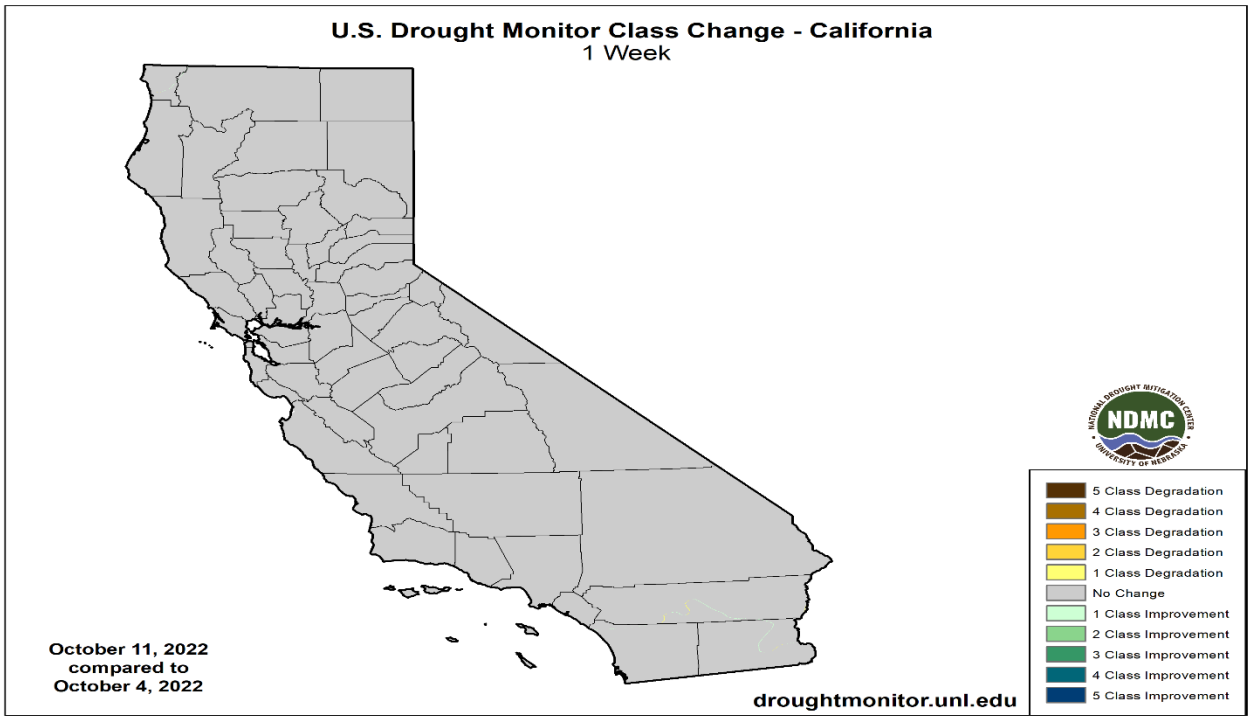
CPC/NOAA

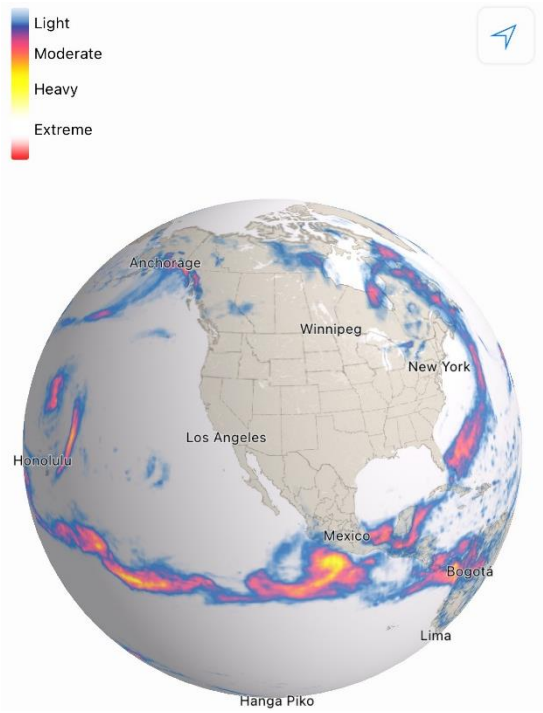
droughtmonitor.unl.edu



The US Drought Monitor release their statistics with a 1-week lag to this report. Over the past week the has been 0.03% class 1 improvement D2 drought conditions.

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

CURRENT SATELLITE IMAGERY



Map: Dark Sky

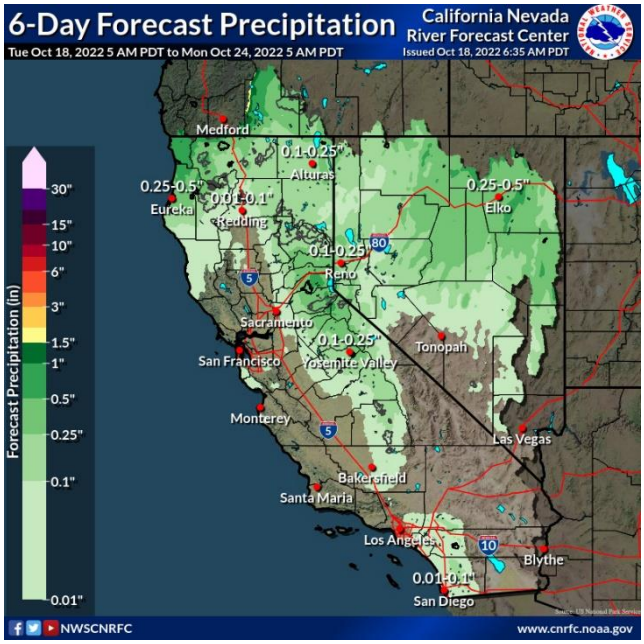
A remarkable satellite picture basically showing the whole of the US with clear skies.

Significant weather conditions have just moved eastward stretching from Florida northwards to Eastern Canada.

Some storm activity is starting to show over the Northwestern Pacific which is expected to hit the coastline in the next few days bringing precipitation to the Northwest and moving in Southeasterly direction..

No Monsoon activity showing but this may change during the week bring moisture inflow to Arizona and New Mexico.

10 Day Outlook



Showers look to arrive along the north coast by Friday evening as the surface low weakens and moves into the PacNW. Precipitation will spread further south and eastward overnight as the cold front moves through norCal. The upper trough will also have begun to make landfall into the PacNW and norCal. Most of the precipitation overnight is forecast over the Smith Basin and along the soOR Cascades. The upper trough will progress eastward throughout the rest of Saturday as the cold front moves to the southeast through northern/central CA and NV. Models at this time show a swath of 1"+ PW moving through the SF Bay Area/Central Coast and to the Sierra. There are some differences in the exact location of the main moisture feed between the deterministic models as well as the depth of the upper trough. This is creating some differences in QPF between the GFS/ECMWF. Both models do agree on some

enhancement over the Sierra and through central NV on Saturday. The front will arrive into soCal by early Sunday at which time most of the moisture will have retreated offshore. Some showers still expected in soCal as the front moves through with lingering precipitation over NV and parts of northern/central CA as well.

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

WESTERN WEATHER DISCUSSION

Increasing 90-day precipitation deficits of more than 6 inches and above-normal temperatures during September resulted in the continued expansion of moderate drought (D1) across western Washington and northwest Oregon. SPI values, soil moisture indicators, and 28-day streamflows strongly support D1 in these areas. According to the NCEI statewide rankings, Montana had its warmest July-August-September on record. Based on the 90-day SPEI along with 24-month SPI, extreme drought (D3) was expanded across northern Montana. D3 was eliminated in parts of eastern Montana due to the lack of support from SPI and SPEI values at various time scales. Based on longer-term SPIs and local feedback, 1-category improvements were made to parts of Utah along with bordering northeast Nevada.

Reference:

Brad Pugh, NOAA/CPC
Richard Tinker, NOAA/NWS/NCEP/CPC

WATER NEWS

CALIFORNIA WATER NEWS

California may reallocate shrinking water supply

While it's not yet formal policy, those who manage California's vast water system are edging toward a historic reallocation of the state's shrinking supply that could have a life-altering impact on its largest-in-the-nation agricultural industry.

For many years, farmers have used about 80% of the water diverted from rivers for human use, with the rest going to urban areas for drinking, watering lawns, maintaining swimming pools, taking showers, cooking and commercial or industrial use.

Prolonged drought has compelled all users to make do with less. However, the biggest loser has been the environment — free flows to maintain habitat for fish and other aquatic species — which generally gets about 50% of the total flow.

In recent years, federal judges have ordered cuts in agricultural water diversions to enforce the Endangered Species Act and the state Water Resources Control Board has moved in the same direction on an emergency basis due to drought. However, environmental groups want permanent habitat-enhancing reductions.

Former Gov. Jerry Brown and his successor, Gavin Newsom, have sought "voluntary agreements" by which agricultural water agencies would curtail diversions to maintain river flows, but results have been scanty at best.

Without such agreements, the water board could implement mandatory reductions, but they would be viewed by farmers as an assault on their historic water rights and probably trigger massive legal battles.

The key principle in these conflicts is that water belongs to the public as a whole and must be put to "beneficial use," as defined in a 1943 law that implemented a constitutional declaration passed by voters in 1928. The law commands authorities to prevent "waste or unreasonable use or unreasonable method of use of water…"

Environmentalists believe the constitution thus authorizes the state water board to curtail agricultural diversions for the protection of habitat, but the 1943 law also declares, "In the enactment of this code the Legislature does not intend thereby to effect any change in the law relating to water rights."

That obvious legal dichotomy is the crux of the situation.

Whether, indeed, the state water board is gearing up for a showdown over water rights, some of which stretch back to the 19th century, is the subject of much speculation in water circles.

Early this year, water board chairman Joaquin Esquivel told a gathering of water officials, "We know we have to change the system. Water rights can be there as a tool to be able to manage supplies through not just a drought but when there is water again. Our water

rights system can be there to facilitate decisions on projects and help us make decisions, or they can be a hindrance."

While the water rights issue percolates in Northern California, there's a similar conflict underway in Southern California over how much water the state diverts from a severely threatened Colorado River.

California is legally entitled to 4.4 million acre-feet per year, with the vast majority of that going to the Imperial Irrigation District and other agricultural users, but the Colorado's flow has dropped dramatically.

The federal government demands that California and other states that draw from the river, principally Nevada and Arizona, reduce diversions by 2-to-4 million acre-feet per year, and threatens to mandate cuts under the "beneficial use" doctrine if they cannot agree.

California has offered a 400,000 acre-foot reduction, only 9%, but that's not enough to satisfy the other states and the outcome is very much in doubt. Meanwhile, the feds are offering Colorado water users $400 for every acre-foot of water they don't take.

Farmers' water rights are clearly not as sacrosanct as they once seemed to be, and as drought persists the stage is being set for a monumental reckoning of some kind.

Original Article: The Sentinel by Dan Walters

Fitch Upgrades Mojave Water Agency, CA's Rev Bonds to 'AA+'; Outlook Stable

Fitch Ratings - San Francisco - 18 Oct 2022: Fitch Ratings has upgraded to 'AA+' from 'AA' the rating on the following bonds issued by the Mojave Water Agency, CA (the agency):

--$26.5 million refunding revenue bonds, series 2017A.

In addition, Fitch has upgraded the agency's Issuer Default Rating (IDR) to 'AA+' from 'AA'.

The Rating Outlook is Stable.

ANALYTICAL CONCLUSION

The upgrade to 'AA+' from 'AA' on the revenue bond rating and IDR reflect the agency's continued very low leverage in the context of solid revenue defensibility and midrange operating risk. Leverage, measured as net adjusted debt to adjusted funds available for debt service, has been less than 1.0x each of the last three years and Fitch expects it to decline even further over the five-year horizon based on issuer forecast financial results. Even when assuming significant cuts to both property tax revenues and historically volatile State Water Project (SWP) water transfer sales, leverage remains very low and well-under 2.0x.

The agency's revenue defensibility is strong and incorporates its ability to access the resource base of the favorable service area through its taxing authority. This taxing authority allows for full recovery of debt service costs. The operating risk assessment reflects a midrange average cost burden based on large annual swings in water sales as

well as a low life cycle ratio. Capital spending is expected to increase over the next five years as the agency pursues multiple groundwater banking projects contingent on funding from partner agencies and/or grants.

Original Article: Fitch Rating

Coalinga Forced to Pay 'Criminal' Price to Get Water for Residents

California's crippling three-year drought is revealing the unique water vulnerabilities of small towns across the San Joaquin Valley.

And while the state has stepped in to help impoverished communities and residents whose wells have gone dry due to plummeting groundwater levels, the handful of towns on the valley's west side that rely on surface supplies are largely on their own.

Towns like Huron, Avenal, Coalinga, and others may have to dig deep into their limited budgets to buy water at staggeringly high prices — in one case nearly 1,300% above the normal price.

The problem for these west valley towns is that they rely entirely on supplies from the federal Central Valley Project, which transports water in a 400-mile-long network of canals.

In February, the Bureau of Reclamation, which operates the CVP, cut allocations to most San Joaquin Valley irrigators to zero. A minimal amount of water the Bureau calls "health and safety" was made available for municipal needs.

But it's not enough.

Paying the Price

After only receiving 2,700 acre-feet of its full 10,000-acre-foot allocation this year, Coalinga, a city of 17,000 in west Fresno County, was set to run out of water by mid-November, said Adam Adkisson, Coalinga city councilman.

It needed another 700 acre-feet to meet the bare minimum for its residents.

Adkisson said the city has made a deal to buy what it needs for the rest of this year but will spend more than $1,800 per acre-foot, as opposed to the $130 per acre-foot it pays normally. That's a 1,284% increase.

It's a last resort option that, at around $1.26 million, will hit the city's budget hard, he said.

Having to pay so much for basic needs during a crisis is something Adkisson can't wrap his head around.

"It's like in the hurricane in Florida. Can you imagine if they were normally selling bottled water for $2 and now they're selling it for $2,000 each, for a bottle of water?" said Adkisson. "That'd be criminal, illegal. So how is this not the same?"

Water prices change based on supply and demand with no control by the state, wrote a spokesperson for the California Department of Water Resources in an email. DWR has funding available through its Urban Community Drought Relief Program which Coalinga could apply for, the spokesperson added.

VELES WATER WEEKLY REPORT

Hoping for a Bump

Coalinga is not alone.

Less than 10 miles south sits Avenal, a city of about 13,000. Avenal is set to run out of water by late December, said Antony López, Avenal's city manager. Like Coalinga, Avenal relies entirely on surface water from the CVP.

The city's full allocation is 3,500 acre-feet. This year, it received 2,000 acre-feet. But Avenal needs a minimum 2,500 acre-feet to make it through the year.

Avenal has been under drought conservation measures which has helped. But it's not enough to close the gap, said López. The Bureau has asked city officials to look for additional water from other CVP contractors, he said. But given the lack of water everywhere, it's possible Avenal may have to buy water on the open market, as Coalinga did.

"We've never had to do that before," said López.

In years past, the Bureau has bumped Avenal's allocation when it ran short, said López. He's holding out hope that will be the case again.

If that doesn't happen, the city will likely have to buy about 180 acre-feet. López estimates that would probably cost upwards of $300,000. That money would come out of the city's water budget which totals $3 million.

Spending that money on supplies would delay upgrades to the city's water treatment plant and a new water pipeline.

"It's very frustrating," said López. "And at times it feels hopeless but I have faith that the wet years will come soon."

Extreme Conservation

Huron, a smaller city of about 7,000, sits just north of Avenal. Huron also relies entirely on CVP water but gets its supplies from Westlands Water District, the largest agricultural water district in the country which covers more than 600,000 acres on the west side of the valley from south of Firebaugh to just north of Kettleman City.

City officials thought Huron was short 200 acre feet until last week when they found out Westlands staff had accidentally excluded the water from Huron's allocation, said John Kunkel, interim city manager of Huron. That error has been corrected and Huron's actual allocation should get it through the year, added Kunkel.

The reason Huron isn't as bad off as its neighbors, Kunkel said, is because of extreme water conservation measures. The city prohibits all landscape watering, car washing, and any water use beyond basic domestic needs. It's a strict plan.

And Kunkel said it's working. Residents are complying, which has saved enough water to get the city through the year.

"It's unfortunate when you drive through our town," said Kunkel. "Everybody's grass is dead and their landscape's dead. But that's the sacrifice they made because they know how dire it is."

Original Article: GV Wire by Jesse Vad / SJV Water

Gov. Newsom Outlines Billion-Dollar Plan to Recycle Water

California should invest tens of billions of dollars in water recycling, storage and desalination over the next two decades to shore up its supply as the state gets drier and hotter, Gov. Gavin Newsom said in a recently released proposal.

It comes as drought continues to grip the U.S. West and the state prepares to lose 10 percent of its water supply by 2040, according to projections by the Department of Water Resources. The Democratic governor discussed the proposal at the construction site of a plant to remove salts from river water that should be fresh, the type of project he said the state needs more of in the coming years.

His proposed water recycling targets, which would make treated waste water safe for drinking, would cost $27 billion by 2040, his proposal said. That was the biggest price tag associated with the plan, which also relies on billions in money already approved in past state budgets. The plan envisions that money coming from both state and federal sources.

In total, he wants to boost annual water supply by nearly 3 million acre ft. each year; one acre ft. can supply about two households.

His plan also calls to expand water storage, in above-ground reservoirs and underground aquifers, by about 4 million acre ft. — nearly enough water to fill Shasta Lake, the state's largest reservoir. New storage infrastructure would help the state capture more water during times of heavy rain, like the two large storms California saw last October and December.

The proposal comes amid the third year of a drought, the state's second in the past decade. Most of the state's major reservoirs are far below normal levels after the state saw its driest January through March in at least a century. That's typically when most of the state's rain and snow falls.

Meanwhile the Colorado River, a key source of water for Southern California, has reached critically low levels. The Newsom administration hopes to reduce dependence on the river and other water exports.

"We're focused on creating more water," he said.

Interest in water recycling is expanding across the West as states and cities see their water supplies threatened by extended droughts. About two dozen communities, including those in Nevada and Colorado, rely on some recycled water for drinking, but that number is expected to grow.

The Metropolitan Water District of Southern California, which provides water for nearly half the state's residents, is building a massive water recycling project. Congress included $1 billion for water reuse projects in the West in the infrastructure bill passed last year.

The plan doesn't have any revolutionary ideas for water management, but includes key details about how the state can "move faster on some of the good ideas," said Ellen

Hanak, vice president and director of the Water Policy Center at the Public Policy Institute of California.

"For water recycling, its important to not just have the technology but to ensure there is a place to put the water after its treated or appropriate regulations to make sure it can safely be put directly back into the water supply," she said. Newsom's plan calls on the State Water Resources Control Board to create regulations for that direct reuse by the end of next year.

The new proposal doesn't call for any immediate, mandatory cuts to water use in cities or on farms. Instead, he wants the water board to develop efficiency targets for every district, but they would only take effect next spring if there's another dry winter. He's also proposing spending $1 billion to get rid of 500,000 sq. ft. of turf.

He previously directed the state's more than 400 local water districts to implement their own plans to reduce water use and has set a few statewide policies, like a ban on watering decorative grass. He has not set a statewide water reduction mandate.

Newsom also said he wants the Legislature to consider a law that would let the state curtail people's water rights even when its not a drought. The state operates an archaic system of water rights to govern how much water cities, farms and others are entitled to take and from where. An effort is underway to digitize records that spell out those terms, some more than a century old.

Desalination would make up only approximately 3 percent of the added water supply Newsom is calling for, most of it coming from brackish water, which isn't as salty as water that comes from the ocean.

His plan doesn't spell out how much water would come from removing salt from ocean water, a more controversial practice, but he's calling on various state agencies to create a process for citing such projects by 2023.

"As California becomes hotter and drier, we must become more resourceful with the strategic opportunity that 840 miles of ocean coastline offer to build water resilience," the plan said.

Original Article: Construction Equipment Guide by AP

Metropolitan Board Calls for Banning Non-Functional Turf on Commercial, Industrial, Public Properties

With drought and climate change stressing water availability, the Metropolitan Water District is taking steps to eliminate an all-too-common sight in Southern California that uses up valuable water resources – ornamental grass that serves no recreational or community purpose – grass known as non-functional turf.

“At the same time, Metropolitan will continue providing cash incentives so that grass is not simply paved over, rather it is replaced with water-efficient landscaping to ensure our trees continue thriving and our communities remain beautiful and ecologically diverse.”

VELES WATER WEEKLY REPORT

Metropolitan's Board of Directors last Tuesday (Oct. 11) adopted a resolution that strongly recommends cities and water agencies across Southern California pass ordinances permanently prohibiting the installation and irrigation of non-functional turf. The board's call is largely directed at both existing and new commercial, industrial and public properties, as well as HOAs, rather than residential properties. It does, however, call for local regulations that don't allow installation of non-functional turf in new home construction.

"More than half of all water used in Southern California is used outdoors for irrigation, much of it for grass that is not walked or played on or used in any meaningful way. Sustaining ornamental grass is not a good use of our precious water resources," Metropolitan General Manager Adel Hagekhalil said.

Metropolitan has for more than a decade incentivized residents and businesses to replace their grass lawns with more water-efficient landscaping. That turf replacement program, which today offers a base rebate of $2 per square foot of grass replaced, has directly resulted in the removal of more than 200 million square feet of grass, saving enough water to serve 62,000 homes annually. In addition, a recent study found that for every 100 homes that converted their yards using a Metropolitan rebate, an additional 132 nearby homes were inspired to convert their own grass without receiving a rebate to help fund the projects. This "multiplier effect" more than doubled the value of Metropolitan's $351 million investment in making Southern California more sustainable.

"Through our turf rebate and California Friendly® and native plant gardening education programs, we've jumpstarted the movement to change the landscape of Southern California. But we must do more," Chairwoman Gloria D. Gray said.

"We are experiencing unprecedented drought conditions in California and on the Colorado River – straining both of our imported water supplies. And the reality of climate change means that these alarming conditions are likely to become more common and more severe. We need to find ways to permanently live with less water," she added.

California is in the midst of the driest three years on record, resulting in the lowest-ever deliveries from the State Water Project, which on average supplies 30 percent of the water used in Southern California. The constraints on that supply have left 6 million people in the region without enough water to meet normal demands, requiring unprecedented mandatory conservation.

On the Colorado River – Southern California's other principal imported water supply – a decades-long drought has left the system's reservoirs at their lowest-ever levels. The federal government has responded with a call for immediate and dramatic cutbacks in water use.

Elimination of non-functional turf is becoming an increasingly valuable tool to quickly and permanently decrease water use. In response to California's drought, the State Water Resources Control Board issued an emergency regulation temporarily banning the irrigation of non-functional turf with potable water from June 2022 to June 2023.

And in August, Metropolitan joined urban water agencies across the Colorado River Basin to sign a Memorandum of Understanding committing to reducing non-functional turf.

“We need to permanently reduce the amount of water used on non-functional turf. That is why we are calling on cities and agencies to adopt relevant ordinances that will work with the particular circumstances of their communities,” Hagekhalil said. “At the same time, Metropolitan will continue providing cash incentives so that grass is not simply paved over, rather it is replaced with water-efficient landscaping to ensure our trees continue thriving and our communities remain beautiful and ecologically diverse.”

The resolution approved Tuesday specifically calls for cities and agencies to pass ordinances that permanently: prohibit the use of potable water to irrigate non-functional turf in existing and new non-residential properties; prohibit the installation of non-functional turf in non-residential and new residential properties; and require the removal of all non-functional turf in non-residential properties by a certain date. Non-functional turf is defined as specific kinds of grasses irrigated by potable water that are not regularly used for human recreational purposes or for civic or community events.

Original Article: Business Wire by Metropolitan Water

'Water batteries' could store solar and wind power for when it's needed

The San Diego County Water Authority has an unusual plan to use the city's scenic San Vicente Reservoir to store solar power so it's available after sunset. The project, and others like it, could help unlock America's clean energy future.

Perhaps a decade from now, if all goes smoothly, large underground pipes will connect this lake to a new reservoir, a much smaller one, built in a nearby canyon about 1100 feet higher in elevation. When the sun is high in the sky, California's abundant solar power will pump water into that upper reservoir.

It's a way to store the electricity. When the sun goes down and solar power disappears, operators would open a valve and the force of 8 million tons of water, falling back downhill through those same pipes, would drive turbines capable of generating 500 megawatts of electricity for up to eight hours. That's enough to power 130,000 typical homes.

"It's a water battery!" says Neena Kuzmich, Deputy Director of Engineering for the water authority. She says energy storage facilities like these will be increasingly vital as California starts to rely more on energy from wind and solar, which produce electricity on their own schedules, unbothered by the demands of consumers.

Californians learned this during a heat wave this past summer. "Everybody in the state of California, I believe, got a text message at 5:30 in the evening to turn off their appliances," Kuzmich says. The sun was going down, solar generation was disappearing,

and the remaining power plants, many of them burning gas, couldn't keep up with demand. The alert worked; People stopped using so much power, and the grid survived.

Yet earlier on that same day, there was so much solar power available that the grid couldn't take it all. Grid operators "curtailed," or turned away, more than 2000 megawatt hours of electricity that solar generators could have delivered, enough to power a small city. That electricity was wasted, and there was no way to store it for later, when grid operators desperately needed it.

"We have a problem if we're going to have these continuous heat waves," Kuzmich says. "We need a facility to store energy so that we don't need to turn off our appliances."

Pumped hydro has a history

The technology that San Diego is proposing, called pumped hydro energy storage, is already operating at more than 40 sites in the United States. Some of the largest ones, which can generate more than 1000 MW for up to eight hours, were built during the 1970s and 1980s to store electricity that nuclear power plants generated during the night. But few new plants have been built over the past 30 years in the U.S. China has continued to build such plants.

Now, the need to store power from renewable sources is reviving interest in this old technology in the U.S.

"Just in the past several years, 92 new projects have come into the development pipeline," says Malcolm Woolf, president and CEO of the National Hydropower Association. Most of the projects, however, are in the planning stages and still need regulatory approval and financing.

Thanks to the climate bill that President Biden signed in August, these projects now qualify for the same 30 percent tax credit that solar and wind projects enjoy. "That is an absolute game-changer," Woolf says. "A number of these projects that have been in the pipeline for a number of years now suddenly are a whole lot more bankable."

Water batteries have a lot of competitors, when it comes to storing energy. Some companies, including the car company GM, are exploring ways for the electric grid to draw emergency power from the batteries in millions of privately owned electric cars. Others are working on ways to store electricity by compressing air or making hydrogen. Still others are focused on ways to manage the demand for electricity, rather than the supply. Electric water heaters, for instance, could be remotely controlled to run when electricity is plentiful and shut down when it's scarce.

Pumping water, however, has some advantages. It's a proven way to store massive amounts of power. The San Vicente project would store roughly as much electricity as the batteries in 50,000 of Tesla's long range Model 3 cars. Water batteries also don't require hard-to-find battery materials like cobalt and lithium, and the plants can keep working for more than a century.

The biggest problem with them, at least according to some, is that it's hard to find places to build them. They need large amounts of water, topography that allows construction of a lower and higher reservoir, and regulatory permission to disturb the landscape.

Woolf, however, says the perception of pumped hydro's limited prospects "is a myth that I am working hard to disabuse folks of." Pumped hydro facilities, he says, don't have to be as massive as those of the past century, and they don't need to disturb free-flowing streams and rivers. Many proposals are for "closed-loop" systems that use the same water over and over, moving it back and forth between two big ponds, one higher than the other, like sand in an hourglass.

Three of the proposed projects in the U.S. that appear closest to breaking ground, in Montana, Oregon, and southern California, all would operate as closed loops.

Kelly Catlett, director of hydropower reform at American Rivers, an environmental advocacy organization which has highlighted the environmental harm caused by dams, says that "there are good pumped storage projects, and there are not-so-good pumped storage projects."

Her group won't support projects that build new dams on streams and rivers, disrupting sensitive aquatic ecosystems. But San Diego's plan, she says, "looks like something that we could potentially support" because it uses an existing reservoir and doesn't disturb any flowing streams. Also, she says, "I'm unaware of any opposition by indigenous nations, which is another really important factor, as they have borne a lot of the impacts of hydropower development over the decades."

The board of the San Diego County Water Authority, and San Diego's city council, are expected to vote soon on whether to move ahead with a detailed engineering design of pumped hydro storage at the San Vicente reservoir. The state of California is chipping in $18 million. The design work, followed by regulatory approvals, financing, and actual construction, is likely to take a decade or more.

Original Article: NPR

Las Vegas community developments begin mandatory turf removal ahead of 2026 mandated law

The Desert Shores community already has an abundance of water with its beautiful lakes, however now it needs to cut back on turf usage.

Nevada law requires the removal of decorative grass in the Las Vegas valley by the end of 2026.

The law was signed by Governor Steve Sisolak in 2021 due to low water levels at Lake Mead and the ongoing drought.

According to the Desert Shores community website, the association is working with the Southern Nevada Water Authority on what they can keep or change.

Margo Quinones has lived in the Desert Shores community for over 20 years.

"Desert Shores, the community here just sprung it up on us, they did not advise us that it was coming, and they received the mandate from the city," said Quinones. "If they had informed us then, there wouldn't be such an uproar. People were very upset, you get a letter all of the sudden saying this is your share, and you're like what?"

On the Desert Shores community website, the association acknowledged this conversion would mean tough circumstances for their residents including a special payment assessment of $1,600 for single-family homes and $800 for condos.

"I think it's a good idea, everybody should conserve water, and as far as gardens go there's a lot of older areas here that have huge amounts of grass," added Quinones.

Desert Shores isn't the only community that needs to follow this mandate.

Joel Just, the CEO of Camco is working with several homeowner associations throughout the valley on this transition.

"The big push right now is there's subsidies available for associations," said Just. "I know in my area; Sun City Anthem is doing a lot of that. They are taking all that turf out and replanting with Xeriscape with desert plants.

Just said, this new standard will help recycle all the water needed despite some pushback from some homeowners.

"I recommend everybody to try and do it as soon as possible because the money that's available is not being replenished. So, once it's done, it's done," added Just. "Then you'll have to do it on your own dime."

Desert Shores also states on their website that the biggest challenge during this conversion will be to maintain and improve the community, also citing on their website that protecting property values and residents' established community lifestyle is crucial.

Their website also states the association has received verbal approval that Desert Shores will be able to keep most of the lake-end landscaping and are applying for waivers to have this in writing.

Original Article: News Now by Mary Jane Belleza

Gila River tribe will take offer to conserve water, but Yuma farmers say it's not enough

The Gila River Indian Community is the first Arizona water rights holder to publicly pursue the federal government's new offer of compensation to leave Colorado River water in Lake Mead.

Tribal Gov. Stephen Roe Lewis announced the plan on Monday at a gathering of Sen. Kyrsten Sinema's water advisory council, which is reviewing ways to spend $4 billion of Inflation Reduction Act funds targeted at Colorado River drought relief, as well as funds approved in an infrastructure funding law.

While several participants in Sinema's council praised the community's proposal as a first step toward attracting others to rapidly conserve water, there were signs that getting significant buy-in from other Arizona farmers will be difficult.

Yuma-area growers had sought $1,500 an acre-foot to forgo some irrigation, but the U.S. Bureau of Reclamation decided to offer $330, or up to $400 for multi-year deals. The Arizona Farm Bureau Federation's president questioned the figure at the meeting, and a vice president later told The Arizona Republic it's nowhere near enough to entice Yuma farmers.

"This is real water," Farm Bureau President Stefanie Smallhouse said of what the farmers had offered. "It's real value that is providing food for people."

"The reality is we need a lot more than $4 billion," Sinema conceded. But she said it's important to spend the majority of the money now available on long-term efficiency gains and not primarily on emergency fallowing programs.

The U.S. Bureau of Reclamation is hoping to conserve at least 2 million acre-feet a year to stabilize reservoir storage that has plunged to crisis levels over two decades of drought. That would be enough to supply several million households, though roughly 80% of Colorado River water is used on farms. In a typical year, Arizona is entitled to 2.8 million acre-feet, more than most of the seven states that share the river with Mexico, but less than the 4.4 million that California takes.

The river is officially in shortage, and Arizona has already weathered cuts to its share. So far those cuts have fallen largely on central Arizona farmers, and officials are trying to prevent more drastic cuts that could batter farmers along the river or force cities to switch to groundwater reserves.

Sinema: Solution 'has to be regional'

Gila River Indian Community's three-year offer is to store 125,000 acre-feet a year in Lake Mead, likely at a compensated rate of $400 an acre-foot, and to seek buyers such as cities to take ownership of a similar amount of the community's stored groundwater instead of diverting their own river water to store in the ground for later use.

"We're going far beyond what we've ever done before," said Lewis, whose community holds major Colorado River rights to replace water that 19th century settlers diverted

from the Gila River. GRIC already has cooperated in programs to keep hundreds of thousands of acre-feet in Lake Mead through previous drought-management programs.

An acre-foot is about 326,000 gallons, or roughly the amount it would take to cover a football field 1 foot deep. Many Arizona farms use several acre-feet on every planted acre each year.

This summer Lewis had announced that his community would no longer participate in such programs because efforts to get others throughout the Colorado River basin to sacrifice appeared to have failed.

“We could not be the only community making a sacrifice,” he explained to Sinema on Monday. He had found it troubling that other water users had sought “outrageous” rates.

Sinema agreed it is critical to get California and other states on board.

"The approach has to be regional," she told The Republic.

Since summer, California water users have proposed a plan to conserve 400,000 acre-feet if they get federal help shoring up the Salton Sea, a toxic dust hazard that could worsen if water conservation reduces irrigation runoff that further diminishes the water body's reach. Lewis said the California offer and federal assurances of acting to protect the river next year had brought Gila River back to the negotiations.

“We can only survive this crisis if we put the entire system first, not our own interests,” Lewis said.

Original Article: AZ Central by Brandon Loomis

50 years after Clean Water Act – how are Texas waterways doing?

Today’s the 50th anniversary of the Clean Water Act becoming law. So how are Texas waterways doing?

Better! A study in 2018 by researchers at UC Berkeley & Iowa State University found that the share of rivers nationally that are safe for fishing increased by 12 percent between 1972 and 2001. I don’t have TX-specific data, but believe this is also the case for Texas.

However, we still have a lot of work to do. 9,711 miles of TX rivers (28% of those assessed) aren’t safe for basic uses like swimming or fishing. That’s also the case for 590,241 acres of lakes (38%) and 1,248 sq miles of our bays and estuaries (48%).

Half of our beaches had unsafe levels of fecal bacteria at least a quarter of the time in 2020 Toxic algae blooms, made worse by rising temperatures, have killed dogs around Texas, including this summer at “Barking Springs” in Austin.

Water pollution comes from a variety of sources, including runoff from factory farms and cities and direct discharges from industry. Texas ranks 1st in the U.S. for toxic dumping in our waterways.

We also have emerging threats to our waterways, including from PFAS “forever chemicals” which have contaminated drinking water around the state and put people at

risk of risk of cancer, liver damage and infertility. Plastic pellets called “nurdles” are polluting our beaches and threatening wildlife. The TCEQ had proposed regulating this pollution, but backed down from industry pressure.

The U.S. Supreme Court is considering narrowing the scope of the Clean Water Act, which could make it harder to reduce pollution.

But there is good news! Thanks to the new infrastructure law, Texas is getting $507,971,000 to upgrade water infrastructure, including to reduce sewage overflows and cut PFAS pollution. Cities like Austin are adopting new green infrastructure standards to reduce cut urban runoff.

But there’s much more to do. I hope we don’t have to wait another fifty years for all our waterways to be safe for my kids to swim in.

Original Article: Environnent America

Austin is looking for a place to store massive amounts of water to pull from during droughts

Austin is planning a big underground water storage project that would provide it with another source of water during droughts. But city planners are not sure exactly where to put it. This week, they'll meet with residents of Lee, Bastrop and Travis counties, the three counties that may end up playing host to the project.

Currently, Austin gets its water from reservoirs in the Highland Lakes along the Colorado River. The new plan is to pump some of that water underground when there’s plenty of it, then pull it back up in times of scarcity.

The system, called aquifer storage and recovery, has been done in other parts of the state — including El Paso and Kerrville — to protect regions from the threat of big droughts.

Under Austin’s plan, the city’s water utility will store about three Lake Austin’s worth of water (60,000 acre feet, in scientific terms) underground by 2040. After that, storage could increase up to 240,000 acre feet (that’s about 11 Lake Austin’s worth of water) by the year 2115.

“The water that will be stored in the cracks, in spaces in the aquifer and the rock and sand,” Marisa Flores Gonzalez, supervisor of Austin Water’s resources team, said. “You can imagine it as a type of giant underground sponge.”

The approach has its benefits. For one thing, it stops water loss from evaporation, something that plagues Texas reservoirs during our hot summers. For another, it reduces the need to build more dams and surface reservoirs, which can be bad for the environment.

"You would have a well field ... you would potentially have a pump station, some facilities for treatment, you would have the [water] well heads,” Flores Gonzalez said. “It's a much smaller footprint than other large water supply projects.”

While the footprint may be smaller than a big reservoir, aquifer storage and recovery still takes complicated engineering and a detailed understanding of local hydrology to implement.

It also requires clear guidelines around water rights and land use to operate effectively. In Texas, landowners typically have the right to pump water from under their property. One challenge for this type of project is ensuring the city will be able to retrieve the water it injects underground.

"Our intent with this project would be to implement it in a way that would allow us to maintain control over the water we would be storing," Florez-Gonzalez said. "We're not intending to remove more groundwater than we would be putting into the project."

Because a big project like this will likely prompt big questions, the city is hosting several workshops this month to provide information and take feedback.

The first of three in-person workshops will happen Tuesday night at the Giddings Public Library and Cultural Center. A second one is planned Wednesday at the Bastrop Public Library. The third will happen Thursday at the City of Austin Permitting and Development Center.

All workshops start at 6 p.m. You can find more information about those meetings and two virtual events planned later this month here.

Austin Water says it's not sure where in Lee, Bastrop or Travis County the project may get built. It should have a clearer idea after doing more hydrological studies and completing an "equity and affordability" study which Flores Gonzalez says will look at "the distribution of benefits and burdens" from the project.

The city hopes to have an exact location identified by 2024. After that, it will build and test a pilot program before beginning full-scale design and construction around 2028.

Austin Water says the first phase of the aquifer storage and recovery project, including the pilot program, will cost around $24 million. The full price tag once the project is built out is estimated to be $367 million.

Austin Water says ratepayers will foot the bill and has left open the possibility of rate increases to pay for the project. Flores Gonzalez says the utility is also considering taking out low interest state loans "to increase the project's affordability."

Original Article: KUT 90.5 by Mose Buchele

Record low water levels in US reduce hydropower output

For the first time since 1967, water levels in the Colorado River system are at a record low and the megadrought in the US southwest have reduced hydropower output significantly, according to experts.

Low water levels at reservoirs across the states of Colorado, New Mexico, Wyoming and Utah mean a reduction in hydroelectric production, which dropped 20 per cent for water year 2022, Xinhua news agency reported citing the Bureau of Reclamation (BOR) as saying.

Although hydropower production is down about 30 per cent overall since 2000, it has plummeted a full 20 per cent since 2021 for the 2022 year ending September 30, a BOR official recently said.

"The outlook is likely for a pretty low generation years," Nick Williams, BOR upper Colorado River Basin power manager, told The Colorado Sun on Tuesday.

According to the report, Lake Powell's Glen Canyon Dam, which produces most of the Colorado River systems hydropower, is down about 78 per cent.

Compared to a pre-drought average from 1988 to 1999, the most recent water year hydroelectric generation is down about 43 per cent, Williams said.

"The beginning of the 21st-century marked what scientists now believe is the driest 22-year stretch in the southwest in the past 1,200 years," said the report.

Recent drops in hydroelectric power production from the southwest's most important river, the Colorado, have officials "rethinking how much power generation can reasonably be relied upon from that system" on a long-term basis.

"We are starting to look really hard at the assumptions that go into what we do base our numbers under storage typical models and question ability of those," Williams said.

"I think the prudent thing to do is to plan for something that's likely lower long-term and then it's easier to react more water and power than it is to the less," he added.

Original Article: Investing.com

Hydropower production down 20% as the Upper Colorado River system finished water year 2022

Hydropower production on the Upper Colorado River system for water year 2022, which ended on Sept. 30, was down about 20% compared with the previous year and about 30% compared with the yearly average since 2000, according to a Bureau of Reclamation official who oversees hydroelectric generation.

“The outlook is likely for pretty low generation years,” said Nick Williams, the Bureau’s Upper Colorado River Basin power manager.

The last time hydropower generation from the Colorado River Storage Project, or CRSP system — the federal dams and reservoirs that move water around the Upper Basin states of Colorado, Wyoming, Utah and New Mexico — was this low was in 1967, Williams said. That’s significant, because not all of the CRSP dams were producing energy at that point, he said.

Lake Powell’s Glen Canyon Dam produces most of the CRSP hydropower, about 78%; Blue Mesa Reservoir west of Gunnison accounts for about 5% of the production.

When compared to a pre-drought average from 1988 to 1999, the most recent water year hydroelectric generation is down about 43%, Williams said. The beginning of the 21st century marked what scientists now believe is the driest 22-year stretch in the Southwest in the past 1,200 years.

Recent dips in CRSP hydropower production have officials rethinking how much power generation can reasonably be relied upon from that system long term.

"We're starting to look really hard at the assumptions that go into what do we base our numbers and historic statistical models on — and questioning the validity of those," Williams said. "I think the prudent thing to do is to plan for something that's likely lower long term and then it's easier to react to more water and power than it is to less."

New agreements

The Western Area Power Administration, or WAPA, which distributes and markets the CRSP power, is thinking through the same long-term implications of lower hydropower production, both internally and in discussions with its customers, said Clayton Palmer, an environmental specialist at WAPA.

"Among the issues is are we in a drought that has some limited duration — or are we to expect these drier conditions as the new normal going forward?" Palmer said. "That's a constant conversation."

WAPA negotiated long-term contracts with its customers nearly 20 years ago that were based on pre-early 2000s hydropower numbers that were higher than today's figures. Those contracts run out in 2024. Last year, WAPA negotiated a two-year period during which customers agreed to take less power. It started Dec. 1.

"The electrical generation was so low relative to our contractual commitments and the market prices for replacement power are so high," Palmer said. "So, we cut a deal that they would take less power than our contractual commitments."

In the meantime, WAPA is trying to sort through how to structure its post-2024 agreements. There are a couple of possibilities, Palmer said. One option is an arrangement where WAPA would distribute certain amounts of CRSP power based on the flows on the river.

"That reduces our risk, but it jerks our customers around," he said. "We don't consider that a sustainable product."

The more likely option, he said, is to just plan for lower yields on average so that customers have at least something they can count on. Then, if there's more, it's a pleasant surprise.

Planning for less

For now, at least, the impact of all this in Colorado appears to be limited. Although several Colorado energy providers receive CRSP hydropower from WAPA, including several small and medium-size utilities, for many of those companies it amounts to a small slice of a larger energy portfolio.

Hydropower from WAPA accounts for about 3% of the power provided by Holy Cross Energy, an electric cooperative that serves more than 42,000 customers in western Colorado. But even replacing a small percentage has its challenges, Holy Cross president and CEO Bryan Hannegan said.

"Instead of having a reliable, low-cost source of clean hydro we have to go find other power supply resources to meet our consumers' needs," Hannegan said. "Today, those are increasingly coming from the wholesale power market — and largely coming from natural gas fire generation."

A variety of factors, including the war in Ukraine, have recently sent natural gas prices soaring, Hannegan said.

Holy Cross has developed enough small-scale, renewable projects, including a new collaborative solar and battery storage project with Colorado Mountain College, that replacing WAPA hydropower won't cause rates to jump this winter, Hannegan said.

"Next year, who knows?" he said.

All this raises questions about whether utilities can count on water being available to generate hydroelectric power on this system in the future, Hannegan said.

The situation is similar at CORE Electric Cooperative, which serves roughly 170,000 members in an area that stretches east from Buena Vista, across the Front Range south of Denver and onto the Eastern Plains.

Power supply manager Chris Hildred said WAPA hydropower has been an important, low-cost piece of the co-op's energy portfolio — but accounts for less than 2% of its energy capacity. Hildred said the company is thinking through what options it has in the future, including replacing this power altogether, if the supply is no longer reliable.

As of this summer, Tri-State Generation and Transmission Association, the largest CRSP hydropower customer, was receiving about two-thirds of its normal hydropower supply. Those numbers are similar through the end of September, according to a company spokesman.

Tri-State, which provides wholesale power to 42 cooperatives in four states, including 17 in Colorado, continues to make up for the losses with other power sources. About 8% of Tri-State's total energy comes from the CRSP project.

"As we have noted for some time, dealing with decreasing allocations from CRSP continues to reduce a piece of the pie that we have historically depended on for carbon-free energy," spokesman Mark Stutz wrote in an email. "This loss of a dispatchable resource remains a hardship, especially during our energy transition, but we have and will continue to work to build a reliable and affordable power supply for our rural communities."

Infrastructure concerns

Some Bureau of Reclamation projections show water levels at Lake Powell could drop below the minimum level needed to generate power as early as the end of next year. With water levels that low, loss of hydropower generation at Glen Canyon Dam is one concern — impacts to the infrastructure is another.

Brad Udall, a senior water and climate research scientist at Colorado State University's Colorado Water Institute, said the ability to continue to get water through Glen Canyon Dam infrastructure is more significant than the power generation itself.

"Dropping below the ability to produce power at Powell is a really bad idea because we need to protect the infrastructure," Udall said. "If we go below the penstocks we end up using some infrastructure that's little used over the years. We have no idea how that would work in the long run. Too many people rely on Powell water to trust these four bypass tubes."

From a power generation perspective, if the levels at Lake Powell drop below minimum power pool, then there's a situation where their customers are expecting a product that doesn't exist, Holy Cross's Hannegan said.

"Then we have a contract but no ability or capability to deliver on it," Hannegan said.

One option, Hannegan said, might be to replace the hydropower with other clean energy sources on federal land. "We could build solar and build wind and use that to take pressure off the hydro system."

Original Article: Colorado Sun by Chris Outcalt

Drought in South Texas has farmers worried about their crops

The ongoing drought across the American West is — in some places — the worst in more than 1,000 years. Conditions are dry from California all the way to the Gulf Coast of Texas.

In a region that depends on water from reservoirs, the lake levels in many of them are shockingly low.

In South Texas, for example, along the lower Rio Grande, two reservoirs supply water to both sides of the border. For the past few years, they've struggled to remain even half-full. And right now, one of them – Falcon International Reservoir — is just 15% full.

That's scary news for farmers in the region who grow sugar cane, cotton, citrus and a whole host of other crops.

Driving between rows of sugar cane on his farm in San Benito, Texas, farmer Sam Simmons said this year's crop isn't in great shape. He got out of his pickup to demonstrate.

"There's basically a section of cane that grows every about 10 to 14 days," he said pointing to a sugar cane stalk with yellowing leaves. "The length of it is according to how much moisture there is."

He said during a normal year, the sections — called barrels — might be six to eight inches long.

"But we didn't have enough moisture to really keep it growing rapidly," he said as he pointed to a plant nearby where the barrels are less than half the length they should be. "That's probably three [inches]. Some of those are three. This might be three and a half."

That means this cane will produce significantly less sugar. "This field normally should produce around 40 tonnes of raw sugarcane," Simmons said.

In a normal year, he guesses that'd translate to about 8,000 pounds of sugar. But this year, he said if he were a sugar buyer making an offer, it'd be for a lot less.

"I wouldn't offer more than about 5,000 pounds," he said. "So it's probably 40% off, and that I can basically say, is due to lack of irrigation water."

"Pray for rain" has always been a common refrain in this part of the country. Farmers can't control what comes from the sky but until recently, water coming out of reservoirs along the Rio Grande has made up the difference.

That's by law — specifically, a treaty with Mexico from 1944. Simmons said his sugar cane is currently suffering because the Mexican government isn't keeping its end of the bargain.

"The real fight is with Mexico, them providing and living up to the treaty obligations," he said.

The treaty Simmons is referring to requires Mexico to deliver to the United States enough water to make up for the lack of rainfall on about 100 farms the size of his every year, on average.

"But the way that it's interpreted and the way that it's enforced is they basically have five years," said Brian Jones, state director of the Texas Farm Bureau for Region 13 in the Rio Grande Valley.

"And it doesn't matter if it all comes on the fifth year or what, even though they're severely lacking through these first two years of the cycle," he said.

That 1944 treaty is just one piece of law that governs a long and complicated water sharing relationship between the United States and Mexico.

According to the International Boundary and Water Commission, over the past two years, Mexico has only delivered a third of the amount of water that farmers had been expecting. The Mexican Embassy in Washington did not respond to Marketplace's request for comment.

The lack of water isn't just stunting sugar cane crops in the area. It's hurting corn and soybeans, cotton and sorghum. There are also a number of citrus growers down here, like Dale Murden.

One of Murden's groves just south of Harlingen, Texas already took a hit during the winter freeze in 2021. Walking through the green grapefruit and oranges buds, Murden said this one is holding its own these days, but he's worried about having enough water before the harvest at the start of next year.

Even as his own crops are suffering, he understands Mexican water commissioners are in a tough position. Things aren't much wetter on their side of the border, and there are lots of farmers upriver who get water from the Rio Grande, too.

"You know, that's a lot of different people to try to get together for the common good and it's a challenge," Murden said.

Murden also knows that climate change is only making the problem worse.

"I've noticed things drying out a lot quicker lately," he said. "I had four inches last month and four inches the month before, but things are just dry. I don't know. It just was really drying out quick for some reason, so that concerns me a little bit."

If the drought continues or gets even worse, Murden says he might have to sell his farmland. And that would probably mean a whole bunch of new homes and apartment buildings where this grapefruit and orange grove sits.

Original Article: Marketplace by Andy Uhler

Biden-Harris Administration Announces $210 Million for Drought Resilience Projects In the West

The Department of the Interior today announced $210 million from President Biden's Bipartisan Infrastructure Law that will bring clean, reliable drinking water to communities across the West through water storage and conveyance projects.

The projects are expected to develop over 1.7 million acre-feet of additional water storage capacity, enough water to support 6.8 million people for a year. The funding will also invest in two feasibility studies that could advance water storage capacity further once completed.

"In the wake of severe drought across the West, the Department is putting funding from President Biden's Bipartisan Infrastructure Law to work to expand access to clean, reliable water and mitigate the impacts of this crisis," said Secretary Deb Haaland. "Water is essential to every community – for feeding families, growing crops, powering agricultural businesses, and sustaining wildlife and our environment. Through the investments we are announcing today, we will advance water storage and conveyance supporting local water management agencies, farmers, families and wildlife."

"Through the Bipartisan Infrastructure Law, the Biden-Harris administration is dramatically advancing our mission at the Bureau of Reclamation to deliver water and power in an environmentally and economically sustainable manner for the American West," said Bureau of Reclamation Commissioner Camille Calimlim Touton. "Our investment in these projects will increase water storage capacity and lay conveyance pipeline to deliver reliable and safe drinking water and build resiliency for communities most impacted by drought."

The Bipartisan Infrastructure Law allocates $8.3 billion for Bureau of Reclamation water infrastructure projects over the next five years to advance drought resilience and expand access to clean water for families, farmers, and wildlife. The investment will repair aging water delivery systems, secure dams, and complete rural water projects, and protect aquatic ecosystems. The funding announced today is part of the $1.05 billion in Water Storage, Groundwater Storage and Conveyance Projects provided by the Law.

The selected projects are:

Arizona:

Verde River Sediment Mitigation Study: $5 million to provide the federal cost share for conducting the Verde River Sedimentation feasibility study, which would identify alternatives to restore at least 46,000 acre-feet of water storage lost due to accumulation of sediment at Horseshoe Reservoir. It would also determine a plan for future management of sediment at Horseshoe and Bartlett Reservoirs and investigate potential operational flexibilities created with increased storage capacity to assist in mitigating impacts of drought and climate change on water availability. An appraisal study was completed in 2021.

California:

B.F. Sisk Dam Raise and Reservoir Expansion Project: $25 million to the San Luis and Delta-Mendota Authority, to pursue the B.F. Sisk Dam Raise and Reservoir Expansion Project. The project is associated with the B.F. Sisk Safety of Dams Modification Project. Once complete, the project will develop approximately 130,000 acre-feet of additional storage.

North of Delta Off Stream Storage (Sites Reservoir Project): $30 million to pursue off stream storage capable for up to 1.5 million acre-feet of water in the Sacramento River system located in the Coast range mountains west of Maxwell, California. The reservoir would utilize new and existing facilities to move water into and out of the reservoir, with ultimate release to the Sacramento River system via existing canals, a new pipeline near Dunnigan, and the Colusa Basin Drain.

Los Vaqueros Reservoir Expansion Phase II: $82 million to efficiently integrate approximately 115,000 acre-feet of additional storage through new conveyance facilities with existing facilities to allow Delta water supplies to be safely diverted, stored and delivered to beneficiaries.

Colorado:

Arkansas Valley Conduit: $60 million to continue the facilitation of supplying a safe, long-term water supply to an estimated 50,000 people in 40 rural communities along the Arkansas River. Once complete the project will replace current groundwater sources contaminated with radionuclides and help communities comply with Environmental Protection Act drinking water regulations through more than 230 miles of pipelines designed to deliver up to about 7,500 acre-feet per year from Pueblo Reservoir.

Montana:

Dry Redwater Regional Water System Feasibility Study: $3 million to provide the authorized federal cost-share for finishing the Dry Redwater Regional Water System Feasibility Study.

Washington:

Cle Elum Pool Raise: $5 million to increase the reservoir's capacity an additional 14,600 acre-feet to be managed for instream flows for fish. Additional efforts include shoreline protection that will provide mitigation for the pool raise.

The Department also recently announced new steps for drought mitigation in the Colorado River Basin supported by the Inflation Reduction Act, releasing a request for proposals for water system conservation measures as part of the newly created Lower Colorado River Basin System Conservation and Efficiency Program. The Act provides $4 billion in funding for water management and conservation in the Colorado River Basin, including at least $500 million for projects in the Upper Basin states that will result in water conservation throughout the system.

Original Article: DOI

GLOBAL WATER NEWS

How the inequality crisis is linked to the sociogenesis of climate change

Research published in Water International develops an approach to the emergence of multiple economies of water in India's capital Delhi, using a neo-Polanyian approach of instituted economic process. Prof Mark Harvey argues that water is an "uncooperative public good" and analyzes the systems of provision, distribution, appropriation and consumption of water, and the formation of scales of these economies of water.

Piped water (legally supplied and illegally diverted, paid and unpaid for), registered and unregistered bore wells, standpipes (legal and illegal), water tankers, street vendors, commercial and public bottled water make up the wide array of water provisioning elements.

The paper systematically compares and analyzes the spatially divided and partially overlapping economies of water in the planned colonies and slum designated areas in the city. It also describes the dynamics of growth and stagnation of the different economies of water within the waterscape of the capital, as well as widespread water

poverty. Entrenched inequalities to both public and market water in different economies of water are symptomatic of the wider political economy, and its pervasive fault lines.

Original Article: Phys.org by University of Manchester

Haryana formulates three-year plan to reduce underground water gap

The Haryana Water Resources Authority (HWRA) has formulated an action plan to reduce the underground water gap in the state in the coming three years.

The water gap is the difference between the available water at any place and the quantity being used there. More water than available is being used in several parts of the state which creates a water gap there. To reduce this gap, the authority has planned to encourage the change of crops, zero tillage and micro irrigation.

To review the progress of the district water resources, plan 2022-25 is being prepared by all 22 districts in Haryana. HWRA chairperson Keshni Anand Arora Monday held a meeting with the superintending engineers of the irrigation and water resources department.

During the meeting, the chairperson reviewed the three-year action plan in order to reduce the water gap by 45 per cent in three years — 10 per cent in the first year, 15 per cent in the second year and 20 per cent in the third year — in water depleted as well as waterlogged areas. Arora lauded the efforts made by the district administration of Yamunanagar and Ambala “which are leading in their efforts”.

Atal Bhujal Yojana’s Haryana project director Satbir Singh Kadian said the districts have been instructed to complete the formulation of the district water resources plan by October 24 this year. According to the data compiled by the groundwater cell of the state irrigation department sourcing it from field units and Central Ground Water Authority, nearly 41 per cent of villages of the state have been found in the category of “groundwater stressed”, while 18 per cent have been found in the classification of “potential groundwater stressed”.

Original Article: Indian Express

World Bank steps in to mediate India-Pak water dispute

The World Bank announced the beginning of two parallel legal processes to address Pakistan’s concerns over two hydropower projects on the western rivers by India in violation of the Indus Basin Treaty, breaking a six-year-old gridlock.

The World Bank, which brokered the I960’s Indus Basin Treaty took a complex path after Islamabad and New Delhi could not build consensus on any single mechanism for the dispute resolution, given in the treaty, The Express Tribune reported.

“In line with its responsibilities under the Indus Waters Treaty, the World Bank has made the appointments. in the two separate processes requested by India and Pakistan in

relation to the Kishenganga and Ratle hydroelectric power plants," the bank said in a statement.

India had requested for appointment of a 'Neutral Expert', while Pakistan opted for Court of Arbitration.

In response, Michel Lino has been appointed as the Neutral Expert and Professor Sean Murphy has been appointed as Chairman of the Court of Arbitration, according to the World Bank.

They will carry out their duties in their individual capacity as subject matter experts and independently of any other appointments they may currently hold, it added.

"The Court of Arbitration has the authority to give a stay order, while the Neutral Expert does not have such powers," Syed Meher Ali Shah, Pakistan's Indus Commissioner, told The Express Tribune.

"The World Bank acted after Pakistan and India could not develop consensus on any single process," he added.

In 2016, Pakistan asked the World Bank to facilitate the setting up of a Court of Arbitration to look into its concerns about the designs of the two hydroelectric power projects. India asked for the appointment of a Neutral Expert for the same purpose.

The matter remained lingering for the past six years.

The requests from both Pakistan and India came after the Permanent Indus Commission remained engaged in discussions on the matter for a while, The Express Tribune reported.

In recent months, Pakistan's Executive Director to the World Bank, Naveed Kamran Baloch, also played an effective role in convincing the bank to accept Islamabad's position.

Earlier, in 2018, the World Bank had asked Pakistan to withdraw its request for the Court of Arbitration.

"The World Bank continues to share the concerns of the parties that are carrying out the two processes concurrently posing practical and legal challenges," said the statement.

"The World Bank is confident that the highly qualified experts appointed as Neutral Expert and as members of the Court of Arbitration will engage in fair and careful consideration of their jurisdictional mandate, as they are empowered to do by the Treaty," it added.

The 1960 Treaty says that the Court of Arbitration can be formed when one or both the parties give "opinion (that) the dispute is not likely to be resolved by negotiation or mediation".

The two countries disagree whether the technical design features of these two hydroelectric plants contravene the Treaty.

The disagreement between India and Pakistan concerns the design features of the 330-megawatt Kishenganga, built on Jhelum River and the 850p-megawatt Ratle hydropower project, being set up over Chenab River.

India inaugurated the Kishenganga project in 2018, while work on the Ratle project began a few months ago, The Express Tribune reported.

However, if any party unilaterally builds a project, it carries all types of risks. The World Bank's decision to take six years to begin the legal processes provided an opportunity to India to complete the Kishenganga project.

The Treaty designates these two rivers, as well as the Indus, as the "Western Rivers" to which Pakistan has unrestricted use with some exceptions.

Under the Treaty, India is permitted to construct hydroelectric power facilities on these rivers, subject to constraints specified in Annexures.

The World Bank says that as a signatory to the treaty, its role is limited and procedural.

In particular, its role in relation to "differences" and "disputes" is limited to the designation of individuals to fulfil certain roles in the context of Neutral Expert or Court of Arbitration proceedings when requested by either or both of the parties.

The World Bank has said in the past that it worked to seek an amicable resolution and multiple high-level meetings were convened and a variety of proposals were discussed.

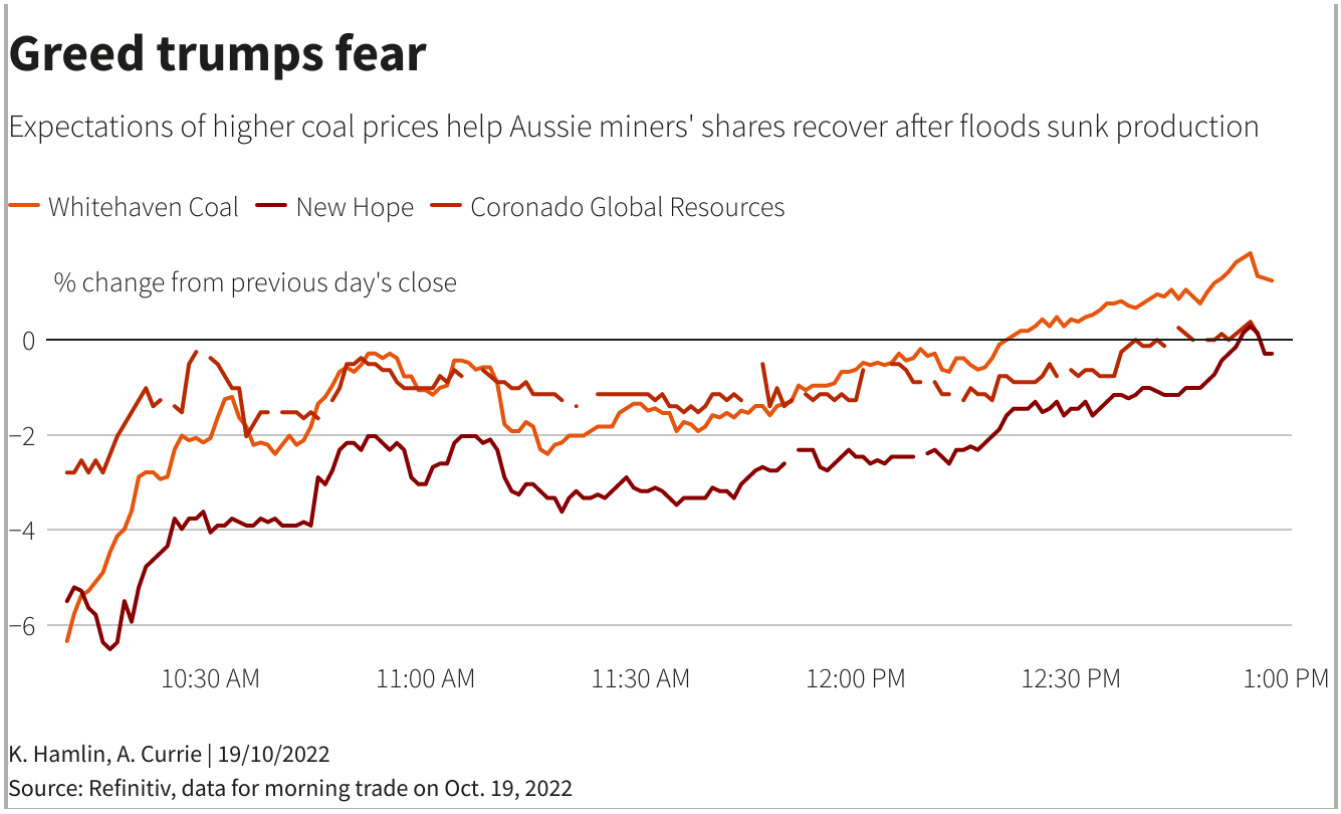
Original Article: The Siasat Daily by P N Sree Harsha

Water risk powers fear-then-greed coal trade

Shareholders have found a distressing silver lining to the floods that have been pounding eastern Australia. On Wednesday Whitehaven Coal (WHC.AX) revealed that its production fell 37% in the three months to the end of September compared to the same period last year in large part because rain cut off access to three of its mines for days at a time. Investors immediately sent stock in both the company and rival New Hope (NHC.AX) sinking 6% or more.

That's despite excessive rainfall being a regular feature in the region over the past couple of years thanks to La Niña weather conditions. Such indifference to water risk in the energy sector is common, with scarcity causing problems with hydropower, and few paying attention to green hydrogen's H2O needs.

This time, though, investors quickly worked out the other side of the trade: a drop in coal supplies that is likely to push prices even higher than the record A$581 ($376) a tonne Whitehaven reaped last quarter. Not only did that erase the losses, Whitehaven shares were up almost 2% in afternoon trading. While good news for miners, it's yet more bad news for a world in the middle of an energy crisis. (By Antony Currie)



Original Article: Reuters

Mexico to invest US$200mn in damaged water infra in Baja California

Mexican water authority Conagua has been granted 4.4bn-peso (US$200mn) in federal government funds to invest in reconstructing water infrastructure in three municipalities of Baja California Sur state.

The works are required after heavy rainfall caused by Hurricane Kay led to significant damage in early September. The government declared a natural disaster in Comondú, La Paz and Mulegé municipalities later in the month.

According to the finance ministry's investment portfolio, the funds will be allocated this year, following the urgent request submitted by Conagua.

Requests for funds from the federal government usually include detailed information on how and on what the resources will be spent, but this one only specifies that funds will be used for reconstruction works for water systems in the three municipalities.

The money is scheduled to be spent this year, according to the ministry.

Original Article: BN Americas

Anglian Water fined £1.2m for causing pollution

Anglian Water has been fined more than £1.2m after admitting causing pollution in three counties.

System and maintenance failures led to incidents in Cambridgeshire, Buckinghamshire and Northamptonshire in 2019, the Environment Agency (EA) said.

In a separate case, a pumped sewer in Cambridgeshire burst in 2019, the sixth time in several years.

Anglian Water pleaded guilty to charges in both cases, brought by EA and heard by magistrates.

The company was fined £870,000 by Loughborough magistrates on Wednesday after a series of process failures "caused damaging blockages and pollution" between May and September, EA said.

After one particular incident, a subsequent biological survey showed dead aquatic invertebrates for 1,500m (4,921ft), the agency added.

At another site, an unchecked build-up of cotton buds and sanitary pads caused a blockage, resulting in discharge of "settled sludge" into the treated sewage, EA said.

The company admitted failing to comply with an environment permit condition in Steeple Claydon, near Buckingham.

It also pleaded guilty to failing to comply with permit conditions over final effluent discharges into the River Lark in Cambridgeshire and over water discharge activity into the River Tove in Northamptonshire.

The company also admitted causing poisonous, noxious, or polluting matter to enter inland freshwaters without an environmental permit and was fined £350,000 by Cambridge magistrates on Thursday.

The Environment Agency said officers visiting a pumped sewer at Bourn Brook in Caldecote, near Cambridge, found ammonia and low oxygen levels in the water, posing a potential risk to wildlife at the site.

Anglian Water's methods of preventing pollution spreading "proved insufficient", the agency added, and 4km (2.4 miles) of the watercourse was affected for at least five days.

The company only located air valves, designed to reduce stress on the sewer, after the incident took place. The valves had been in place for at least 25 years, EA said.

Original Article: BBC News

Jersey Water prices to increase by 6% from January

Jersey Water is increasing its charges by 6% from January 2023.

The firm said it was equivalent to an increase of about £23 per year for the average household.

Helier Smith, Jersey Water's chief executive, said it was because of increased costs caused by Brexit, the Covid pandemic and the war in Ukraine.

The firm added there would be no further increases in Jersey Water's prices until January 2024.

Mr Smith said: "Like many businesses we are experiencing sizeable increases in our operating costs including energy, raw materials, labour, transport, and financing.

"These cost increases are driven by factors outside of our control including the effects of Brexit, Covid and the war in Ukraine on supply chains and financial markets.

"We have been actively doing what we can to shield customers from these increases.

"However, it is essential that Jersey Water maintains its capacity to invest in the island's water supply infrastructure."

Jersey Water urged any customers concerned about paying their bills to contact the customer services team.

Original Article: BBC News

Drought threatens England's fruit and vegetable crop next year, says report

Farmers have warned they will not be able to grow crops next year if predictions that the drought will last until next summer prove accurate.

Leaked slides from a national drought group meeting, seen by the Observer, show there are concerns that because reservoirs are still empty due to record dry conditions, the fruit and vegetable supply chain could collapse.

They read: "If reservoirs cannot be filled during the winter 2022/23, which it is felt could be a possibility, this would have serious implications for businesses, the supply chains and those employed within them.

"Confidence is needed by the sector to have access to water to enable cropping plans to be enacted. Where confidence is not available, cropping rotations are being reviewed and reductions in areas of irrigated crops/water hungry crops are being undertaken."

At the meeting, attended by the Environment Agency, water companies, farmers and other groups, there were warnings that it was unlikely that there would be enough rainfall to refill reservoirs and enable normal river flows by next year.

On Friday, the government announced that the drought in England was expected to last for many months, with further restrictions on water use under consideration.

Though rainfall levels were average across most of the country in September, this was not enough to dampen the soil and refill reservoirs after a dry and scorching summer.

Consistent above-average rainfall is needed throughout the autumn and winter to bring England out of drought, and this is not likely.

This could spell disaster for the agriculture sector, which has already faced reduced yields for crops including potatoes and barley.

The National Trust, also at the meeting, warned that its sites were running out of water. It said that this would impact its aims to meet net zero carbon emissions as tree planting was a large part of the strategy. It said there would probably be fewer flower displays in its gardens next year.

Tom Bradshaw, the National Farmers' Union's deputy president, said: "As the irrigation season is coming to a close and attention is turned to winter abstraction for storage reservoir fill, we have been working with the Environment Agency to further support the industry through these challenging times, with flexible abstraction measures being provided.

"However, more needs to be done to provide short-term certainty that water will be available for food production for the next growing season."

Reservoirs across the country are currently at exceptionally low levels. Only one major reservoir in the country is assessed to be at normal water level for this year, with most others notably or exceptionally low.

The situation is particularly bad in Devon and Cornwall.

South West Water drought director Jo Ecroyd told the BBC that the region had experienced some of the driest weather for 130 years.

Currently, the water levels at Colliford Lake in Cornwall are at about 20%, according to the South West Lakes Trust. Roadford Lake, which can store up to 34,500 megalitres, is currently at 38% capacity.

Overall the company's water storage is at 31.5% capacity.

Millions in the London and Oxfordshire areas could be placed under severe restrictions in coming months because the data also revealed that Thames Water is considering non-essential use bans.

There can be no more hiding, and no more denying. Global heating is supercharging extreme weather at an astonishing speed. Guardian analysis recently revealed how human-caused climate breakdown is accelerating the toll of extreme weather across the planet. People across the world are losing their lives and livelihoods due to more deadly and more frequent heatwaves, floods, wildfires and droughts triggered by the climate crisis.

Original Article: The Guardian by Helena Horton