

Veles Water Weekly Report

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VelesWater



WATER FUTURES MARKET ANALYSIS

Welcome to ***WATERTALK***

by Joshua Bell

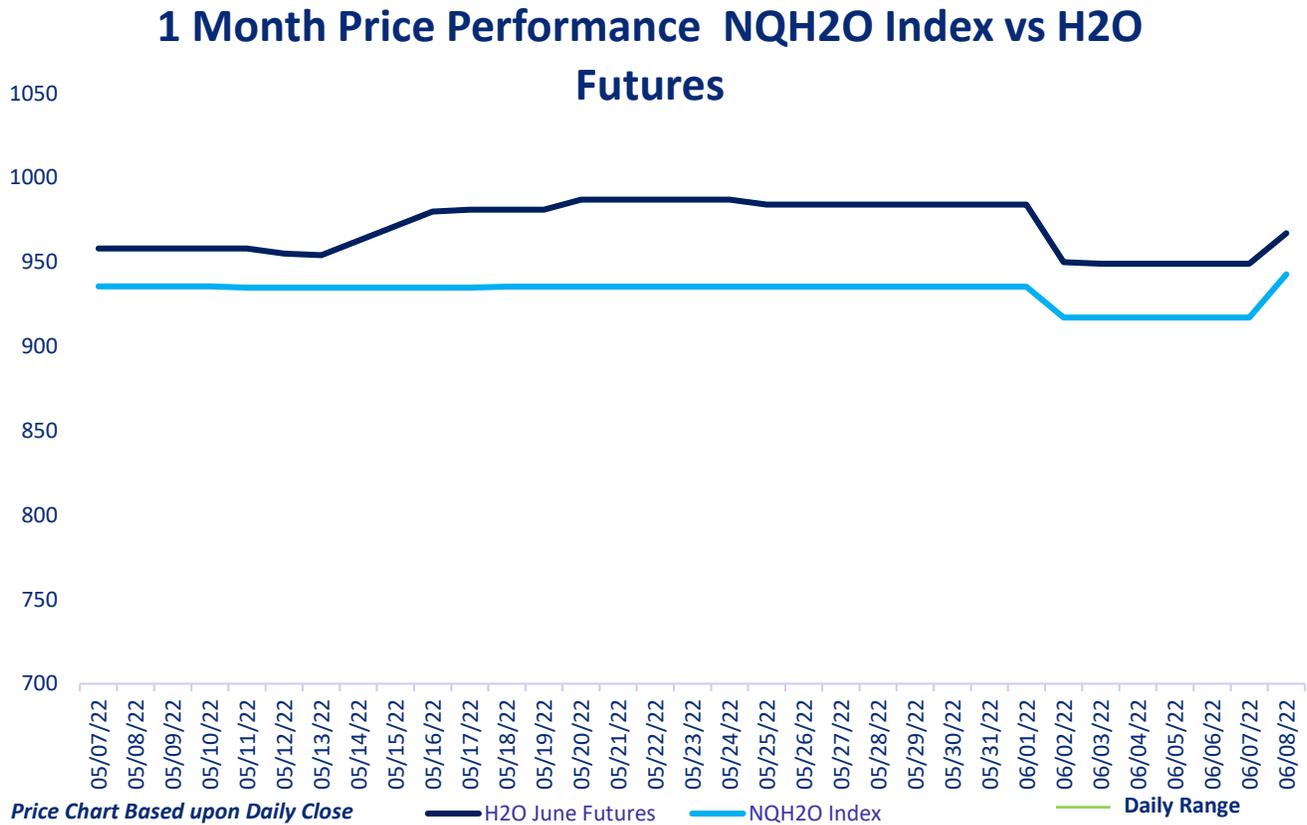
CLICK THE LINK BELOW

"A 2 minute technical analysis video of H2O futures"

<https://vimeo.com/718593782>



NQH2O INDEX PRICE vs H2O FUTURES PRICE



The new NQH2O index level of \$942.74 was published on the 8th of June, up \$25.66 or 2.80%, which sets a new all time high. Over the past week the June contract had been trading at a premium of +\$24.26- \$31.92.

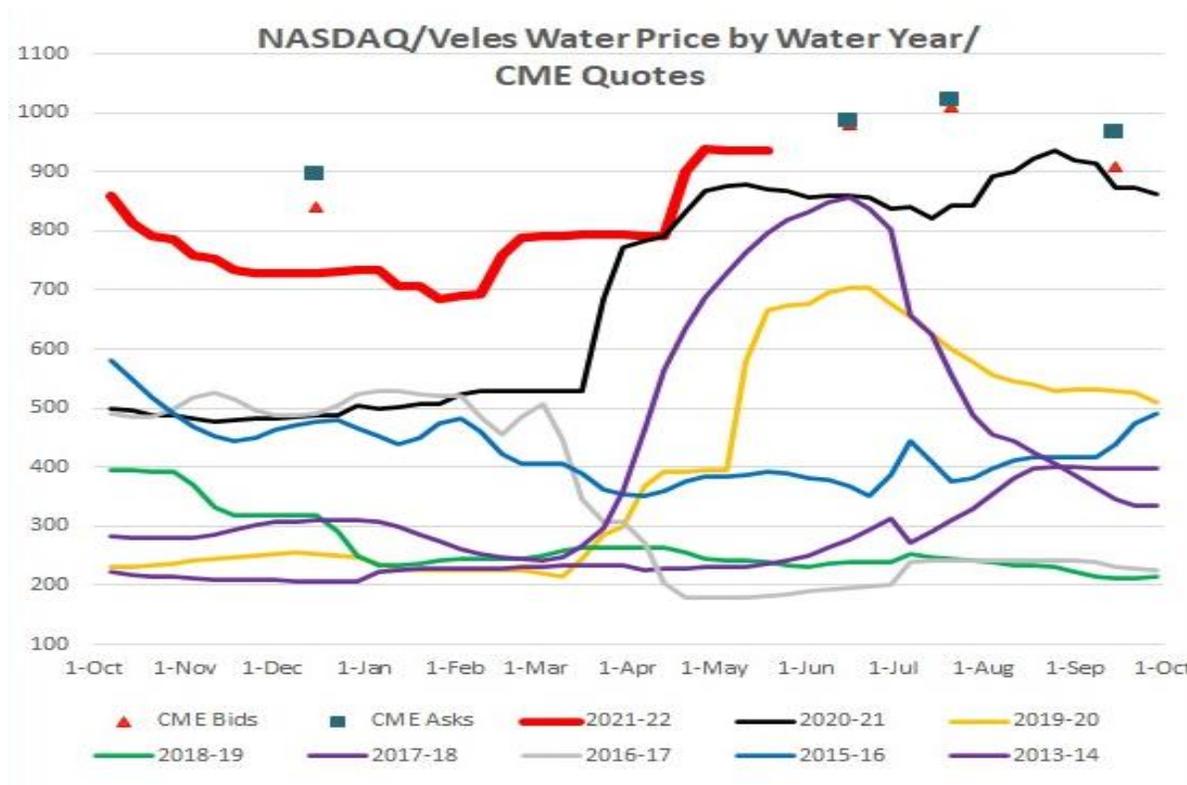
NQH2O is up 33.46% Year to Date.

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

June 22	946@974
July 22	985@1065
Sept 22	905@973
Dec 22	835@924
Jun 23	1025@1075



NQH20 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.

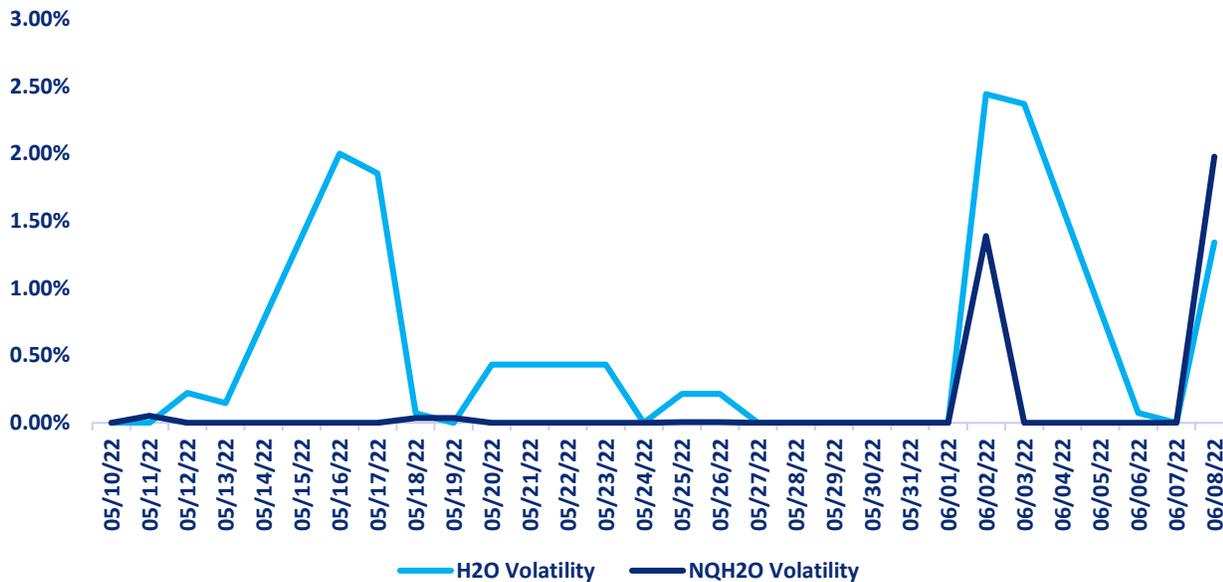
The graph for 2021 is highlighted in red. It shows the same seasonal climb, but at record-high values above each of the last eight years since February. Current bids and offers in the market are still higher than historic prices showing that expectations are that this is an exceptionally dry year and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



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H2O FUTURES AND NQH2O INDEX VOLATILITY ANALYSIS

Daily H2O Futures Volatility vs Daily NQH2O Index Volatility



DAILY VOLATILITY

Over the last week the June daily future volatility high has been 2.37% on June 3rd and a low of 0% on the 7th June.

ASSET	1 YEAR (%)	2 MONTH (%)	1 MONTH (%)	1 WEEK (%)
NQH2O INDEX	21.81%	12.62%	3.91%	4.762%
H2O FUTURES	N/A	11.91%	4.97%	4.33%

Mixed signals for the week ending on the June 8th the two-month futures volatility is at a discount of 0.71% to the index, up 0.19% from the previous week. The one-month futures volatility is at a premium of 1.06% to the index, down 1.57% from last week. The one-week futures volatility is at a discount of 0.43% to the index, a reversal of 1.91% from the previous week.

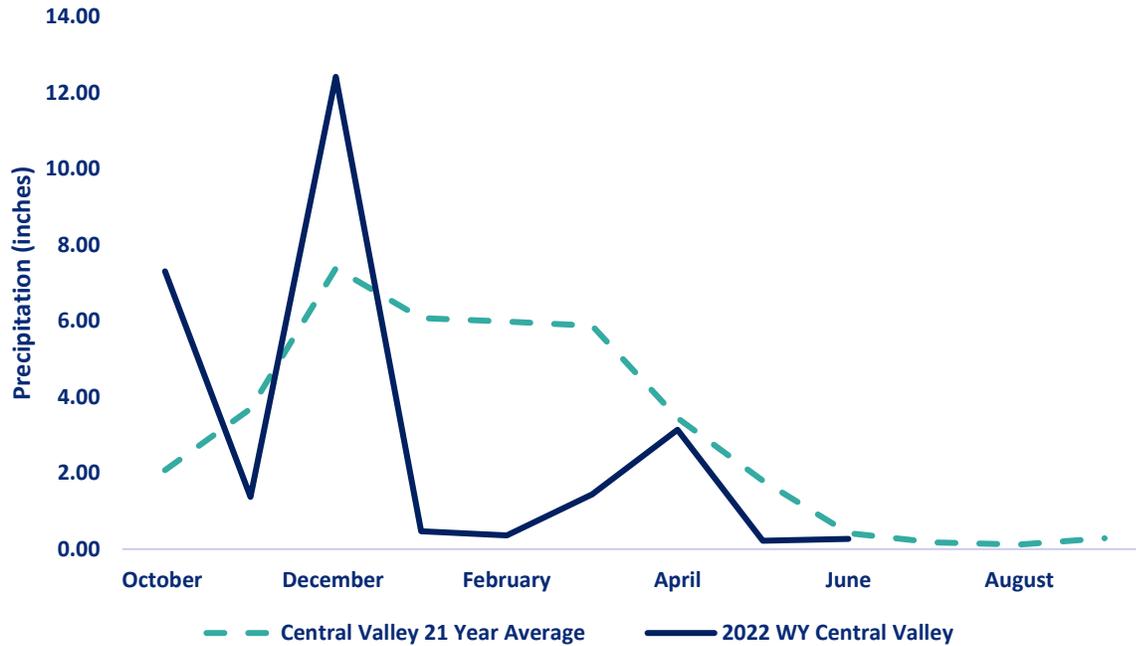
*Above prices are all **HISTORIC VOLATILITIES** and **IMPLIED VOLATILITIES** will be introduced once an options market has been established. All readings refer to closing prices as quoted by CME.*

VELES WATER WEEKLY REPORT

CENTRAL VALLEY PRECIPITATION REPORT



Central Valley Precipitation Index



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

STATION	MTD (INCHES)	WEEK ON WEEK CHANGE (INCHES)	% OF 20 YEAR AVERAGE MTD	2022 WYTD VS 2021 WYTD %	2022 WY VS 20 YEAR AVERAGE TO DATE %
SAN JOAQUIN 5 STATION (5SI)	0.04	0.04	12.48	47	63
TULARE 6 STATION (6SI)	0	0.00	0.00	35	58
NORTHERN SIERRA 8 STATION (8SI)	0.76	0.76	98.28	45	79
CENTRAL VALLEY AVERAGE	0.27	0.27	36.92	42	67

RESERVOIR STORAGE

RESERVOIR	STORAGE (AF)	% CAPACITY	LAST YEAR % CAPACITY	HISTORIC ANNUAL AVERAGE CAPACITY %
TRINITY LAKE	737,985	30	51	38
SHASTA LAKE	1,815,129	40	42	48
LAKE OROVILLE	1,891,534	53	37	68
SAN LUIS RES	898,961	44	41	67

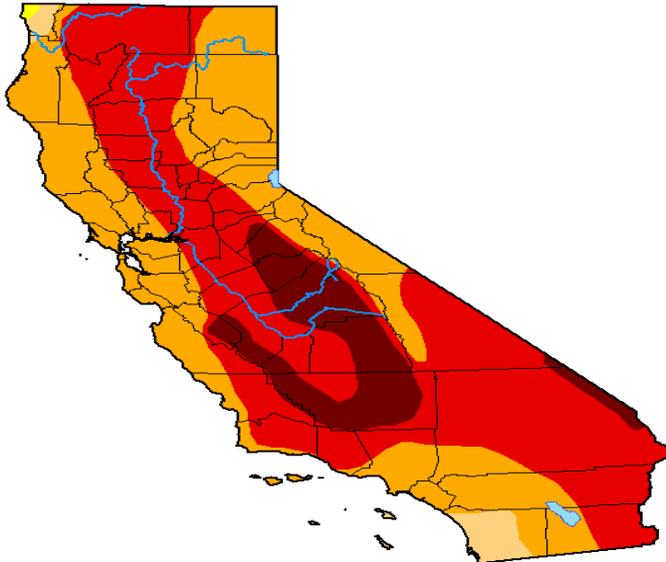
Reference: [California Water Data Exchange](https://www.waterdataexchange.com/)

VELES WATER WEEKLY REPORT DROUGHT MONITOR



U.S. Drought Monitor California

May 31, 2022
(Released Thursday, Jun. 2, 2022)
Valid 8 a.m. EDT



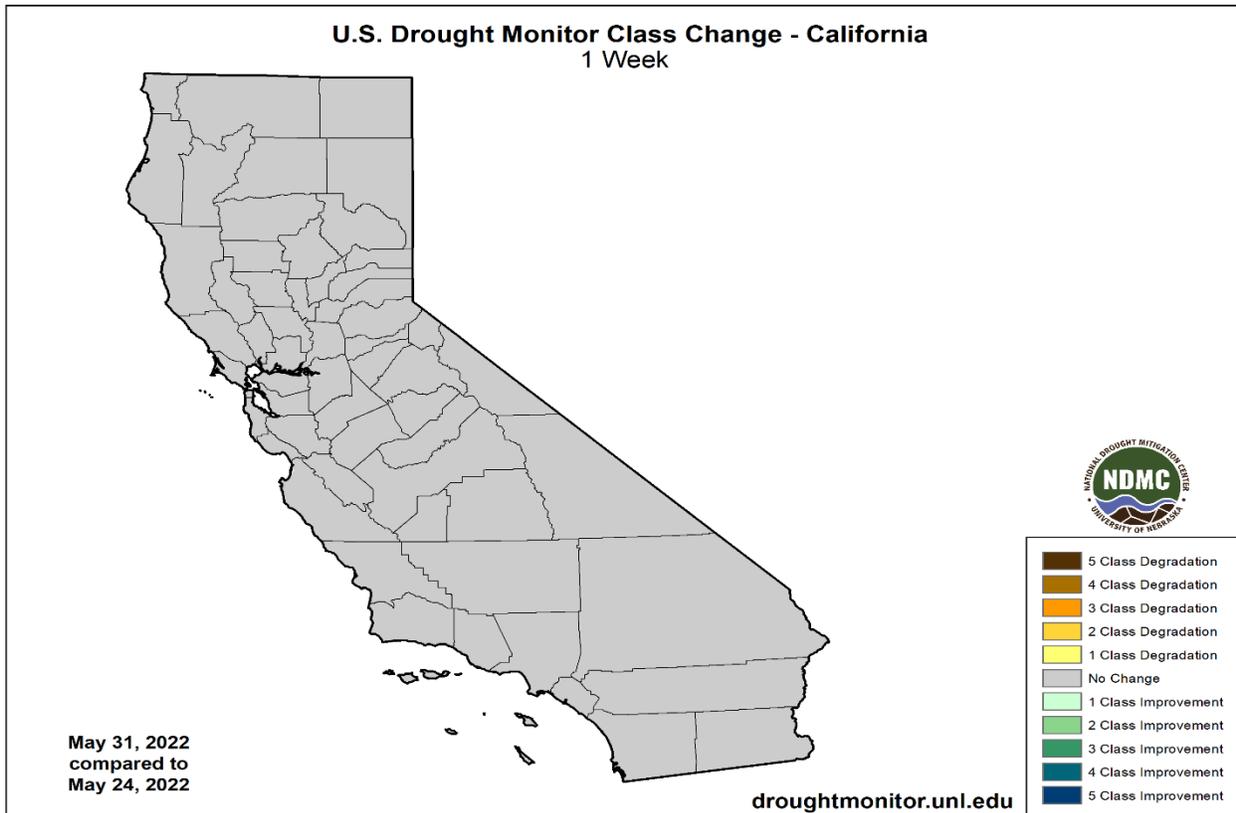
Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	99.86	97.56	59.81	11.59
Last Week 05-24-2022	0.00	100.00	99.86	97.56	59.81	11.59
3 Months Ago 03-01-2022	0.00	100.00	100.00	86.98	12.82	0.00
Start of Calendar Year 01-04-2022	0.00	100.00	99.30	67.62	16.60	0.84
Start of Water Year 09-29-2021	0.00	100.00	100.00	93.93	87.88	45.66
One Year Ago 06-01-2021	0.00	100.00	100.00	94.61	74.46	26.04

Intensity:
 None (White) D2 Severe Drought (Yellow-Orange)
 D0 Abnormally Dry (Yellow) D3 Extreme Drought (Red)
 D1 Moderate Drought (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:
Curtis Riganti
National Drought Mitigation Center



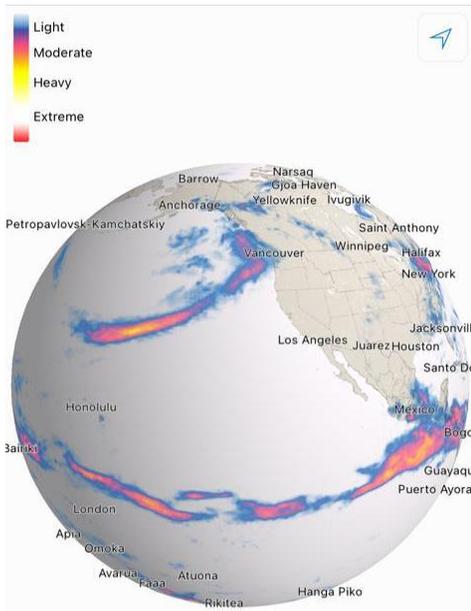
The US Drought Monitor release their statistics with a 1-week lag to this report. Over the past week the has been 0% change in Drought conditions in California.

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



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CURRENT SATELLITE IMAGERY



Map: Dark Sky

The current satellite picture shows a significant frontal system approaching the North Western US making landfall in the next few days.

This will bring precipitation to the Northwestern US and some precipitation is expected in Northern California. The greater portion of the West and Mid west appears dry at present.

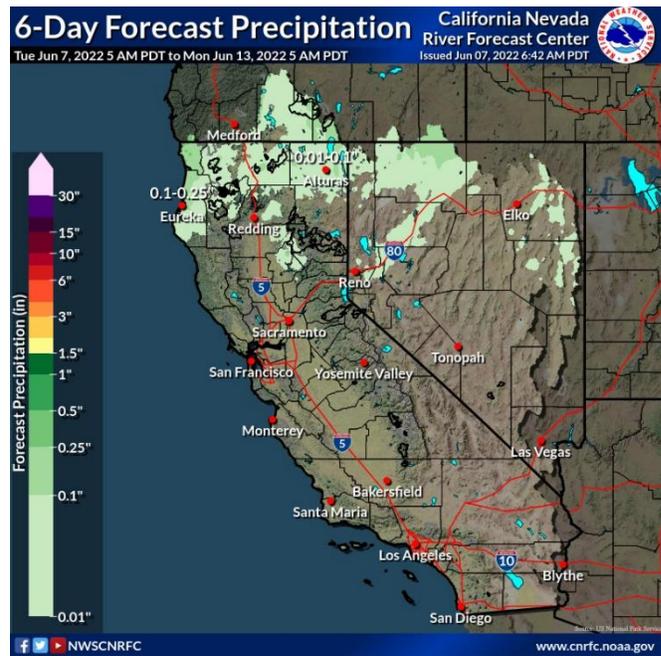
There is a scattered cloud activity and precipitation activity from Jacksonville spreading Northwards with more concentrated conditions from New York to Halifax in Canada.

There is no Monsoon activity showing at present but we are expecting this to start in next few months .

10 Day Outlook

the trend for the latter half of the week will be building high pressure across the interior bringing dry conditions and temperatures above normal for this time of year. Currently looking like anomalies of 10- to 20-degF except for coastal locations peaking on Friday...before the overall pattern shifts again. For the weekend...the high pressure ridge will be displaced downstream over the Plains states...while a s/wv trof approaches the west coast. Currently... some differences in the models in terms of the depth of the system. Cooling will occur by the end of the weekend into early next week...while some light precipitation will be possible across portions of northern CA and the upper Klamath River basin over into far northern NV.

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





WESTERN WEATHER DISCUSSION

Localized heavy precipitation fell across mainly the northern half of the West region this week, leading to a few areas of improvements. Drought areas in southwest and northeast Oregon, central Idaho, northern Nevada, and northern Utah saw some local improvements as drought indices responded to recent precipitation. As mentioned in the High Plains section, widespread improvements were made in southern Montana after heavy precipitation fell there, with localized amounts of 5 inches or more. Recent precipitation also allowed for some improvements in northeast Montana. Despite these improvements, widespread severe, extreme, and some exceptional drought continued across the West. Impacts from the widespread drought include reduced grazing for cattle in New Mexico due to wildfire closures in national forests and hydropower production concerns at reservoirs in Nevada and California due to very low water levels.

Reference:

Curtis Riganti, National Drought Mitigation Center
Richard Tinker, NOAA/NWS/NCEP/CPC



VELES WATER WEEKLY REPORT

WATER NEWS

CALIFORNIA WATER NEWS

California Department of Water Resources (DWR) Encourages Counties, Communities to be ‘Well Prepared’ to Support Dry Drinking Water Wells

As California continues to experience climate-driven severe drought conditions, the Department of Water Resources (DWR) is providing tools and resources to help communities and domestic well owners prepare for potential well outages and other drought impacts.

“Being ‘Well Prepared’ means that state and local agencies and well owners have an understanding of local groundwater conditions, can identify areas where drinking water supplies may be threatened, and know how to access assistance when it is needed,” said Paul Gosselin, DWR Sustainable Groundwater Management Deputy Director. “To meet the challenges of this current drought and future droughts, DWR is providing new and updated tools to help county drought leaders develop informed solutions that work best for their local communities.”

DWR, in coordination with the State Water Resources Control Board, has launched a new Dry Well Susceptibility Tool that identifies areas in groundwater basins across the state that may be prone to domestic well outages. This tool has been developed as a resource for local monitoring and early warning to help increase general awareness of where domestic water wells may be susceptible to going dry to help communities proactively plan for potential well outages.

DWR has also updated its Dry Well Reporting System, a user-friendly online system for reporting incidents of household drinking water wells that have gone dry due to drought impacts. The Dry Well Reporting System was originally developed during the 2012-2016 drought and based on feedback from counties, the system has been updated to directly and immediately notify local agencies, including county officials, water agencies, and GSAs, when household water supply well outages are reported in their region.

In addition to assisting with drought planning and response, both of these tools have value for local well permitting agencies and groundwater sustainability agencies (GSAs) as they navigate new well permitting requirements contained in Action 9 of Governor Gavin Newsom’s Drought Executive Order N-7-22, and new drought planning requirements contained in Senate Bill 552, passed by the Legislature last year.

With the hotter, drier summer months ahead, California is committed to planning ahead and tracking ongoing impacts of drought and working together with local governments and agencies to identify solutions to protect the health and safety of our communities.



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“We cannot let our guard down when it comes to preparing for drought conditions and conserving water,” Gosselin said. “DWR will continue to invest in the latest technologies and data to help the state and locals prepare for and act to protect communities from dire impacts of drought.”

Original Article: [Sierra Sun Times by DWR](#)

California seeks to rein in water usage by closing a nearly two-month gap in getting data from suppliers

In response to prolonged drought across the West and ahead of the scorching summer months, California is asking its urban water suppliers to voluntarily report water consumption data sooner -- so the state can better assess whether its water conservation goals are being met.

Years of low rainfall and snowpack coupled with more intense heat waves have fueled the state's historic, multiyear drought conditions, rapidly draining its reservoirs.

Now California Gov. Gavin Newsom has responded by calling on local water agencies to submit water usage data by the third business day of every month -- or sooner -- in a bid to measure water conservation goals accurately and to foster greater transparency.

The California State Water Resources Control Board requests that water suppliers submit data outlining their monthly water production, the population served and the percentage of residential use earlier than usual.

As it stands, the state's suppliers have been required to share the data by the 28th of the following month. For instance, water-use data for the month of April were not submitted until the end of May and were not available to policymakers until June.

In a message to water suppliers, state water officials wrote, "access to current water consumption data is essential to state and local management of the drought emergency."

Last summer, Newsom pleaded with residents and businesses to voluntarily reduce their water consumption by 15%. But by the end of March, urban water usage was up by 19% compared to March 2020, the year the drought began. It was the highest March water consumption since 2015, the State Water Resources Control Board reported.

In March, Newsom issued an executive order addressing the state's dire drought conditions. In response, the water board banned watering turf at commercial, industrial and institutional properties, excluding turf grass used for recreation or community purposes.

California's drought emergency now covers all 58 counties as the state is pushing into its third year of the megadrought. The board pointed to the worsening conditions, with the largest reservoirs in the state currently at half their historical averages.

This year, the state faced the driest January, February and March since California started keeping records more than 100 years ago, the board noted.



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Facing back-to-back dry years and record-breaking heat waves pushing the drought into historic territory, California got a taste of the rain it was looking for in early fall last year, when the first big storm of the season pushed onshore in October.

Then, in late December, more than 17 feet of snow fell in the Sierra Nevada, which researchers said was enough to break decades-old records.

But suddenly precipitation flatlined in January, and water content in the state's snowpack this year was just 4% of normal by the end of winter.

Because of this, the state's two largest reservoirs -- Shasta Lake and Lake Oroville -- were also at "critically low levels" in May, the point of the year when they should be the highest.

In Southern California, water district officials announced unprecedented water restrictions, demanding businesses and residents in parts of Los Angeles, Ventura and San Bernardino counties to cut outdoor watering to one day a week, which began June 1.

Original Article: [CNN by Stephanie Elam and Rachel Ramirez](#)

California orders thousands of farms and cities, including San Francisco, to stop pumping water during drought

In one of the most far-reaching efforts to protect California's water supplies this year, state regulators on Tuesday ordered thousands of farmers, irrigation districts and municipal water agencies, including the city of San Francisco, to stop making draws from rivers and creeks.

The move, which comes amid a third year of the California drought, forces water users, from individual landowners to utilities serving tens of thousands of people, to turn to alternative sources of water, if they have it. Some growers and small water providers without a backup supply may be forced to go without water entirely.

The action marks an unusually extensive application of the state's water rights system, a policy that reserves California's limited flows for those with the most senior claims to water. Officials with the powerful State Water Resources Control Board said they needed to push in to the system because there's simply no longer water for everyone. Erik Ekdahl, deputy director of the agency's Division of Water Rights, called the restrictions — known as curtailment orders — “significant” and “very deep.”

The orders, effective Wednesday, apply to those with lesser water rights in the sprawling Sacramento and San Joaquin river watersheds, basically inland areas from the Oregon border to Fresno. The extent of the water rights affected varies by location, but state records show that a total of 4,252 rights will be curtailed, including those of 212 public water systems.



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For the large public agencies, including the San Francisco Public Utilities Commission, which provides water to San Francisco and several suburban communities in the Bay Area, the curtailment means leaning on groundwater, waterways that are not restricted or water held in storage.

Although the curtailments prevent water in rivers and creeks from being diverted into reservoirs, water that's already in storage, which is a primary source of water for the big utilities, is not affected. The SFPUC maintains water in several reservoirs in and around Yosemite National Park, most of which are now near full.

Officials with the SFPUC had not yet received their orders from the state water board as of Tuesday afternoon. They declined to comment until they had.

While the curtailments may have little immediate impact on the city's water supply, San Francisco officials have been critical of past efforts to limit water rights, specifically rights from 1914 and older, which are considered senior. Many senior rights holders don't think the state has authority to restrict such claims and don't want to see the state set a precedent of curtailing them. Three of San Francisco's pre-1914 water rights, all along the Tuolumne River, are affected by the new orders.

The biggest toll of the curtailment will be on farmers, particularly those in the San Joaquin Valley, the state's agricultural heartland. Only a small number of water rights holders are being restricted in the Sacramento Valley, to the north, whereas in the San Joaquin Valley, some with water rights dating back to 1900 are cut off.

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

Parts of Southern California used 26% more water in April, despite conservation pleas

Coastal Southern California increased water usage by more than 25% for the month of April, lagging behind most other parts of the state in conservation and appearing to dismiss dire warnings of supply shortages.

According to data released Tuesday by the State Water Resources Control Board, cities and towns in the South Coast hydrologic region — an area that includes Los Angeles and more than half the state's population — used 25.6% more water in April than in April 2020, the first year of the current drought.

Statewide, urban residents used 17.6% more water, marking a small decline from March, but still far less than what officials say is needed to weather a historic drought.

The poor numbers in Southern California put more pressure on residents to follow sweeping water restrictions that went into effect on June 1, and were ordered by the Metropolitan Water District.

"These are not the numbers we wanted to see, and they are not the numbers we need to see," MWD general manager Adel Hagekhalil said in a statement Tuesday. "We are in an unprecedented situation, where our water supplies from the State Water Project are



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so limited by drought and climate change that they do not meet demands. Southern Californians must decrease their water use. I know we can do it.”

Dozens of water agencies, including the Los Angeles Department of Water Power, reduced residents to either one- or two-day-a-week outdoor watering in response to the MWD’s order.

But while those numbers have yet to be reported, some signs are pointing in the wrong direction. The cumulative savings from last July — when Gov. Gavin Newsom called on Californians to voluntarily cut water use by 15% — to the end of April were just 2%, officials said.

A statement released by Newsom’s office described the latest conservation numbers as “disappointing” and warned that stronger measures were on the table.

“The governor has made it clear that if we do not start seeing increased conservation across the state there may be a need to move to mandatory state water conservation measures,” the statement read. It noted also that California was heading into summer with below-average reservoir storage and nearly no Sierra snow.

During California’s last severe drought, then-Gov. Jerry Brown imposed statewide cuts to relative success. This time around, officials had been hoping to delegate control to local and regional agencies, with clearly mixed results. While the South Coast’s numbers were disheartening, the Colorado River hydrologic region in the southwestern part of the state did even worse, with a reported usage increase of nearly 41% in April.

Original Article: [Los Angeles Times by Hayley Smith](#)

As Drought Lingers, CA Considers \$1.5 Billion to Buy Farm Water Rights

A proposal to use up to \$1.5 billion to purchase farmer’s senior water rights has made its way into the budget negotiations between lawmakers and Governor Gavin Newsom, the Associated Press reports.

It comes at a time when 98 percent of the state is experiencing a severe drought and is part of the larger \$7.5 billion Water and Drought Package “to build a climate resilient water system.” In addition to the buy-back program, the package also includes \$500 million for the Department of Conservation “for acquisition and repurposing of lands to implement the Sustainable Ground Water Management Act,” \$1.5 billion to ensure Californians have safe drinking water, and \$1.5 billion for Drought Resilient Water Supply grants.

Water shortages continue to plague the California, even as statewide water consumption increased by 18 percent in April, the Los Angeles Times reports. And agriculture truly is Big Agriculture in a state that would rank as the world’s fifth largest economy if it were its own country, with a GDP of almost \$3 trillion. So, the proposal faces opposition.



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“This makes my blood boil,” is how state Sen. Brian Dahle put it, according to the AP. “It’s ridiculous. You are forcing them into a corner where they have no other option.”

California produces almost 50 percent of U.S.-grown fruits, nuts, and vegetables, and is the only state to export commodities such as almonds, artichokes, dates, and walnuts. Farmers are allocated water for their crops each year through a complicated governing system based on seniority, according to AP. California’s water can’t be owned, “but permits, licenses, and registrations give individuals and others the right to beneficially use reasonable amounts of water.”

How the state would go about buying up \$1.5 billion of land associated with water rights remains to be determined, but some say it’s not all that substantial—and that the benefits could be much greater.

“The \$1.5 billion may sound like a lot of money but it’s not a lot in the grand scheme of things,” John McManus, executive director of Golden State Salmon, told CBS Sacramento. “We’re talking about the possibility of providing a small amount of additional water to keep species currently on life support from going extinct and hopefully to rebuild the population.”

Original Article: [LA Magazine by Laurenz Busch](#)

California Water & Irrigation Cuts and Food Production Creates Jobs

Regulations, adopted by the California State Water Resources Control Board, require local water agencies to impose restrictions to make up for potential 20% shortfalls.

Meanwhile, California farmers are getting no water deliveries from the federal Central Valley Project and only a 5% allocation from the State Water Project.

The production, processing, storage, transportation, and marketing of farm and food products headed for export markets support a large number of jobs throughout the U.S. The USDA’s Economic Research Service says in 2020, U.S. ag exports supported the equivalent of more than 1.13 million jobs on and off the farm.

With U.S. ag exports valued at more than \$150 billion in 2020, every \$1 billion in exports creates 7,550 jobs.

The USDA announced the framework to transform the food system and supply chain to provide more options, increase access, and create new, more, and better markets for small and mid-size producers.

As the pandemic evolved and Russia's war in Ukraine caused supply chain disruptions, USDA says it became clear we “cannot go back to the food system we had before.”

USDA plans to build a more resilient food supply chain that provides more and better market options for consumers and producers while reducing carbon pollution.

Original Article: [Ag Info by Bob Larson](#)



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State Water Board approves historic Russian River water sharing agreement

The State Water Resources Control Board on Tuesday approved a groundbreaking agreement that allows “senior” water rights holders in the upper Russian River watershed to share their supply with junior rights holders whose claims might otherwise be suspended due to drought.

The collaborative, community-first approach, negotiated over many months by agricultural, municipal, tribal and other stakeholders in the region, is the first of its kind to try to bring balance to the allocation of scarce water supplies in a state governed by what one board member called an “inherently inequitable” water rights system.

Instead of relying on the century-plus-old “first in time, first in right” system, through which younger water rights can be fully curtailed while senior rights are left completely whole, the voluntary framework approved Tuesday allows neighbors to support each other through hard times, supporters say.

Any senior water rights holder who participates will be agreeing to forgo some of their water so that junior water rights holders can at least have a minimal amount to sustain their agricultural interests or other needs.

The five-member board, which approved it unanimously, lauded it for its innovation and focus on equity, as well as its practicality in making room for more people to weather the drought successfully.

The water rights system “is what it is, and it is something of a blunt tool,” board Chairman E. Joaquin Esquivel said. “But here, again, water rights holders in communities can organize and say there’s an ability to share better with one another.”

The decision comes as the state board imposes what Division of Water Rights Deputy Director Erik Ekdahl called “significant, very deep cuts” on 4,252 water rights holders in the San Joaquin/Sacramento River Delta watershed. The curtailment orders take effect tomorrow.

About 1,800 upper and lower Russian River water rights were curtailed last year as Lake Mendocino receded to its lowest level on record. Ekdahl said supply and demand evaluations for this year had been conducted monthly and would be made at the end of this week, with curtailments possible as soon as June 16.

If the water sharing agreement works, some who might be curtailed may still get some water. But success still depends on enough people and institutions enrolling in the program, including enough with senior water rights to contribute enough water for junior rights holders to use.

Enrollment is open through June 20. Calculations made in the days to follow will determine if the program is viable for this year. That means curtailments could go into effect a few days before that determination is made.

It may be possible to go forward with as few as 10 participants, depending on the mix, said Sam Boland-Brien, supervising engineer with state water board. But there are



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hundreds of water rights holders in the upper river and “obvious” benefits of scale, “so we would like to see 100 percent enrollment,” he said.

There is no way of knowing whether there will be sufficient water in the watershed for even the most senior water rights holders to share.

Storage in Lake Mendocino is currently at about 56% of the target water supply curve for this time of year, and Sonoma Water, which manages summer releases, expects to have just enough water available to sustain minimum river flows required to support federally protected salmon and steelhead trout.

While diversions of Eel River water into the East Branch Russian River and Lake Mendocino through the Potter Valley powerhouse still might provide enough to buffer downstream users, supporters of the voluntary agreement were incensed to discover three weeks ago that Pacific Gas & Electric had asked federal regulators for permission to reduce those flows to a fraction of what they normally would be.

The company did so, members of the water sharing steering committee said, even though it has pledged and been directed by regulators to share such information with a working group comprised of stakeholders in the Potter Valley project, many of whom are involved in the water sharing effort, as well.

“This is a year’s worth of work,” said Phillip A. Williams, special water counsel for the City of Ukiah, still clearly angry. “We are 99 percent of the way there, and then PG&E files a variance.”

If federal regulators approve the lowest end of PG&E’s proposed range, the program may not be viable, Boland-Briend said.

Members of the steering committee said they believe it remains worth pursuing, however.

Some also spoke of the experience of working on the agreement once water board staff initiated discussions about a locally driven solution to the threat of curtailments back in 2020, in the first year of what’s now a 3-year drought.

Elizabeth Salomone, general manager of the Russian River Flood Control and Water Conservation Improvement District in Mendocino County, recalled how early conversations with disparate parties “morphed into partnerships” and all became “a team.”

Williams, special water counsel for the City of Ukiah, told the board he had reflected recently on the longtime usage of the phrase “water wars” to capture the tension in the West over this vital resource and the tension over who has it and who needs it.

It is, he said, “an extraordinarily unfortunate term and a misnomer,” conveying a zero sum game.

“My experience tells me the this past year has been nothing like a war ... “The water sharing agreement testifies to the fallacy the paradigm of water wars offers to us.”

Original Article: [North Bay Business Journal by Mary Callahan](#)



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State imposes sweeping ban on pumping river water in San Joaquin Valley, Bay Area

In sweeping water curtailments stretching from Fresno to the Oregon state line, cities and growers in the Sacramento-San Joaquin Delta watershed have been ordered to stop pumping from rivers and streams.

The cutbacks, announced today by the State Water Resources Control Board, will affect 4,252 water rights in the Delta watershed, including 400 or more held by 212 public water systems, beginning Wednesday. But they're concentrated around the San Joaquin River and its tributaries, where state officials expect "significant, very deep cuts."

Water board staff called the cutbacks "unprecedented," although similar curtailments were imposed in the watershed last year, just much later in the year, in August.

California's water rights system operates on the basis of seniority — those with the oldest claims are typically the last to be cut back. But even those with rights in the San Joaquin watershed that date back to 1900, before California enacted its water rights law, are expected to be hit with the curtailment orders.

"This is now affecting water users that may have not been impacted in well over 100 years, or were affected for the first time just last year," said Ryan Jacobsen, CEO of the Fresno County Farm Bureau. "This is not only a historic cutback, but we hope it's not what is now the baseline for the future."

The pain for growers will vary, depending on their access to other water supplies, such as wells.

"Similar to last year, for some of those agricultural users, they have no other supply, thus they feel immediate pain," Jacobsen said. "For others, they may have to use groundwater instead."

Last summer, thousands of water users were ordered to stop diverting water from rivers after many growers had already made planting decisions.

Public water systems that could be affected by the curtailments include the cities of Lodi and Vallejo, and San Francisco's Regional Water System, according to a water board document. Many cities have a variety of water sources, such as groundwater and stored supplies, and it is not immediately clear how much water they will lose.

The Sacramento River watershed, although hit hard by the drought, is expected to be relatively spared by the new cutbacks for now.

"In the Sacramento watershed, we actually don't anticipate significant curtailments at this time," Erik Ekdahl, a deputy director with the State Water Resources Control Board, said at the water board meeting today.

The lack of substantial curtailments there, Ekdahl said, are "largely related to the reduction in water use by the Sacramento River and Feather River settlement contractors," which have contracts entitling them to certain amounts of water even in dry years.



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In the Sacramento Valley, for instance, major irrigation districts have already agreed to reduce their water deliveries to 18%, a massive cut from their typical dry-year reductions that leave 75% of their supply intact.

Smaller tributaries, however, including Cache and Putah Creeks are expected to see curtailments, Ekdahl said.

Deeper cutbacks could come as the summer continues.

The news of the curtailments comes as Californians once again fell short of Gov. Gavin Newsom's entreaties to conserve water. New data released today shows households and businesses in cities and towns increased water use by 17.6% in April compared to two years ago.

Urban water use decreased in northern coastal and mountain regions by about 10 to 14% and flatlined in the San Francisco Bay Area. But it increased everywhere else — from 2.2% in the Sacramento River area, to more than 40% in the deserts of southeast California. The increase once again cut into the state's total water savings since last July, which now sit at 2% overall relative to 2020.

Southern California water users haven't been unscathed by the drought. The giant Metropolitan Water District this month imposed strict water restrictions on 6 million of its 19 million customers, including in parts of Los Angeles, that rely on the parched State Water Project.

Original Article: [Cal Matters by Rachel Becker](#)

Metropolitan General Manager Issues Statement on Latest Statewide Conservation Numbers

"These are not the numbers we wanted to see, and they are not the numbers we need to see. We are in an unprecedented situation, where our water supplies from the State Water Project are so limited by drought and climate change that they do not meet demands. Southern Californians must decrease their water use. I know we can do it.

"Our board's action in late April to mandate dramatic cuts in water use in one-third of Southern California, and to urge 20 percent conservation in the rest of the region, generated widespread public attention to the drought's severity. That new public understanding of our alarming water supply crisis, combined with the mandatory emergency conservation restrictions that went into effect June 1, must prompt strong action, or we won't have enough water to get us through the year.

"Our communities have for decades responded to our calls to increase their water efficiency and we are grateful for that. We would be in a far worse situation were it not for those efforts. But now we need to work together to immediately cut our water use to get through this crisis together."

Original Article: [Business Wire by MWD](#)



VELES WATER WEEKLY REPORT

Calif. prepares water supply for another dry summer

The California Department of Water Resources (DWR) and the U.S. Bureau of Reclamation are gearing up for the hot and dry summer months as the state experiences a third consecutive year of severe drought.

The agencies report that California will enter the dry summer months with below-average reservoir storage and with the state's largest reservoir, Shasta Lake, at critically low levels. The Sierra snowpack is essentially gone, and runoff into the state's streams and reservoirs has largely peaked for the year.

"The overall water supply for California is still critical going into the dry summer months," said DWR Director Karla Nemeth. "DWR and its federal partners at the U.S. Bureau of Reclamation will continue to take a conservative approach to water management decisions to maintain storage, water quality, and water deliveries for millions of Californians. We need to be prepared for a hotter, drier future brought on by our changing climate."

DWR and Reclamation are coordinating closely on water project operations and actions to address expected low river flows and temperature challenges this summer.

As a result of the ongoing severe drought conditions, DWR has finalized its decision earlier this year to deliver 5 percent of requested State Water Project (SWP) supplies in 2022. DWR will also provide water for any unmet critical health and safety needs of the 29 water agencies that contract to receive SWP supplies.

Reclamation is taking a similar approach to water supply allocation this year, given the critical conditions at Shasta Lake, the primary source of water for the Central Valley Project (CVP). Reservoir levels in Shasta were the second lowest on record on May 1 this year.

Most agricultural water service contractors will receive a zero percent allocation from the CVP this water year (with Friant Division Class 1 at 15 percent) and municipal water supplies for communities at the minimum levels for health and safety needs only.

"As the cornerstone of the Central Valley Project, we are working to conserve as much storage in Shasta Reservoir as possible, which is currently only at 40 percent capacity," said Reclamation Regional Director Ernest Conant. "As such, we will be relying heavily on Folsom Reservoir to help with Delta water quality needs this summer. We are also working closely with state and federal partners to help protect endangered winter-run Chinook salmon."

Among the actions to benefit winter-run Chinook is the installation of chilling units at Shasta Dam that will further cool the water coming into the Livingston Stone National Fish Hatchery.

DWR plants to continue preserving as much storage as possible in Lake Oroville, the SWP's largest reservoir. Water releases from Lake Oroville will be prioritized to maintain Delta water quality, protect endangered species, and meet senior water right needs.



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DWR and Reclamation have been operating the State Water Project and Central Valley Project under a Temporary Urgency Change Order since April that allowed for the flexibility to release less water into the Delta through June 30 and conserve limited stored water in Shasta, Oroville, and Folsom reservoirs. DWR and Reclamation currently project that both systems have available water supply to maintain Delta water quality through the summer.

The Emergency Drought Salinity Barrier along the West False River in the Delta will remain in place to help conserve storage and reduce the amount of saltwater intrusion into the Delta through the summer and fall. The barrier is expected to remain in place until November 30 — however, its continued need into 2023 will be reassessed in the fall.

Original Article: [Water World](#)

California's Drought Is So Bad, It's Going to Slash Hydropower

California's ongoing megadrought — which has already led to water restrictions — is also going to start affecting the state's ability to generate hydropower. This could raise energy costs for residents and increase emissions, CNN reports.

There are already signs of a difficult summer to come. Outlooks from the U.S. Energy Information Administration found that hydropower would make up only 8% of the state's total power generation, down from 15%, if California were not under drought conditions. The energy sector will have to use natural gas to fill in the gap left by the lack of hydropower.

There are more than 270 hydroelectric facilities throughout California. In order for these facilities to work, they need moving water to create power, which is why they're located at or near bodies of water. The water flows from a pipe and into the facility, where it pushes blade in a turbine to create the electricity. Most of the facilities are found at or near dams.

This news comes after residents in South California were asked to reduce their water usage in hopes of stopping reservoirs from reaching even lower levels. After being asked to cut back voluntarily, water usage actually went up about 19% in March, which ushered in the mandated restrictions. Water providers face \$US2,000 (\$2,776) fines for violations.

The U.S. Southwest has experienced an unusually dry winter, which meant less snowpack that would melt into the nearby reservoirs. This year's megadrought is the worst the region has experienced in more than 1,000 years. As of last month, the largest water reservoirs in California were disturbingly low. Last month, Lake Oroville was at about 55% of its usual capacity, and Shasta Lake reservoir was at about 40% — the lowest the lake has been in May since record-keeping began in 1977.

Energy concerns in California will likely continue into the summer as the drought sees no end in sight.



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At Lake Powell, a reservoir on the Colorado River, historically low water levels may have contributed to a dramatic rock slide on Memorial Day, as cliffs that were previously stabilised by water experience new, drier conditions. Lake Powell is close to dipping below the minimum depth needed to generate hydropower, and federal officials have recently opted for extreme measures to keep the reservoir productive.

Original Article: [Gizmodo by Angely Mercado](#)

US WATER NEWS

Navajo Nation leaders finalize Navajo Utah Water Settlement Act

Navajo Nation leaders finalized the Navajo Utah Water Rights Settlement Act with the federal government and the state of Utah May 27, which will deliver running water to many Navajo families on the Nation within Utah.

Navajo Nation President Jonathan Nez, Vice President Myron Lizer, and members of the 24th Navajo Nation Council welcomed U.S. Secretary of the Interior Deb Haaland, U.S. Sen. Mitt Romney (R-UT), Utah Gov. Spencer Cox and Utah Lt. Gov. Deidre Henderson to Monument Valley, Utah May 27 for the historic signing.

The following provisions are part of the Navajo Utah Water Rights Settlement:

- Settles all current and future claims by the Navajo Nation for water rights within Utah;
- Ratifies the proposed water rights settlement between the Navajo Nation and the State of Utah, confirming the Navajo Nation's right to deplete 81,500 acre-feet of water per year from Utah's Colorado River Basin apportionment; and
- Authorizes approximately \$220 million for water infrastructure to provide water infrastructure, which will provide clean drinking water, to Navajo communities in Utah.

"We are located on the ancestral lands of our Diné people. Since time immemorial, Diné people have resided here and have continued to create their permanent homeland and livelihood within this region," Nez said.

"Present day, this area is home to the community of Oljato, which is one of the eight Navajo Utah communities who will directly benefit from the Navajo Utah Water Rights Settlement Agreement. This historic occasion is the product of decades of hard work and diligence of all parties, and will benefit over 40-percent of Navajo homes in San Juan County alone. These communities located in this area of Utah, have been at the forefront of water insecurity and have managed to endure years of lack of access to clean, running water."

More than 40-percent of Navajo households in Utah lack running water or adequate sanitation. In some cases, such as in the community of Oljato on the Arizona-Utah border, a single spigot on a desolate road, miles from any residence, serves 900 people. In June 2019, Nez testified before the U.S. House Subcommittee on Water, Oceans, and Wildlife and called upon lawmakers to pass the settlement legislation immediately.



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“Water is life. Those are the words that we hear from our elders and youth so often,” Lizer said. “Today’s signing is the culmination of many years of work and commitment of past and present leaders. This is not about what we did as leaders, but what is to come for our people by way of this agreement between two the United States, the state of Utah, and the Navajo Nation. This agreement represents life for our Navajo people — for the generations who are yet to be born and those who continue to aspire for a greater quality of life.”

Original Article: [Navajo Hopi Observer by Staff Writer](#)

Arizona prepares to break open its Water Bank

In late April 1996, Lake Powell sat at an elevation of 3,673 feet — just 27 feet below its maximum capacity. At that time of plenty, Arizona lawmakers worried that the state wasn’t using its full share of Colorado River water.

Instead of potentially ceding those flows to California, the state opened a kind of liquid piggy bank, storing away a share of its water for an uncertain future.

In the first year of operations, the Arizona Water Banking Authority set aside 300,000 acre-feet of water. After 25 years, its savings balance — stored underground in facilities across the state — has grown to 3.75 million acre-feet.

Following more than two decades of a “megadrought” that has shrunk the Colorado River — and drawn down the Lake Powell reservoir to levels dangerously close to the cutoff for continued hydropower production — it almost sounds like a parable.

But after saving its water for the dry times to come, Arizona faces a new new challenge: determining how to get the water to the communities that need it, while also making it last as long as possible.

“Now we’re in that situation where we’re transitioning,” Virginia O’Connell, the manager of the Arizona Water Banking Authority, recently said in an interview.

She continued: “There is no more excess water for us to store. ... We’re working on phasing into the other responsibilities that we have, of actually making that water available to others when shortages hit us.”

While Arizona’s water banking system isn’t the only one in operation — other storage schemes exist in places like California, which is home to 517 groundwater basins — it is unique in that it does not serve as a clearinghouse, or a middleman that sells and exchanges water credits from users with excess to those in need.

Instead, the Arizona Water Bank operates as a kind of warehouse manager for water, recording excess Colorado River water at sites around the state.

When the state began operating the banking authority in 1997, Arizona wasn’t using its full allocation of Colorado River water, which amounts to 2.8 million acre-feet annually. Officials didn’t want to give up the precious resource and were concerned that California could move to claim the unused portion in federal court.



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“It was important for Arizona to secure that water, especially because it has junior rights to the Colorado River,” O’Connell said, referring to the state’s lower priority status for water.

Now Arizona is experiencing that junior status. When cuts are made because of low water levels in the Colorado River Basin, the state is among the first places to feel the impacts.

The Bureau of Reclamation declared its first-ever Tier 1 shortage last year, sparking a series of actions intended to shore up Lake Powell and the Glen Canyon Dam’s hydropower production.

That declaration also triggered a reduction of water from Lake Mead: Arizona saw a cut of 512,000 acre-feet of water, about 18 percent of the state’s annual apportionment, while Nevada would get 21,000 acre-feet of water less, about 7 percent of its annual apportionment.

Warm temperatures and low precipitation are anticipated to force additional emergency declarations in the Colorado River Basin later this year and in the future.

Central Arizona Water Conservation District board President Terry Goddard said last month that his agency predicts “almost for certain” that even larger Tier 3 cuts — another 720,000 acre-feet — could affect the state as early as 2024 (Greenwire, May 4). Between the cuts already in place and dire predictions for the future, the Water Bank is preparing itself to make withdrawals on its longtime savings plan.

“It was a really huge accomplishment that we were able to accrue all of those [water credits] over the last 20 years,” O’Connell said, referring to the system used to track water storage and its eventual recovery, or withdrawal from the ground.

She continued: “But it is a finite supply, and once those credits are gone, they’re gone. I don’t necessarily see excess water being available again in the future. We really need to utilize those credits very judiciously to try to preserve them for as long as we can.”

To bank the unused water, the state Water Bank relies on two different processes: actually keeping water in underground storage and an exchange program known as groundwater savings.

In the latter, the Water Bank partners with a local agency, typically an irrigation district, to provide Colorado River water to a user who might otherwise pump groundwater.

The unused groundwater is then recorded as banked.

The underground storage process involves physically storing water drawn from the Colorado River in existing aquifers.

That water can be put into the aquifers either by an injection well or a standard well, or via large recharge basins that sit over alluvial material, typically composed of layers of sand and gravel.

The water trickles between spaces in the sand and gravel, ultimately filling, or “recharging,” the water table.



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Those recharge basins can vary significantly in size. A small city might operate a site on one-tenth of an acre, while the Central Arizona Water Conservation District operates multiple 20-acre basins. The facilities tend to be a popular choice given both their low cost and low technology requirements, making them easy to operate and monitor.

While the basins might appear as enormous swimming pools from above, AWBA officials said the designs ensure that water gets underground as quickly as possible.

Basins are tested to ensure that water does not sit on the surface for days at a time, which avoids losses from excessive evaporation.

The state Department of Water Resources likewise requires storage facilities to monitor water levels and water quality.

While the AWBA operates the water banking system, it doesn't actually own any facilities. Those recharge facilities are owned and operated by the Central Arizona Water Conservation District, local governments or even the Salt River Project, a public utility.

"We are basically just an entity that stores water. We don't operate facilities," O'Connell explained. The Water Bank relies on 26 storage facilities across the state.

She also noted: "We accrue long-term storage credits from the storage at those facilities. Basically, that credit is what gives you the ownership of that water."

Original Article: [E&E News Green Wire by Jennifer Yachnin](#)

Las Vegas Valley Water District shares steps Nevadans can take to conserve water

As the triple-digit heat begins to climb across Southern Nevada, water conservation is essential in the desert.

Residents are asked to do their part no matter where they live across the valley. The most important step is to follow the mandatory watering schedule posted on the Las Vegas Valley Water District's website

Running landscape irrigation system outside assigned days is water waste and may result in a water-waste fee or citation.

No watering is permitted on any day between 11 a.m. and 7 p.m.

The Las Vegas Valley Water District map is provided below, along with the mandatory watering schedule.

Original Article: [8 News Now by Julia Romero](#)

Texas Supreme Court Water Law Verdict Highlights Lack of TCEQ Authority Over Water Rights

The Texas Supreme Court ("TXSC") recently confirmed what many already know: the Texas Commission on Environmental Quality ("TCEQ") has only administrative authority related to water rights in Texas. This means that water rights ownership disputes must utilize Texas courts to adjudicate water rights ownership.



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In 2014, the Papes purchased a tract of land containing 1,086 acres that included State of Texas Certificates of Adjudication (“COA”) issued as part of a 1986 judgment brought under the Texas Water Rights Adjudication Act. The COAs were later amended to include the authorized use of water for irrigating 250 acres that were subsequently purchased by DRR. In 2015, the Papes attempted to record their purchase of the water rights with TCEQ, who notified other interested landowners that they might own an interest in those rights. One of those interested landowners, DRR, then filed a change of ownership form with TCEQ. TCEQ then determined that DRR owned a portion of the water rights and amended its records to reflect DRR’s ownership. The effect of TCEQ’s determination was that the land Pape was authorized to irrigate was reduced from 1,086 to 821 acres. The Papes filed an unsuccessful motion to overturn TCEQ’s determination and later filed suit against DRR seeking a declaration that it was the sole owner of the water rights appurtenant to the 1,086 acre tract.

On May 20, 2022, the TXSC rendered its decision in *Pape Partners, Ltd. v. DRR Family Properties*, which resolves that in Texas, it is the courts and not TCEQ that determine ownership of water rights. The TXSC decision overruled the Waco Court of Appeals, which held that TCEQ has exclusive jurisdiction to determine water rights because “the regulatory scheme behind surface water permits is pervasive and indicative of the unless the Texas Legislature’s (“Legislature”) intent that jurisdiction over the adjudication of surface water permits is ceded to the TCEQ.”[1] However, the TXSC disagreed, holding that the “power to determine controverted rights to property” has been “vested in the judicial branch.”[2]

TCEQ’s own view of its authority over water rights is that it is ministerial in nature, i.e. a “record-keeping function” that is consistent with the TXSC’s decision.[3] While the agency will review the deeds furnished to it as part of water rights transfers, there is no right to a contested case hearing (which TCEQ does perform for other issues) for change of ownership requests relating to water rights. Section 11.021 gives the TCEQ the right to cancel water rights, which clearly falls within the purview of affecting title to water, but the TXSC nevertheless held that the Section 5.013(a)(1) references Chapter 11 of the Water Rights Adjudication Act and that “[n]othing in that Act gives TCEQ authority to decide conflicting claims to water rights acquired with the title to the land.”[4]

Water law is a unique, challenging, and esoteric field of law. Unless the Legislature amends TCEQ’s enabling language to provide it greater authority to determine water rights, individuals seeking to dispute how water rights are owned will now only be able to pursue relief in Texas Courts. Some argue that the legislature should consider amending TCEQ’s enabling language to vest the agency with greater authority, similar to states like New Mexico and Colorado which have State Engineers who assist in resolving disputes related to water rights, in order to avoid the sometimes significant expenditure of legal fees by those seeking relief on water rights disputes.



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The TXSC suggested this is an option by indicating that the Legislature could vest TCEQ with greater authority, citing to the TX Constitution and noting that “Section 59, empowers the Legislature to delegate the resolution of property disputes to TCEQ.”[5] However, for the foreseeable future, courts in Texas will be tasked with determining water rights disputes.

Original Article: [JD Supra by Miguel Suazo/ Husch Blackwell LLP](#)

Monitoring the impact of Arizona's drought

Lower rainfall and higher temperatures have created ideal conditions to exacerbate Arizona’s longstanding drought. Entering 2022, more than half of the state remains in severe drought status and an additional 10% is enduring extreme drought.

These conditions — including the drop in levels at crucial water sources such as Lake Mead and the Colorado River — drive the research of doctoral student Zhaocheng Wang, who is studying hydrosystems engineering in the School of Sustainable Engineering and the Built Environment, one of the seven Ira A. Fulton Schools of Engineering at Arizona State University

Wang’s dissertation research focuses on combining modeling tools and earth observation products to better understand hydrological processes in the Southwestern United States. He has dedicated part of his dissertation research to determine the impacts the Colorado River drought will have on the people who live and work in Arizona.

“Water is a scarce and valuable resource for us living in the desert, especially under the impact of climate change,” Wang says. “A better understanding of hydrological processes can help us to better use and protect this resource and live a more sustainable lifestyle in preparation for a hotter and drier future.”

Wang was one of four students from across the U.S. and Mexico named as a 2022 Babbitt Center Dissertation Fellow by the Lincoln Institute’s Babbitt Center for Land and Water Policy, a leading nonprofit foundation supporting research and preservation of the Colorado River Basin.

The Babbitt Center Dissertation Fellowship recognizes the work of outstanding doctoral students, provides a \$10,000 stipend and allows access to a wealth of resources including collaboration with other researchers to support their efforts.

“Zhaocheng Wang has become a leading-edge researcher in the application of remote sensing and modeling for water resources applications,” says Enrique Vivoni, the Fulton Professor of Hydrosystems Engineering in the School of Sustainable Engineering and the Built Environment and doctoral adviser to Wang. “His PhD work spans a broad range of topics, from quantifying water in dryland rivers to creating scenarios of future water use in cities and agricultural areas. And for each, he has demonstrated a keen awareness of novel, impactful outcomes.”



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Wang started his academic career in China at Hunan University. While there, he completed a study abroad year at ASU. He says he had the opportunity to take a course in hydrology with Associate Professor Giuseppe Mascaro and was encouraged by Associate Professor Zihua Wang to pursue a graduate degree and conduct research landing him back at ASU after completing his undergraduate studies.

“I think the hydrosystems engineering program, which consists of a group of faculties and students with diverse backgrounds and expertise, really created a dynamic and enthusiastic environment suitable for collaborative research drawing me back,” Wang says.

In addition to the academic environment at ASU, Wang says Arizona’s drought conditions present unique opportunities for not only research but also application of what hydrosystems engineering students learn about the physical environment.

“The unprecedented current drought in the Southwestern United States has triggered a Tier 1 water shortage,” Wang says. “As a result, the water delivered to Arizona from the Colorado River will be cut by 30% in 2022. Farmers in central Arizona — mostly in Pinal County — who have lower priority in water rights will have less water to use.”

Original Article: [Arizona State University News](#)

GLOBAL WATER NEWS

Tariffs could increase Indians’ sense of ownership of water—and reduce wastage

Water in India has always been perceived from a lens of public good rather than an economic commodity.

A sense of ownership is missing among users as they abstract water at minimal or no cost, and in turn, discharge wastewater into rivers either without or partial treatment. It is the primary reason why water is valued minimally by consumers. Such a thought process is ironic given the already ‘water stressed’ situation in India wherein the current water availability is about 1500 m³ per capita per annum. The situation is expected to worsen in the coming years due to the probability of India becoming a ‘water scarce’ nation with water availability of less than 1000 m³ per capita per annum in the Business as Usual (BAU) scenario. The current situation can be improved by adopting tools and mechanisms such as water conservation, water-efficient practices, improved irrigation practices, wastewater treatment, and recycling, benchmarking of water used for different sectors, and use of economic instruments. While many such mechanisms are already being adopted in some places, they need to be adopted widely to improve their impact.

In the national capital, water demand on the domestic front is increasing at a rapid pace. Based on the norm of 60 gallon per capita per day (GPCD), the total requirement of water for NCT of Delhi in March 2021 was 1380 MGD for the projected population of 23



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million, according to the Economic Survey of Delhi, 2020-21. At present, there is a requirement of approximately 20% more water supply for the city to meet the domestic water requirement.

In the current scenario, urban authorities are facing serious challenges in addressing the water demand and water supply augmentation for the future. However, the lack of supply and demand equilibrium worsens the on-ground challenge. The issue is exacerbated by a host of other problems such as water resource depletion and degradation resulting in persistent water scarcity, climate change that is triggering unequal rainfall distribution, as well as increased water demand due to urbanisation. It is also seen that economically stable consumers have higher water demands. Therefore, these on-ground complications along with scarce budgetary resources and respective institutional and governmental issues lead to a huge gap between resource requirement and availability.

Further, high water subsidy services under governmental control have led to water being an underpriced commodity, and consequently, the community consistently perceives that water is free. Besides, the 'free water scheme' of the Delhi government allows domestic consumers who have a functional water meter to use up to 20 kilo litres per month. On the other hand, a large number of unmetered connections continue to exist while many others remain faulty or non-functional. As per Delhi Jal Board (2018), 2.6 million water connections have been sanctioned, amongst which 13% lack functional meters, while 3.5% connections remain unmetered. Since the piped water supply continues to exist, the groundwater withdrawal by several residents of Delhi remains unmonitored and unbilled.

Original Article: [Quartz India by Aproorva Bamal & Niyati Seth](#)

Why the collapse of an Atlantic ocean current could mean La Niña becomes the norm

Climate change is slowing down the conveyor belt of ocean currents that brings warm water from the tropics up to the north Atlantic. Our research, published today in Nature Climate Change, looks at the profound consequences to global climate if this Atlantic conveyor collapses entirely.

We found the collapse of this system – called the Atlantic meridional overturning circulation – would shift the Earth's climate to a more La Niña-like state. This would mean more flooding rains over eastern Australia and worse droughts and bushfire seasons over south-west US.

East-coast Australians know what unrelenting La Niña feels like. Climate change has loaded our atmosphere with moister air, while two summers of La Niña warmed the ocean north of Australia. Both contributed to some of the wettest conditions ever experienced, with record-breaking floods in New South Wales and Queensland.



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Over the south-west of North America, a record drought and severe bushfires have put a huge strain on emergency services and agriculture, with the 2021 fires alone estimated to have cost at least US\$70bn (AU\$98bn).

Earth's climate is dynamic, variable and ever-changing. But our current trajectory of unabated greenhouse gas emissions is giving the whole system a giant kick that will have uncertain consequences – consequences that will rewrite our textbook description of the planet's ocean circulation and its impact.

What is the Atlantic overturning meridional circulation?

The Atlantic overturning circulation comprises a massive flow of warm tropical water to the north Atlantic that helps keep European climate mild, while allowing the tropics a chance to lose excess heat. An equivalent overturning of Antarctic waters can be found in the southern hemisphere.

Climate records reaching back 120,000 years reveal the Atlantic overturning circulation has switched off, or dramatically slowed, during ice ages. It switches on and placates European climate during so-called “interglacial periods”, when the Earth's climate is warmer.

Since human civilisation began about 5,000 years ago, the Atlantic overturning has been relatively stable. But over the past few decades a slowdown has been detected, and this has scientists worried.

Why the slowdown? One unambiguous consequence of global warming is the melting of polar ice caps in Greenland and Antarctica. When these ice caps melt they dump massive amounts of freshwater into the oceans, making water more buoyant and reducing the sinking of dense water at high latitudes.

Around Greenland alone, a massive five trillion tonnes of ice has melted in the past 20 years. That's equivalent to 10,000 Sydney Harbours worth of freshwater. This melt rate is set to increase over the coming decades if global warming continues unabated.

A collapse of the north Atlantic and Antarctic overturning circulations would profoundly alter the anatomy of the world's oceans. It would make them fresher at depth, deplete them of oxygen, and starve the upper ocean of the upwelling of nutrients provided when deep waters resurface from the ocean abyss. The implications for marine ecosystems would be profound.

With Greenland ice melt already well under way, scientists estimate the Atlantic overturning is at its weakest for at least the last millennium, with predictions of a future collapse on the cards in coming centuries if greenhouse gas emissions go unchecked.

The ramifications of a slowdown

In our study, we used a comprehensive global model to examine what Earth's climate would look like under such a collapse. We switched the Atlantic overturning off by applying a massive meltwater anomaly to the north Atlantic, and then compared this to an equivalent run with no meltwater applied.



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Our focus was to look beyond the well-known regional impacts around Europe and North America, and to check how Earth's climate would change in remote locations, as far south as Antarctica.

The first thing the model simulations revealed was that without the Atlantic overturning, a massive pile-up of heat builds up just south of the equator.

This excess of tropical Atlantic heat pushes more warm moist air into the upper troposphere (about 10 km into the atmosphere), causing dry air to descend over the east Pacific.

The descending air then strengthens trade winds, which pushes warm water towards the Indonesian seas. And this helps put the tropical Pacific into a La Niña-like state.

Australians may think of La Niña summers as cool and wet. But under the long-term warming trend of climate change, their worst impacts will be flooding rain, especially over the east.

We also show an Atlantic overturning shutdown would be felt as far south as Antarctica. Rising warm air over the west Pacific would trigger wind changes that propagate south to Antarctica. This would deepen the atmospheric low pressure system over the Amundsen Sea, which sits off west Antarctica.

This low pressure system is known to influence ice-sheet and ice-shelf melt, as well as ocean circulation and sea-ice extent as far west as the Ross Sea.

Original Article: [The Guardian by](#)

[Matthew England, Andréa S. Taschetto and Bryam Orihuela-Pinto](#)

South Asian countries lose over \$14.2 billion a year due to the lack of a water sharing deal

Countries around the Ganges-Brahmaputra-Meghna (GBM) basin lose over \$14.2 billion annually from a lack of cooperation in sharing the waters of these rivers, with little prospect of accord in the foreseeable future, according to a new analysis.

“A lack of collaborative arrangements and unilateral exploitation of the basin's freshwater resources have made transboundary water management a contested issue, catalysing disputes and leading to regular conflicts,” says the study led by Ashok Swain, head of the department of peace and conflict research and the director of Research School of International Water Cooperation at Sweden's Uppsala University.

The report suggests that “considering China's apathy to any involvement in any basin-wide multilateral cooperation,” the south Asian countries, including Bangladesh, Bhutan, India and Nepal, could form a common river management framework on the lines of the Mekong River Commission.

Swain, who is also the UNESCO chair on International Water Cooperation, says that countries in the basin will eventually realise that sub-basin cooperation is the only option.



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The study, commissioned by the Trans-boundary Rivers of South Asia (TROSA) programme, says that while the demand for water is increasing, its availability and quality are gradually decreasing, fuelling competition among the riparian states (countries bordering a transboundary inland river or lake).

“One promising strategy to promote benefit-sharing is the joint development of multipurpose storage dams in the upper catchment of the GBM basin,” the study says. “That will allow the riparian states to store excess water during the monsoon, regulate floods during the peak time, and increase river flow in the dry period.”

Analysing the economic costs of non-cooperation across the water, energy, food and environment sectors, the researchers identified major adverse effects such as deteriorating water quality and availability, reduced agricultural productivity and fisheries, degradation of ecosystems, untapped hydropower potential and greater loss of lives and livelihoods due to natural disasters. Between 1976 and 1993, the lack of adequate cooperative arrangements in the Ganges basin between Bangladesh and India cost Bangladesh annual financial losses of about US\$186.59 million, which was around 0.6% of the country’s GDP at that time.

Similarly, due to non-cooperation, Nepal and Bhutan lose annual economic benefits of between \$105 million and \$1.8 billion under different scenarios from the development of hydropower generation projects.

“Such a high cost of non-cooperation in one of the most climate-stressed regions warrants for more urgent action by various stakeholders to improve and sustain cooperation on shared waters and associated natural resources,” the study says.

“In the GBM basin, any political party of any country that proposes that more water should be allocated to the neighbouring country will be booted out of power promptly,” Asit Biswas, director of the Singapore-based consultancy firm Water Management International and a visiting professor at the University of Glasgow, UK, said.

Biswas notes that even for two countries like India and Bangladesh, which enjoy good relations, there have been disagreements on water-sharing from the time Bangladesh was created in 1971.

As for countries like India and China that are not only serious geopolitical rivals but have had long-standing border disputes, it is naive to consider that they will cooperate in any way on water for the next 30-50 years, says Biswas.

He believes Bangladesh, India and Nepal can improve their own water management practices to gain billions of dollars, regardless of what happens in its upstream countries.

Original Article: [Quartz India by Athar Parviaz](#)



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India is All Set to Harness Hydropower With Eye on the China-Pakistan Axis

Sometime around the end of last month, the Cabinet Committee on Economic Affairs sanctioned 4526 crore rupees to construct the 540 MW Kwar hydropower project in Jammu and Kashmir's Kishtwar district by Chenab Valley Power Projects Pvt. Ltd, a joint venture between the state PSU National Hydro Power Corporation Ltd and Jammu and Kashmir State Power Development Ltd with an equity contribution of 51% and 49%, respectively.

The project above is a part of the Indus basin and would be one of the many development projects coming up in the district. Other important projects are Pakal Dul and run-of-the-river (ROR) Kiru hydroelectric projects, having power generation capacities of 1000 MW and 624 MW, respectively. The ROR hydroelectric projects generate electricity from the flowing water in the absence of large dams and reservoirs. These projects hold strategic importance in the dynamics of Indo-Pakistan relations, especially when the latter's reliance on China has reached concerning levels for economic development. The backdrop to these developments is the Indus Water Treaty (IWT) signed between India and Pakistan in 1960 to share the waters of six Indus basin rivers that flow from India to Pakistan.

As per the treaty, India has complete rights over three eastern rivers— Sutlej, Beas, and Ravi— whereas Pakistan has complete rights over three western rivers— Sindhu, Chenab, and Jhelum.

In 1960, citing the precedent of the use of water resources during the British rule, Pakistan got a lucrative deal of using almost 80% of water in the Indus basin. But Pakistan is highly dependent on its neighbours for water. In the case of the water of the Indus river, India is an upper riparian state, and in the case of the Kabul river, Afghanistan is an upper riparian state.

Things between India and Pakistan have been as sour as vinegar since the beginning. Bomb blasts and terrorist attacks of 2008, 2016, and 2019, and the role played by the Pakistani establishment in them, have repeatedly led to questions on the validity of the IWT. Chinese investment in POK and near the border also adds complexity to the Indian interests.

Although India can back out from the IWT by citing the Vienna Convention on the Law of Treaties, it has not done so yet. And thus, that card is unavailable to play for the time being. Also, India can push Pakistan to revisit the conditions laid out in 1960, but it is unlikely to happen, thanks to the gigantic share Pakistan is getting from the Indus basin. Given this context, the primary thing that India can aggressively do is utilise the water on which it has a legitimate claim, according to the existing conditions of the treaty. Though Pakistan has control over the Western rivers, India can still build the ROR projects on them— and thus, since the brutal Uri attack in 2016, the central government has sanctioned various projects on both the eastern and western rivers. Kiru and Ratle



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(ROR), and Pakal Dul (concrete-face rock-fill dam) projects are already being constructed on the Chenab and its tributary.

Pakistan also gets the water from the river Ravi, to which India has complete rights. In May of last year, India decided to give a nod to the Ujh Multipurpose project, which would be built on the river Ujh, a tributary of the Ravi. With this project, India would be able to block 531 MCM of water flowing to Pakistan.

However, it is not the case that India is undertaking such development projects on just Western borders. On the Eastern side, India is planning to construct the country's second-largest dam at Yingkiong in Arunachal Pradesh, with a capacity to store 12.2 BCM of water, in response to the Chinese aspirations to build another dam on the Brahmaputra river.

To cut a long story short, India has decided to counter the China-Pakistan axis with these developments. They serve the Indian people and our strategic interests well.

Original Article: [News 18](#)

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