

Veles Water Weekly Report

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VelesWater



WATER FUTURES MARKET ANALYSIS

Welcome to ***WATERTALK***

by Joshua Bell

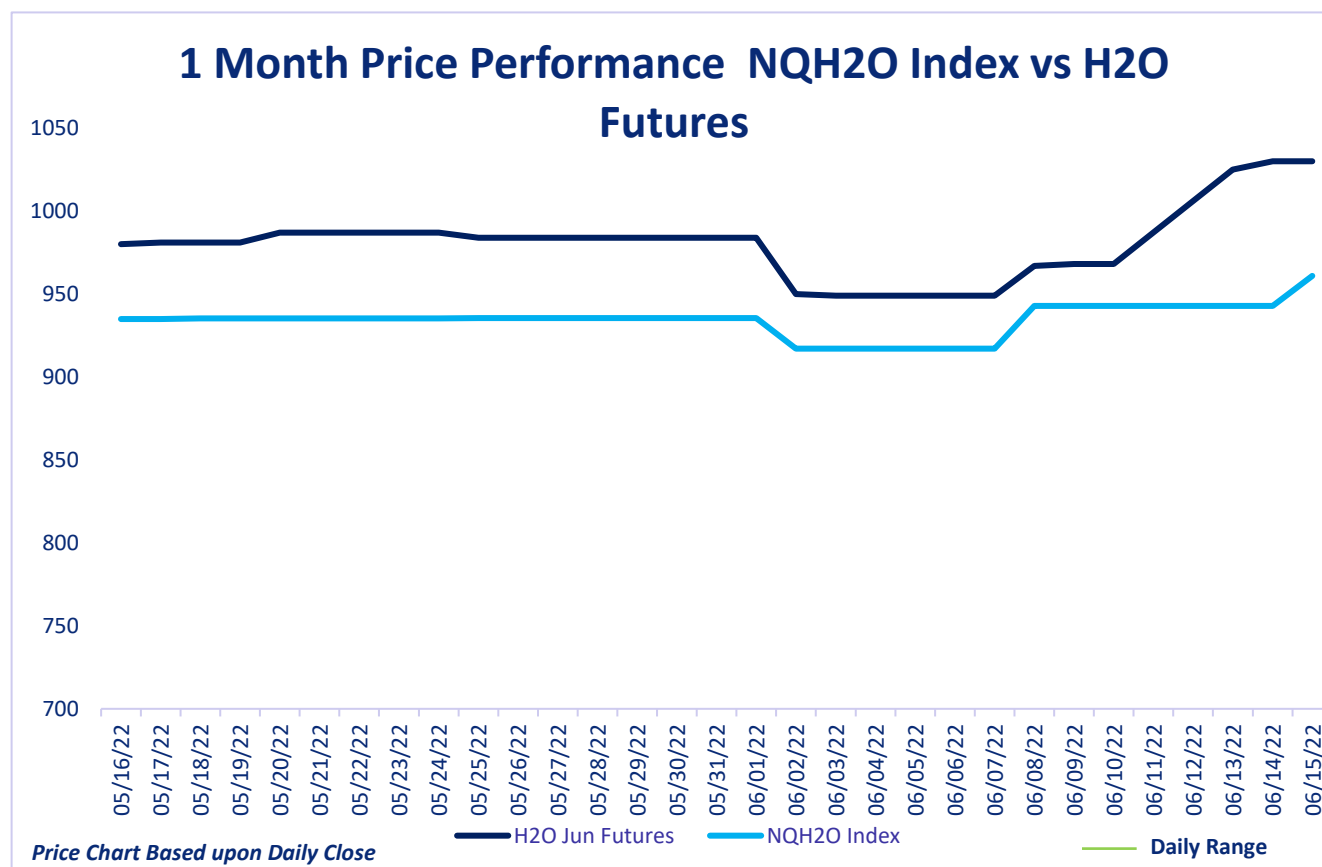
CLICK THE LINK BELOW

"A 2 minute technical analysis video of H2O futures"

<https://vimeo.com/720955119>



NQH2O INDEX PRICE vs H2O FUTURES PRICE



The new NQH2O index level of \$960.93 was published on the 16th of June, up \$18.19 or 1.93%, which sets a new all-time high. The June contract had been trading at a premium of \$25.25 - \$87.26. The June contract settled at the new index level making the July contract the front month contract.

The July contract has been trading at premium of \$69.07 - \$89.26 over the past week.

NQH2O is up 36.03% Year to Date.

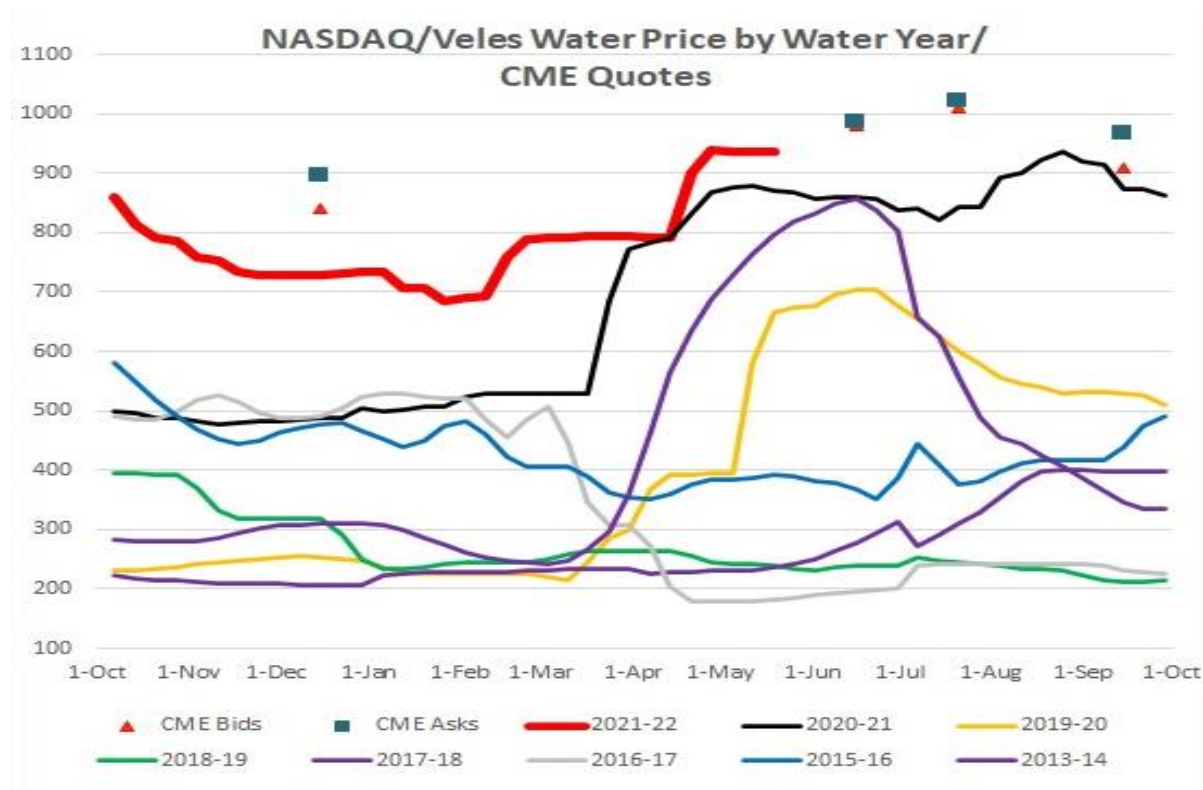
Below are the bid offer prices on different expiries being quoted in the market.

July 22	995@1065
Aug 22	1030@1090
Dec 22	855@940
Jun 23	1030@1070



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NQH2O INDEX HISTORY



The graph above lays out the Nasdaq Veles water index by year, showing 2013- 2022. In very dry years, prices clearly rise through the spring, peaking in May to July (with the exception of 2015) as demand for water from farmers peaks. Prices then taper off heading into the winter on reduced demand, and the possibility of rain/snow.

The restricted ability to “carry” water, much like one can do with financial contracts, gives this index the same type of seasonal pattern that one sees on some other commodities.

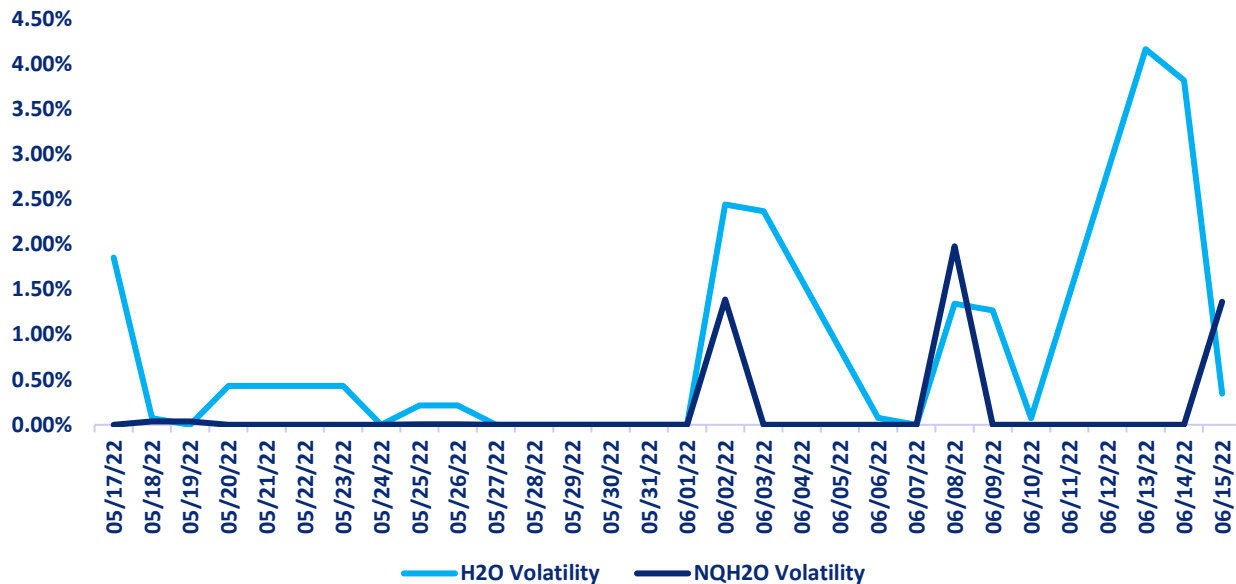
The graph for 2021 is highlighted in red. It shows the same seasonal climb, but at record-high values above each of the last eight years since February.

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



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 4.16% on June 13th and a low of 0.07% on the 10th June.

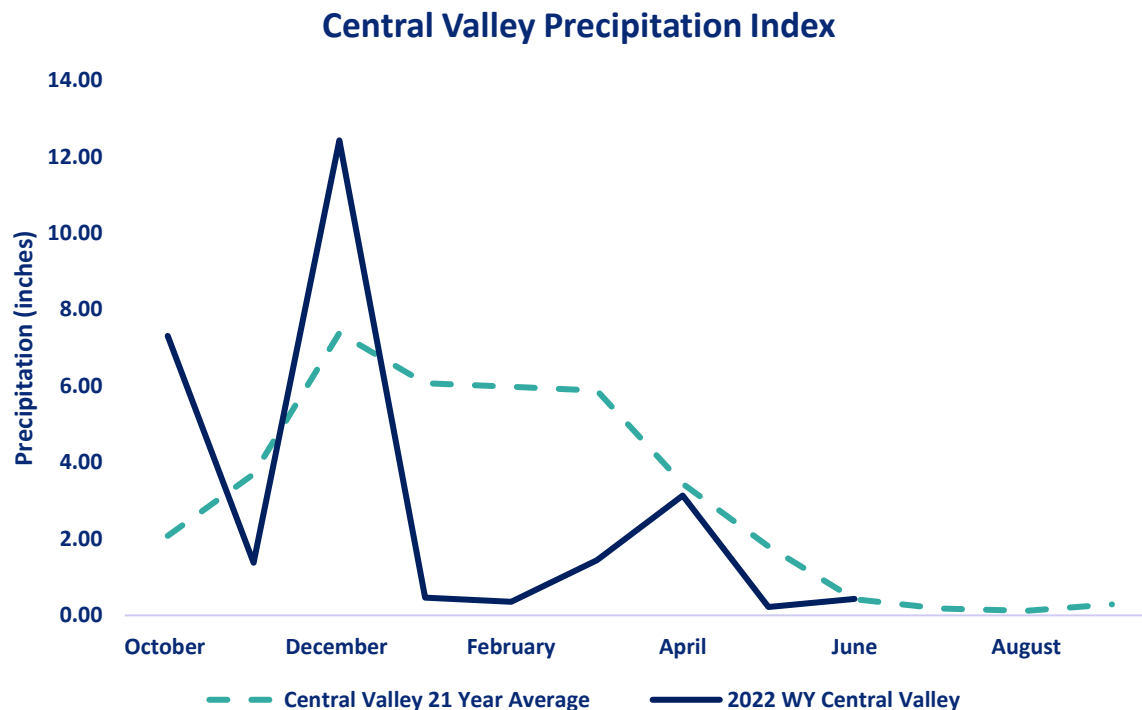
ASSET	1 YEAR (%)	2 MONTH (%)	1 MONTH (%)	1 WEEK (%)
NQH2O INDEX	21.87%	12.48%	4.24%	0.869%
H2O FUTURES	N/A	10.58%	7.23%	5.53%

Mixed signals for the week ending on the June 15th the two-month futures volatility is at a discount of 0.71% to the index, up 1.19% from the previous week. The one-month futures volatility is at a premium of 2.99% to the index, up 1.93% from last week. The one-week futures volatility is at a premium of 4.66% to the index, a reversal of 5.09% from the previous week. We expect futures volatilities to converge to the index volatilities.

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



CENTRAL VALLEY PRECIPITATION REPORT



Central Valley average is calculated using data from 19 weather stations in the Central Valley, California.
Data as of 15/06/2022

STATION	MTD (INCHES)	WEEK ON WEEK CHANGE (INCHES)	% OF 20 YEAR AVERAGE MTD	2022 WYTD VS 2021 WYTD %	2022 WY VS 20 YEAR AVERAGE TO DATE %
SAN JOAQUIN 5 STATION (5SI)	0.06	0.02	18.72%	47	63
TULARE 6 STATION (6SI)	0	0.00	0.00%	35	58
NORTHERN SIERRA 8 STATION (8SI)	1.23	0.47	159.05%	45	79
CENTRAL VALLEY AVERAGE	0.43	0.16	59.26%	42	67

RESERVOIR STORAGE

RESERVOIR	STORAGE (AF)	% CAPACITY	LAST YEAR % CAPACITY	HISTORIC ANNUAL AVERAGE CAPACITY %
TRINITY LAKE	733,499	30	50	38
SHASTA LAKE	1,811,104	40	41	49
LAKE OROVILLE	1,858,646	53	36	67
SAN LUIS RES	868,045	43	39	68

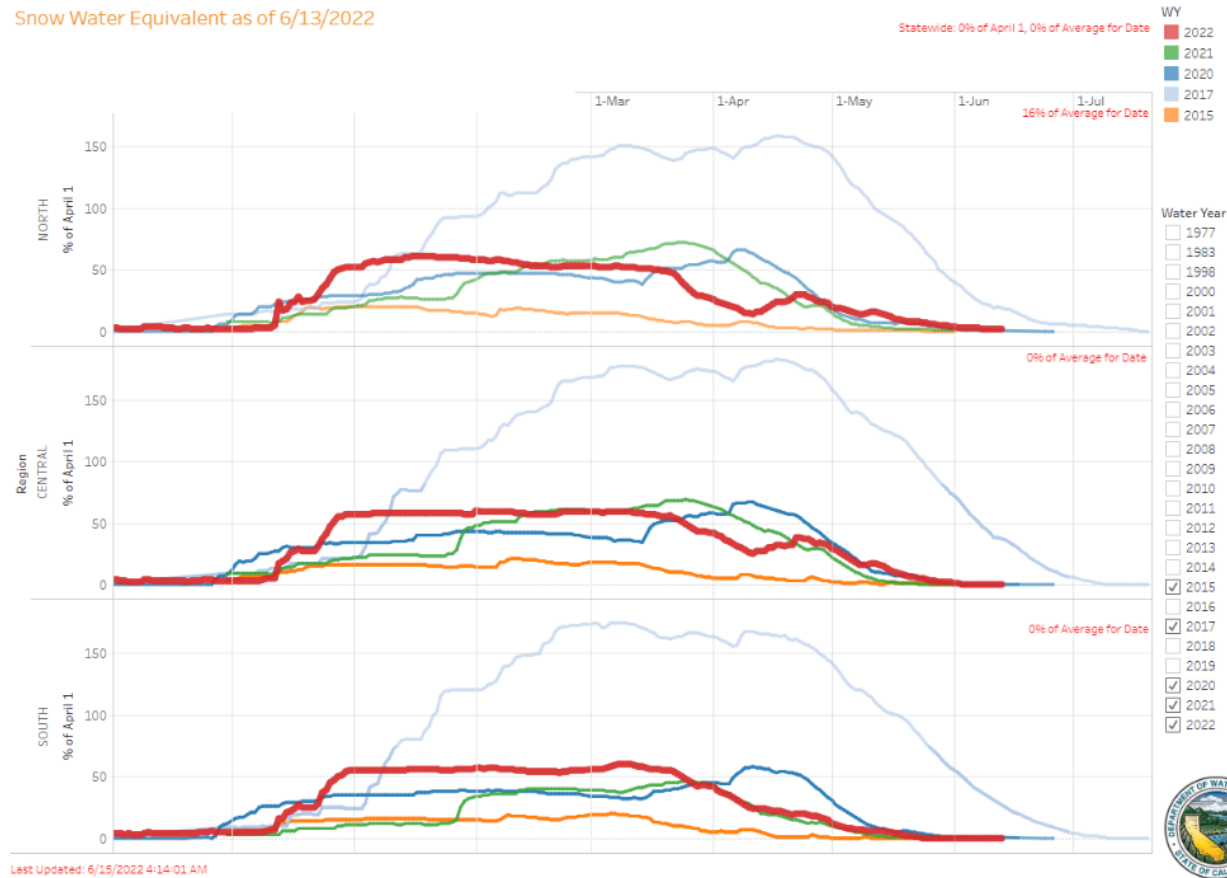
Reference: [California Water Data Exchange](#)



SNOWPACK WATER CONTENT

Snow Water Equivalent Dashboard

Snow Water Equivalent as of 6/13/2022



REGION	*SNOWPACK WATER EQUIVALENT (INCHES)	WEEK ON WEEK CHANGE (INCHES)	% OF AVERAGE LAST YEAR	% OF 20 YEAR HISTORICAL AVERAGE	% OF HISTORICAL **APRIL 1ST BENCHMARK
NORTHERN SIERRA	0.4	-0.30%	0	16	2
CENTRAL SIERRA	0	0.00%	0	0	0
SOUTHERN SIERRA	0	0.00%	0	0	0
STATEWIDE	0.1	-0.10%	0	0	0

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

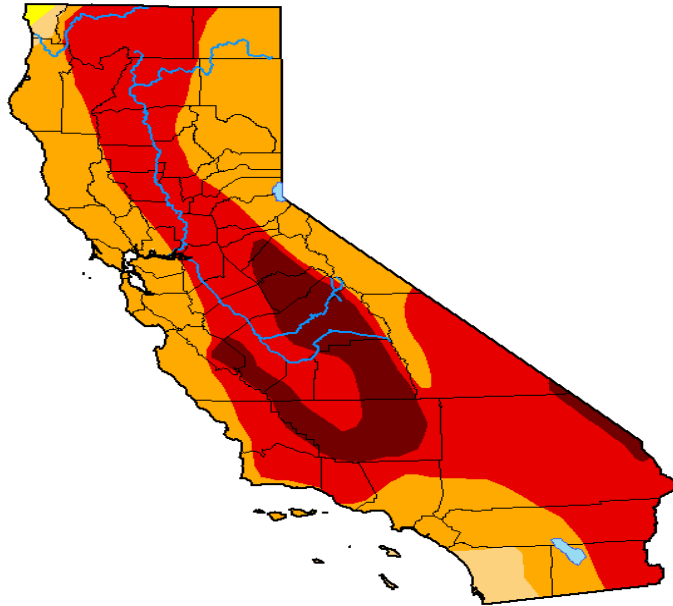
** April 1st is used as the benchmark as it when the snowpack in California is generally deepest. It has been used the benchmark date since 1941 by DWR and can be used to predict spring river flow.



DROUGHT MONITOR

U.S. Drought Monitor California

June 7, 2022
(Released Thursday, Jun. 9, 2022)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	99.79	97.48	59.81	11.59
Last Week 05-31-2022	0.00	100.00	99.86	97.56	59.81	11.59
3 Months Ago 03-08-2022	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 09-28-2021	0.00	100.00	100.00	93.93	87.88	45.66
One Year Ago 06-08-2021	0.00	100.00	100.00	94.75	85.20	33.32

Intensity:

None	D2 Severe Drought
D0 Abnormally Dry	D3 Extreme Drought
D1 Moderate 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:

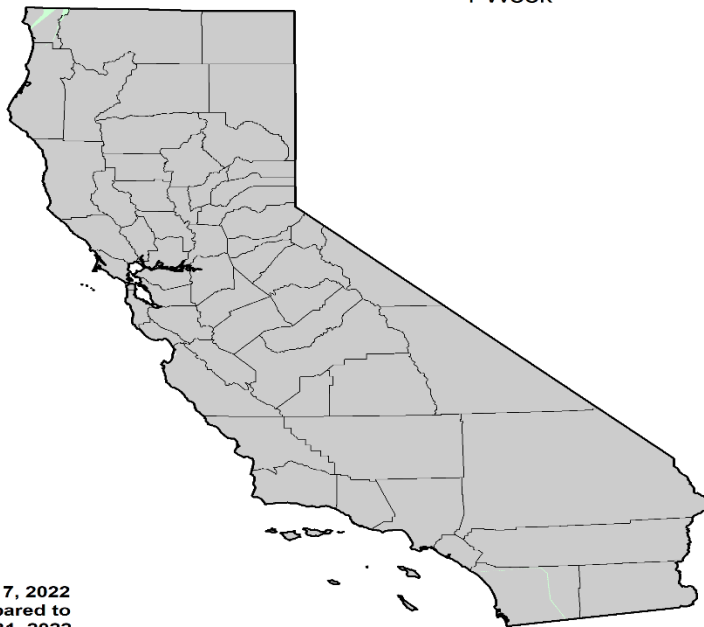
Brad Pugh
CPC/NOAA



droughtmonitor.unl.edu

U.S. Drought Monitor Class Change - California

1 Week



June 7, 2022
compared to
May 31, 2022



5 Class Degradation
4 Class Degradation
3 Class Degradation
2 Class Degradation
1 Class Degradation
No Change
1 Class Improvement
2 Class Improvement
3 Class Improvement
4 Class Improvement
5 Class Improvement

droughtmonitor.unl.edu

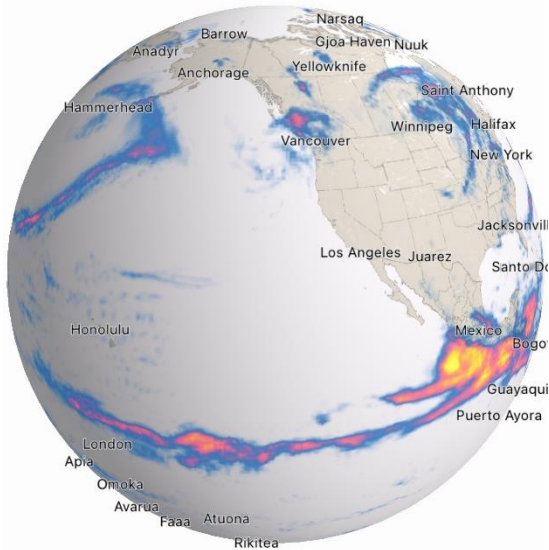
The US Drought Monitor release their statistics with a 1-week lag to this report. Over the past week there has been 0.07% class 1 improvement in D1 moderate drought conditions and a 0.08% class 1 improvement in D2 Severe Drought conditions in California.

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



CURRENT SATELLITE IMAGERY

Light
Moderate
Heavy
Extreme



Map: Dark Sky

The current satellite picture shows a frontal system hitting the coastline in the Vancouver area of Canada with some mild precipitation in the Seattle region. This system is not expected to affect the Western US in any significant way.

There is another frontal system forming in the North-western Pacific, but similarly it is not expected to bring much precipitation to the Western US and both systems are not expected to reach California.

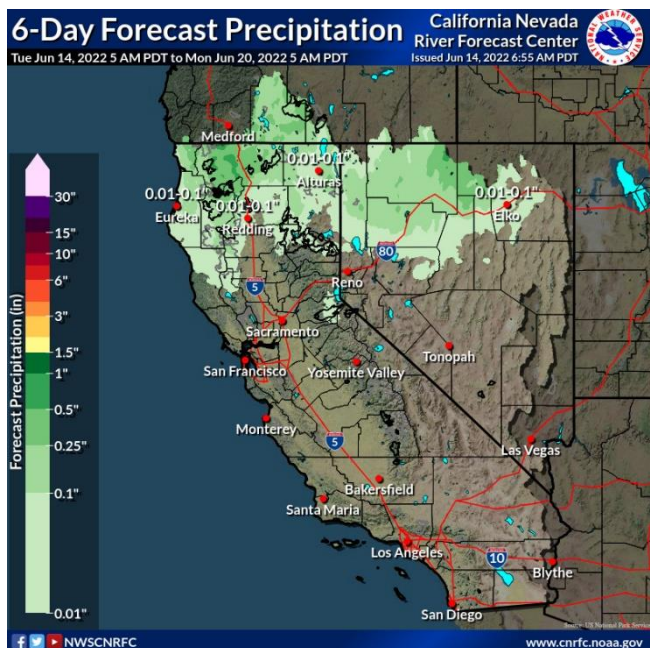
In general the Western and Central US is dry as expected with the advent of summer.

The Eastern and North-eastern US has a large area of scattered cloud bringing summer rainfall to these regions stretching from Kentucky Northeasterly.

Most notably we are seeing the start of the first signs of Monsoon activity with moisture flow from the southern regions in Mexico starting to move northwards towards Arizona. We expect this to develop further and strengthen over the next few months.

10 Day Outlook

The upper low will shift southward offshore of norCal Thursday evening engulfing most of the west coast by Friday morning. There are some slight differences in positioning between the GFS and the ECMWF. This is resulting in precipitation being spread further to the south along the north coast later that morning in the ECMWF than the GFS. These differences become more apparent in the afternoon as the ECMWF has 0.10-0.25+" over nw CA from 18z-00z while the GFS shows less than a tenth of an inch. For this time frame, began with WPC and blended in the GFS/ECMWF to show a bit more





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precipitation but not quite as much as the ECMWF. The low will progress inland into norCal throughout the day Saturday keeping lingering showers across northern areas. As the system progresses eastward into Sunday, light showers will also reach northern NV. The low will weaken and begin to exit the area into Monday. The bulk of the precipitation from this system is expected north of Cape Mendocino. The main associated moisture will end up staying offshore according to forecast PW values. Locally the highest totals look to be about 0.25-0.50" with generally 0.10-0.20" elsewhere. Some very light showers may reach the northern Sierra but no precipitation is expected south of I-80 at this point.

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

WESTERN WEATHER DISCUSSION

The wet late spring continues to support improving conditions from the Pacific Northwest eastward to the Northern Rockies. Based on multiple indicators including springtime precipitation, soil moisture, and streamflow, a broad 1-class improvement was made to eastern Washington with improving conditions also supported for parts of Oregon. The recent precipitation was enough to shift the long-term SPEIs out of exceptional (D4) drought in much of Klamath and Lake Counties of Oregon. In western Idaho, severe drought (D2) was improved to moderate drought (D1) based in part on the hydrologic response in the Weiser Basin. Southwestern Montana had a 1-class improvement, following recent wetness, soil moisture recharge, and 60-day SPI. Precipitation amounts of 1 to 3 inches along with below-average temperatures resulted in a 1-category improvement to parts of north-central Montana. Despite the recent cool pattern, 90 to 180-day SPIs supported 1-category degradation to parts of northern Montana. Impacts in this worsening drought area include required supplemental feeding, very dry soils, and dry stock ponds. Based on 90-day SPI and hydrology considerations in the Sevier River basin, extreme (D3) to exceptional (D4) drought was expanded across parts of Utah. Widespread severe to exceptional drought persists throughout much of the Southwest, Great Basin, and California. Hydropower production concerns at reservoirs in California and Nevada continue due to low water levels.

Reference:

Brad Pugh, NOAA/CPC

Richard Tinker, NOAA/NWS/NCEP/CPC



WATER NEWS

CALIFORNIA WATER NEWS

Wildfires erupt in Arizona and California in foreboding sign of intense summer

Scorching temperatures and desperately dry conditions set the stage for the rapid spread of several explosive wildfires that erupted over the weekend, forcing evacuations in California and Arizona.

The blazes are among dozens that have broken out across the US south-west early in the summer, including a ferocious fire in New Mexico that became the worst in the state's history. Officials say it is a foreboding sign of what is shaping up to be another intense year of fire.

The so-called Pipeline fire, burning to the north of Flagstaff, Arizona, grew to an estimated 5,000 acres (2,000 hectares) after igniting on Sunday, fueled by gusty winds through the desiccated grasses and brush. The windy, warm conditions complicated containment efforts, according to officials, who added that the fire continues to be active on all sides.

"Strong winds coupled with warm weather have been the challenging factor for firefighters and air resources, as winds are predicted to be 40 to 50mph today" Coconino county officials said in an update on Monday.

The cause of the blaze is still under investigation and there have not been any destroyed structures, but a 57-year-old man has been arrested, Forest Service law enforcement said.

Nearby, a separate blaze, named the Haywire fire, ignited early Monday morning – probably due to flying embers – and within hours had blackened more than 1,600 acres (650 hectares). The two fires are expected to combine, and are burning near where the Tunnel fire was recently contained in Coconino county.

The fires have forced many residents in the Flagstaff area to evacuate for a second time this season.

"Here we go again," said resident Euelda King said as she waited with her family in a parking lot, watching smoke billow through the air and aircraft flying overhead. She said she barely had had time to settle back in after the last evacuation earlier this spring. Her family of 11 is planning to stay at the Navajo Nation casino, which is offering assistance to tribal members who evacuated.

"The winds are high, and I think they're going to have a little bit of a battle with it," she added of the fire forming large ominous plumes on the horizon. Gusts were sweeping the smoke through Schultz Pass toward Doney Park and authorities asked everyone in



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the area to leave immediately. “With this thing going as fast as it is, it could get much closer, of course hoping it doesn’t,” King said.

Authorities said 13 engines, nine crews, six prevention patrol units, three bulldozers and one water tender were involved in fighting the fire. An incident management team is scheduled to arrive on Monday.

Meanwhile, in California, evacuation orders were in place on Monday for remote homes near a wildfire that flared up over the weekend in mountains north-east of Los Angeles, authorities said. The Sheep fire, which grew to more than 990 acres (400 hectares), was 18% contained as of Monday afternoon, according to officials, who also said 300 people had been evacuated from the area.

Original Article: [The Guardian by Gabrielle Canon](#)

Land Fallowing Could Reach More Than 690,000 Acres Due to Drought

The lack of available water supplies could increase the amount of agricultural land fallowing than previously estimated. Mike Wade, Executive Director of the California Farm Water Coalition, said that more is needed to ensure ample water availability moving forward. The state is looking at a significant economic impact due to dismal water supplies, which could have even further repercussions.

“We are looking at another dry year for California, and we’re coming off of a previous somewhat dry year. So, the water storage in our reservoirs was very low at the beginning of this year,” said Wade. “We’re potentially looking at record fallowing numbers, anywhere, in our estimate, from 594,000 to perhaps 691,000 acres of farmland that’s not going to be growing any food in 2022.”

The impact of dry conditions and the subsequent land fallowing will also take a hefty toll on the economy. Wade said that the drop in production will have a significant impact on job losses. As many as 25,000 jobs could be lost as a result of the increased land fallowing due to the reduction of available water. Overall, California could be looking at a decline in economic activity of approximately \$3.5 billion.

Drought conditions causing a drop in acreage used for food production will also be felt by consumers. The cost and availability of fresh produce will also be negatively impacted. Wade noted that the consequences of insufficient water availability in California will have a detrimental affect on domestic food security.

“The global unrest that we’re seeing is a strong indicator of the troubles we can see here at home if we’re not careful about maintaining our productivity and relying on a safe and domestic food supply. That comes with a reliable water supply for California,” Wade explained. “What we’re seeing around the world with the uncertainty and the problems in getting food to various parts of the world, we’ll see that here if we don’t take care of our own farm production.”

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



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Farmers worry water-rights proposal could affect food supply

As drought continues to be a concern across California and Kern County, there is a new proposal in the state senate that could spend up to \$1.5 billion to buy back the water rights that allow farmers to take as much water as they need from the state's rivers and streams to grow their crops.

After decades of fighting farmers in court over how much water they can take out of California's rivers and streams, some state lawmakers want to try something different: use taxpayer money to buy out farmers. It comes at a time when the state's drought tracker says that almost 98 percent of California is currently experiencing yet another severe drought, which is resulting in low river levels.

Senator Bob Wieckowski and a group of other Democratic senators say the proposal comes as climate change is impacting hydrology throughout California.

According to the Associated Press, "legally, all of the water in California is the property of the government. But farmers have 'water rights' that let them take water for agriculture. Farmers have used those rights — governed by a complicated system based on seniority and other factors — to turn California's Central Valley into an agricultural powerhouse that provides much of the nation's fruits, nuts and vegetables. But siphoning off all that water also has disrupted the fragile ecosystem of the San Joaquin/Sacramento River delta, the largest estuary on the West Coast and home to endangered salmon and other fish. Environmental groups and farmers have battled for years over state and federal rules governing just how much water can be diverted for agriculture, which uses far more water than any other sector of the economy."

Now, with California having a record budget surplus of nearly \$100 billion, Democrats in the state Senate have proposed using up to \$1.5 billion to buy senior water rights — by either buying the land associated with the rights, buying just the right itself, or putting an easement on the land that requires the water to be used for fish and other fauna and flora.

"It's like we're taking a page from corporate America and we're buying back stock," State Sen. Wieckowski told the AP.

For this to work, farmers would have to voluntarily sell their valuable water rights — something Birmingham says shouldn't be a problem. Lots of farmers try to sell their water rights to Westlands Water District every year, Birmingham said.

"For many farmers ... their children simply are not interested in continuing to farm," Birmingham said.

However, California farmers are saying that the buyback of rights can heavily affect their crop productivity.

"To buy those water rights and permanently dry up that land at a time when we don't have enough food in the world. Those that live in urban areas as well as farmers, have done tremendous things and will continue to do more but it is a hardening demand while



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we've done nothing to increase our water supply," says Danny Merkley, the director of water resources for the California Farm Bureau.

Merkley says that as a result of the proposal the impact that it could have economically also contributes to a loss of food supply. He adds that the state of California grows two-thirds of the tree fruits and nuts in the United States and about half of the vegetables that are consumed.

Original Article: [23 ABC by Breanna Polk](#)

Time to Reform the Unreasonable SJ River Exchange Contract

The Biden Administration has an opportunity later this year to begin the process of reforming one of the most unreasonable water contracts in California: the San Joaquin River Exchange Contract. People who have never heard of the San Joaquin River Exchange Contractors may be shocked to learn that thanks to their permanent contract with the Bureau of Reclamation, these four water districts appear to be getting more water from the Bay-Delta than anyone else in California (75 percent of their maximum contract amount this year, which is more than 656,000 acre feet of water), and have been getting more water under this contract than they would be entitled to under their claimed senior water right. Last month, NRDC sent this letter requesting that the Bureau of Reclamation formally request renegotiation of the contract, as provided for in the contract. Reforming this contract is a matter of fundamental fairness and is necessary to protect California's rivers, salmon, and the Bay-Delta.

The San Joaquin River Exchange Contractors are four irrigation districts along the San Joaquin River. Decades ago, these districts negotiated an agreement with the United States where the U.S. purchased their claimed right to divert water from the San Joaquin River, in exchange for the Bureau of Reclamation delivering substitute water from the Delta. This agreement enabled Reclamation to build Friant Dam, which resulted in the Bureau of Reclamation illegally drying up the San Joaquin River and extirpating the river's native salmon runs, which numbered in the tens or hundreds of thousands. Drying up the river, of course, is unlawful under section 5937 of the California Fish and Game Code, which was the statutory basis for the settlement to restore the San Joaquin River.

However, whenever Reclamation cannot deliver enough water from the Delta to satisfy this bloated water contract, Reclamation delivers water from the San Joaquin River to these contractors. That happened for the first time in 2014, then again in 2015 and 2016, and again this year. As a result, the San Joaquin River is completely dried up for miles this year – because of these unreasonable contracts and resulting water deliveries to the Exchange Contractors.

But these contracts aren't just causing the San Joaquin River to be bone dry, they're also unfairly hogging the water in the Bay-Delta watershed. While many agricultural contractors of the Central Valley Project are getting a 0 percent allocation this year, the



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Exchange Contractors are getting a 75 percent allocation. Even the Sacramento River Settlement Contractors, who likewise claim senior water rights, are getting the equivalent of an 18% allocation this year, notwithstanding the terms of their contract with the Bureau of Reclamation. As a result, it appears that the Exchange Contractors are getting more water from the Bay-Delta than anyone else this year, the legacy of the Miller & Lux cattle empire and California's deeply inequitable water rights system. And they're getting their water at bone cheap prices - \$20 per acre foot for the first 2.5 acre feet per acre land, and \$50 per acre foot for the last 0.5 acre feet of water. Original Article: [NRDC by Doug Obegi](#)

AV study of water storage continues

The Antelope Valley State Water Contractors Association is continuing with a study to determine the feasibility of two different methods of storing surplus State Water Project water from the California Aqueduct underground in the vicinity of Big Rock Creek, southeast of Palmdale.

A pilot study of the original plan — to recharge water directly into the aquifer through the creek bed — conducted in 2019-2020 proved to be infeasible, as the ground did not absorb the water fast enough to prevent it from spilling downstream, where it crossed and flooded East Avenue T.

Instead, the Association is looking at either using culverts beneath avenues T and S to direct the water without flooding the roads, or to pipe water into recharge basins, located east of the creek bed.

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Original Article: [AV Press by Allison Gatlin/ Valley Press Staff Writer](#)

State curtails river diversions again. What that means to Modesto-area water users

The state has again stopped river diversions in much of Stanislaus and nearby counties, but the effect on farms and cities is minimal for the moment. The orders allow water agencies to continue delivering supplies already in reservoirs. They include the Modesto and Turlock irrigation districts and San Francisco on the Tuolumne River, and the Oakdale and South San Joaquin districts on the Stanislaus River. These agencies have enough stored water for this year, but they still challenge the state's authority over their long-held river rights.

A drought now 3 years old forced Tuesday's action by the State Water Resources Control Board. It first curtailed diversions last August but lifted them after heavy storms in October and December. The months since then have been historically dry. "We're not going to get a significant pulse of new snowmelt at this point," said Erik Ekdahl, the state board's deputy director. "There is no more snow to melt The order affects many rights holders on the San Joaquin River and its tributaries. The state board seeks to provide at least some flow to protect fish and water quality in the Sacramento-San Joaquin Delta and San Francisco Bay. Many irrigation districts on the west side of the San Joaquin Valley are already getting zero water from the federal Central Valley Project. Allotments are 75% for about a quarter-million acres with senior rights between the Crows Landing and Mendota areas. MID and TID capped their customers at about 60% of normal use with the goal of having enough for 2023 and meeting lower-river fish rules. OID and SSJID do not have caps but have urged careful use. San Francisco has several years of storage but is urging conservation, too, in the Bay Area. These agencies and others sued the state board last year on the grounds that it does not have the power to curtail their rights. Today's top headlines Sign up for the Afternoon Newsletter and get the day's biggest stories in your inbox. SIGN UP This site is protected by reCAPTCHA and the Google Privacy Policy and Terms of Service apply. MID and TID issued a joint statement about the latest action: "As we continue to analyze these curtailment orders and the state water board's methodology to justify the need for curtailments on the Tuolumne River, the Modesto and Turlock irrigation districts will be able to continue to meet our customers' needs and environmental requirements." URBAN CONSERVATION LAGS Meanwhile, new figures released by the state board show that urban Californians remain largely indifferent to Gov. Gavin Newsom's call for 15% voluntary water



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conservation. The board said per-capita urban water consumption in April fell by 7% compared to a year earlier — and was 17% higher when compared with April 2020. All told, urban Californians have reduced consumption by just 2% since the governor called for savings last summer. The fact that water usage fell in April compared to a year earlier was “at least heartening,” said board Chairman E. Joaquin Esquivel. Others, though, said the conservation numbers need to get a lot better.

Original Article: [The Modesto Bee](#) by John Holland and Dale Kasler

Calif. opens \$193M to water infrastructure proposals

The California Department of Water Resources (DWR) has released the Grant Program Guidelines and Proposal Solicitation Package for approximately \$193 million in grant funding to help local agencies advance water infrastructure and resilience projects.

The funding will support projects such as water desalination, wastewater treatment, water conservation, and groundwater recharge as California plans for a fourth year of drought.

Financed by voter-approved Proposition 1, \$167.5 million is available through the Integrated Regional Water Management (IRWM) Program to implement projects that respond to local challenges by improving water supply reliability, reducing fire risk, increasing water storage, and improving water quality — including treating drinking water — while adapting for future challenges caused by climate change and drought. The remaining \$25.5 million is reserved to fund projects that will benefit disadvantaged communities.

“As a state we must prepare now for continued impacts to our water supply from a changing climate. We must invest in water infrastructure and work towards a droughtproof and sustainable water supply that supports our communities and the environment into the future,” said DWR Director Karla Nemeth. “This funding will help regions and local agencies increase self-reliance and implement projects that best suit the needs of their area.”

DWR will deliver the funding through two phases and will require applications for the first phase to be submitted by August 19 of this year. Applications for the second phase of funding must be submitted by February 1, 2023. Applicants must coordinate through their respective established IRWM Regional Water Management Group and can submit grant applications using DWR’s online submittal tool, GRanTS. DWR expects to announce the first phase of awards later this fall and the second phase in spring 2023.

This solicitation will award all remaining funding in the Proposition 1 IRWM Program. In 2020, DWR awarded \$211 million to 42 IRWM regions for implementation projects including approximately \$25 million for projects benefiting disadvantaged communities.

Original Article: [Water World](#)



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Where Parched California Is Finding New Water Sources

As drought-plagued western states watch their water sources literally dry up, California is digging deeper to tap the most basic source of all: groundwater.

Amid a worsening drought scorching much of the western U.S., California's numerous and varied potential drinking water sources are becoming unusable or, when purchased from Colorado or other districts, too costly. As reservoirs, rivers and washes dry out, state water resource administrators are boosting use of alternative supplies to ensure water keeps flowing.

Groundwater is the "abandoned child of the water system because we have not been very meticulous in the way we gathered data or managed or protected it," says Newsha Ajami, chief development officer for environmental research at Lawrence Berkeley Lab in Berkeley, Calif., and a longtime state drought expert.

But more reliance on groundwater is problematic for a variety of reasons.

Many groundwater wells—not monitored or managed until California enacted the Sustainable Groundwater Management Act in 2014—have simply been overdrawn.

Moreover, it was common practice during the 1940s and 1950s for industrial facilities, manufacturers and even dry-cleaners to dump chemicals and waste underground, leaving a legacy of pollution that renders some groundwater undrinkable.

Los Angeles is able only to consistently draw from 41 of 115 wells in the San Fernando Basin, a collection of regional underground aquifers that currently provide about 10% of city water supply. This has caused a 50% reduction in its historical groundwater supply. But the LA Dept. of Water and Power says the basin has the potential to provide as much as 21% of city water.

As a result, the department is working with federal and state officials, potentially responsible polluted site owners and a slew of engineering and construction firms on multiple remediation projects to return a more significant portion of groundwater supply to the drinking water system. Concentrated in the San Fernando Valley, these projects are using a combination of granular activated carbon tanks coupled with ultraviolet advanced oxidation when needed to clean up pollutants that have remained in the basins for decades.

State Water Resources Control Board member Sean Maguire, a civil engineer and former consultant, says the department has been a "real leader" in transforming water that was formerly off limits for use into a future significant portion of the city water portfolio.

The U.S. Environmental Protection Agency established four Superfund sites within the valley in the mid-1980s, and efforts to identify responsible parties and remediate the groundwater basin have continued since then.

Some toxics, mainly detritus from manufacturing facilities that provided parts for aircraft, include a veritable alphabet soup of volatile organic compounds (VOCs), including trichloroethylene, perchloroethylene, petroleum compounds and heavy metals.



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Also present is 1,4 dioxane, often found in paint-stripping products, as well as hexavalent chromium, which is both naturally occurring and contained in some consumer and industrial products such as coatings and plastics. Many of these chemicals are in large enough quantities that the water is not safe to drink unless it is treated.

Original Article: [Engineering News Record by Pam McFarland](#)

US WATER NEWS

It's time for Legislature to protect water for all Arizonans

My work is keeping me up at night these days. I'm very concerned because the groundwater that rural Arizonans rely on for drinking and their livelihoods is at serious risk. I'm very concerned because the natural water-fed outdoor spaces I have enjoyed since I was a child are at risk of disappearing. Decades of drought and unregulated groundwater overpumping are threatening life in rural Arizona as we know it. In my work I have heard urgent calls for help from rural Arizonans get louder and louder over the past few years. Up to now our Legislature has ignored them. It's time we give them real and workable answers.

My parents moved my five brothers, my sister and me to Arizona in the early 1970s when my father took a job with the state. Soon after we arrived, my dad and older brothers were taking me all over the state to hike, camp, hunt, and fish. Places nourished by water like the Verde Valley and the White Mountains were always cherished destinations. Today, four siblings still make Flagstaff their home, and I spend time with family there and in places like the West Fork of Oak Creek whenever I can. It's been inspiring to follow my brother Mark's service as a Coconino County Superior Court judge and cheer on my brother Mike's over 350 career wins as the Coconino High School boys basketball coach. I guess you could say that I am based in Phoenix but strive to stay grounded in "greater Arizona."



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I've worked in and around Arizona public policy since the late 1980's, much of it proudly on behalf of for-profit companies. Since focusing on water policy eight years ago, I'm more concerned than ever about the future of greater Arizona. Unless we improve our water policies, Arizona's air, land and water will not sustain our communities and many special outdoor places in the future.

We need to face the reality that Arizonans living outside the state's biggest urban areas face mounting risks from extreme heat, wildfires, and drought. In 80 percent of the state's land area, many property owners' water supply is at risk because the groundwater they rely on is unprotected. Regardless of how long a property owner has relied on well water for a home, farm, or business, a big industrial or agricultural water user can drill new wells on adjacent land and pump as much groundwater as they want with no restrictions. It doesn't matter if that pumping forces a neighbor to spend thousands of dollars to deepen their well or causes a neighbor's well to run dry. Both scenarios are playing out in several areas right now and land owners have no recourse. Unrestrained groundwater pumping also threatens irreplaceable resources like the Verde River and springs in the Grand Canyon.

This rule of "the deepest well wins" in rural Arizona is unsustainable and unacceptable. It rewards the interests of a few wealthy interests – often a newly arrived private corporation with plans to use large quantities of limited groundwater supplies without full consideration for the needs, interests, and future of all other water users in a community, including small pre-existing farms.

Water is the lifeblood of ecosystems, wildlife and special places that sustain our communities and nurture our souls. Our goal should be to ensure reliable water for everyone now and in the future. Sound water management is essential for protecting property values and sustainable economic development.

The good news is that we now have a solution to help rural Arizona communities. H.B. 2661, Rural Management Areas (RMAs), introduced by Rep. Regina Cobb, would allow rural counties whose groundwater is at risk to opt into a system of locally driven groundwater management. The county board of supervisors would appoint an RMA council composed of local residents to develop a plan to conserve and manage groundwater, which would be submitted to the director of the Arizona Department of Water Resources for approval and then be eligible for state funding and technical assistance. This balanced, locally driven approach is unanimously supported by the boards of supervisors in Yavapai, Coconino, La Paz, and Mohave counties.

Developing a balanced and sustainable plan will undoubtedly be hard for some water-stressed areas. We need to ensure that farms and ranches can grow food and fiber sustainably even though water supplies are dwindling in the Colorado River Basin. Drier conditions will require investments to upgrade irrigation infrastructure, improve efficiencies, promote soil health and regenerative agriculture, and incentivize growing



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economically viable and lower water use crops such as guayule. Different communities will have different approaches; there is no one-size-fits all solution. And that's the point of the RMA bill: Rural communities ought to be able to steer their own futures.

While water issues may seem unique and complex, in many ways they are not so different from other issues that we address with credible information; inclusive, transparent processes; and rules that reflect a community's values. I've thought about these similarities recently while reflecting on how the public service careers of my two Flagstaff brothers compare to my work in water. With wisdom and integrity, Judge Mark applied the community's values as embodied in law to a wide variety of people and complex situations. Coach Mike held all basketball players accountable to follow the team's rules, even the star player, upholding a community value that the win-loss record must be secondary to the educational experience of all student athletes.

Managing our water resources is not fundamentally any tougher than administering justice or educating student athletes. Now that my brothers are both retired while I'm still working on water, our family conversations are turning more often to the topic of leaving a legacy of vibrant land and waters in greater Arizona. I find hope in the rising call of rural Arizonans for state groundwater legislation and strong public leadership in rural communities. Now it's time to see the same kind of leadership in the Legislature. It's time for state leaders to entrust rural groundwater management to the rural Arizonans whose lives and livelihoods depend on it.

Original Article: [AZ Capitol Times by Kevin Moran](#)

Gov. Justice announces a total of \$12.8 million to go towards water infrastructure projects around the state

Nearly two months ago, Governor Jim Justice called a special session of the West Virginia Legislature to secure \$250 million for the new Economic Enhancement Grant.

Now, the program's first grant recipients are being awarded a combined total of \$12.8 million for three water and wastewater infrastructure projects. It will include a project of \$3.4 million in the city of Ripley, a \$1.8 million in Richwood, and a \$7.5 million project in the city of Lewisburg.

Managed by the West Virginia Water Development Authority (WDA), the grant will specifically go toward upgrading water and sewer systems in those areas.

"And we know...we know all across this state that we still got a lot of people that need clean water," Justice says. "We still got all kinds of sewage projects that we need to do across the state. We need to do them. And we want to do them."

The projects will also be in collaboration with the WV Infrastructure and Jobs Development Council, along with the WV Department of Economic Development.

Original Article: [ABC 4 WOAY by Katherine Skeldon](#)



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Lake Mead's steady decline hits low water mark

As the western megadrought worsens, the nation's largest reservoir hit a new worrisome milestone this week.

Lake Mead now sits just 29 percent full, dropping below 30 percent for the first time since the reservoir was initially filled more than 80 years ago, according to the most recent weekly report released this week by the U.S. Bureau of Reclamation.

"We have been planning for this and preparing for this potential for more than two decades," said Bronson Mack, spokesman for the Southern Nevada Water Authority. "We anticipate that Lake Mead's water level is going to continue to decline as a result of drought and climate change conditions. But this further emphasizes the seriousness of this issue. And it does serve as a very stark reminder that we all need to conserve the water that we use outdoors."

Lake Mead's continued drop is not a surprise. Beyond the rising temperatures and dwindling water supply in the Colorado River, the Bureau of Reclamation recently implemented a plan to hold back 480,000 acre-feet of water in Lake Powell that would normally be released downstream and to Lake Mead, a measure taken to ensure that Glen Canyon Dam can continue to generate electricity amid what the Department of Interior has said are the driest conditions in the American West in more than 1,200 years. The lake's levels have fallen steadily for years, and estimates from the Bureau of Reclamation show no sign of that trend stopping anytime soon. Lake Mead sits at an elevation of 1,046.3 feet. That's more than 40 feet lower than the 1,087.1 feet elevation the lake was at just two years ago in June 2020. The latest two-year projection from the federal agency shows that the lake could drop as low as 1,020 feet within the next two years.

In December, water agencies in Nevada, California and Arizona joined the bureau in signing the so-called "500+ plan," a new effort to buoy Lake Mead's elevation by about 16 feet over the next two years.

Last month, the water dropped far enough to expose the first intake straw for the first time in the lake's history, and the water authority moved to activate its newest low-lake-level pumping station that pulls water from near the bottom of the reservoir.

But Southern Nevada's water supply shouldn't be affected anytime soon even as the lake continues to shrink, as that low-level pumping station is able to send water to the valley even if the reservoir shrinks another 150 feet to its "dead pool," the point at which Hoover Dam would be unable to release water downstream.

Southern Nevada has also become more adept at conserving water over the years. Since 1999, the authority has been paying residents who convert their lawns to desert landscaping, and more recently it made a successful push for a new law that requires the removal of nearly one-third of all grass in Southern Nevada by making it illegal to use Colorado River water to irrigate "nonfunctional turf" starting in 2027.



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The valley consumed roughly 242,000 acre-feet of water last year, Mack said. That's more than 90,000 acre-feet, or about 26 billion gallons, less than the Las Vegas valley consumed in 2002.

"We are providing less water to more people today than we did 20 years ago," Mack said. "That's because of conservation."

Original Article: [Las Vegas Review Journal by Colton Lochhead](#)

EPA to give \$60M to 12 states to help curb water pollution

The federal government said Friday that it will distribute \$60 million among 12 states that have waterways that flow into the Mississippi River to help them control farm runoff and other pollution that contribute to a dead zone in the Gulf of Mexico.

The money comes from the infrastructure law that President Joe Biden signed in November, the Environmental Protection Agency said.

Radhika Fox, EPA assistant administrator for water, made the announcement with Iowa Secretary of Agriculture Mike Naig in Des Moines.

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Radhika Fox, EPA assistant administrator for water, made the announcement with Iowa Secretary of Agriculture Mike Naig in Des Moines.

The states are Arkansas, Illinois, Indiana, Iowa, Kentucky, Louisiana, Minnesota, Mississippi, Missouri, Ohio, Tennessee and Wisconsin.

Original Article: [KTAR News/ Associated Press](#)



GLOBAL WATER NEWS

HORN OF AFRICA: \$385m funding for groundwater development

The Board of Directors of the World Bank Group has approved \$385 million in financing for drought-affected countries in the Horn of Africa. This financing will allow the implementation of a groundwater exploitation project carried out in partnership with the Intergovernmental Authority on Development (IGAD).

Faced with the climate emergency in the Horn of Africa, the World Bank is finally reacting. Its Board of Directors has just validated a financing package of 385 million dollars. Granted through the International Development Association (IDA), the funds will finance the Horn of Africa Groundwater Resilience Project (HoAGWRP).

This regional project aims to strengthen the capacity of the Horn of Africa to adapt to the effects of climate change. Climate change is manifesting itself in prolonged drought that is drying up the already scarce surface water resources in this region known for its arid climate. The HoAGWRP project targets Ethiopia, Somalia and Kenya. The governments of these three countries are expected to work closely with the Intergovernmental Authority on Development (IGAD), a regional grouping of seven East African countries including Djibouti, Ethiopia, Kenya, Somalia, Sudan, South Sudan and Uganda.

Improving water supply

With funding from the World Bank, the governments of the countries concerned and Igad will use solar energy to set up small- and medium-scale facilities to provide water to drought-affected populations. Specifically, after assessing the sustainable management of aquifers, the Horn of Africa countries will rehabilitate and build new climate-resilient groundwater infrastructure for human and livestock consumption.

This includes the drilling of new wells equipped with solar pumps to replace diesel generators and thus reduce CO2 emissions. In addition to improving the supply of drinking water, the regional project focuses on investing in small-scale irrigation systems, contributing to soil conservation and aquifer recharge.

Sustainable use of aquifers

These investments are currently being considered in the Borena region of Ethiopia, on the border with Kenya. This activity will help small-scale farmers to switch from rain-fed to irrigated agriculture, enabling them to adapt to changing rainfall patterns and drought events in the lowlands. Irrigation systems will also be equipped with pressurised systems that will use renewable energy for pumping and distributing water.

Also, Igad and the three Horn of Africa countries will invest in infrastructure to support aquifer sustainability (recharge) and flood mitigation. This type of infrastructure will also help improve water supply during periods of extreme drought. Examples include sand



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dams, a storage mechanism built into dry riverbeds that helps retain soil moisture and concentrate water during dry months.

The HoAGWRP project will build on other nature-based solutions to improve groundwater recharge. These include rainwater harvesting, afforestation, and soil and water conservation measures to prevent erosion and land degradation. The regional project will also encourage the integration of these interventions into river basin plans as part of broader water resource management strategies.

Original Article: [Adrik21 by Jean Marie Takouleu](#)

Accelerating rate of groundwater depletion in Punjab, worries farmers and experts

A 2020 block-wise groundwater resources [assessment](#) by the Central Ground Water Board (CGWB) found that most of the districts in Punjab had over-exploited the groundwater levels. In some districts, the groundwater level was marked as critical.

Groundwater extraction in Punjab has already reached 150-200 metres in most places in central Punjab. If the present depletion continues, Punjab's groundwater is expected to drop below 300 metres by 2039, as per CGWB. Experts warn a major threat to India's food security if Punjab's groundwater goes dry. Phasing out paddy and remodelling British era canal systems to improve canal-based irrigation techniques are being recommended as possible solutions.

Last month, a monitoring committee of the National Green Tribunal (NGT) reviewed the district environment plan of Shaheed Bhagat Singh Nagar district (formerly Nawanshahr district). The committee laid stress on the depleting groundwater levels and announced that usable groundwater is available till the threshold limit of 300 metres (1000 feet), beneath the ground.

Balbir Singh Seechewal, a noted environmentalist and member of the NGT panel that met last month, told Mongabay-India that their prediction about 'groundwater depletion in 17 years' was not based on hearsay. It came from Central Ground Water Board (CGWB)'s 2019 [report](#) which studied Punjab's groundwater situation till 2017. The report states that if the present rate of extraction continues, within the next 22 years, the state's usable groundwater will vanish.

"Five years have already passed and there has been no drop in Punjab's groundwater depletion rate. We are left with 17 years. The situation is very delicate. The successive governments have not given the serious and immediate attention this issue deserves. The time has come to stop this; otherwise, no one can stop Punjab from getting perished," Seechewal told Mongabay-India. As per the report, the average yearly rate of fall of groundwater levels works out to be approximately 0.49 metre/year.

Punjab's central and southern districts, such as Barnala, Bathinda, Fatehgarh Sahib, Hoshiarpur, Jalandhar, Moga, SAS Nagar, Pathankot, Patiala and Sangrur, are among the most affected.



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Kahan Singh Pannu, a retired bureaucrat and the current convenor of Punjab Vatavaran Chetna Lehr, a group working to mainstream environment issues in the state, explained that there is a limit at which water can be extracted beneath the ground. It is scientifically established that good quality water is available in the first aquifer reaching down to 100 metres (328 feet). If the water level drops below 300 metres (roughly 1,000 feet), the quality of water becomes highly contaminated and not fit for irrigation or drinking. Pannu said, "Now, compare this situation with Punjab. As per CGWB, Punjab's ground water in the first 100 metres will get exhausted by 2029 and it will drop below 300 metres by 2039."

Pannu, who previously worked with Punjab Irrigation Department for years, shared with Mongabay-India, "There are already villages in central Punjab, where groundwater has already depleted below 100 metres and reached to 150-200 metres (500-600 feet). Out of 138 Blocks in the state, 109 Blocks ([79 percent](#)) are 'over-exploited', which clearly means that they are fast reaching to the threshold limit of 300 metres. Even if one may find some quality water above 300 metres in some pockets subject to laboratory testing, it will not be financially viable for farmers to extract that deep, as it would need bigger tube wells and much deeper pipes that will not cost less than 40-50 lakh rupees."

Pannu urges that the present depletion of groundwater be declared a national emergency since Punjab is a food bowl of India. "Punjab feeds the country with both wheat and rice. If Punjab fields go barren, it will create a major food security challenge in the whole country. If country wants that Punjab continues to feed the nation, then time has come for solutions to reverse the looming environmental crisis before it is too late," he added.

Original Article: [Mongabay by Vivek Gupta](#)

Chilean workers 'beg God for water' as reservoir turns to desert amid record drought

Chilean workers are becoming desperate as a record drought, driven by warmer temperatures, has sapped almost all the water from an enormous reservoir.

The Penuelas reservoir in central Chile was 20 years ago the main source of water for the city of Valparaiso, storing enough water for 38,000 Olympic-size swimming pools.

Amid a historic 13-year drought, rainfall levels have crashed in the South American nation, leaving Penuelas with enough water to fill just two such pools.

What was once a lake bed is now a vast expanse of baked earth, punctuated with fish skeletons and animals hunting for water.

"We have to beg God to send us water," said Amanda Carrasco, a 54-year-old who lives near the Penuelas reservoir and can remember line fishing in the waters for local pejerrey fish.



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"I've never seen it like this," he told Reuters news agency. "There's been less water before, but not like now."

The drought has hit mine output in the world's largest copper producer, stoked tensions over water use for lithium and farming, fuelled forest fires and driven the capital Santiago to draw up unprecedented preparations for water rationing.

Segundo Aballay, an animal breeder in the Chilean village of Montenegro, is praying change comes soon.

"If it doesn't rain this year we will be left with nothing to do," he said. "The animals are getting weaker and dying day by day."

Rainfall was once reliable in winter but now at historic lows, said Jose Luis Murillo, general manager of

ESVAL, the company that supplies Valparaiso with water.

"Basically what we have is just a puddle," he said, adding that the city now relied on rivers. "This is especially

significant if you think that several decades ago the Penuelas reservoir was the only source of water for all greater

Valparaiso."

Hotter air temperatures have meant that snow in the Andes, that usually yields water as it melts in the spring and summer, is melting faster or even turning straight to vapour.

Scientific studies have found that a global shift in climate patterns is driving the problem by sharpening natural weather cycles. Ozone depletion and greenhouse gases in the Antarctic are exacerbating weather patterns that draw storms away from Chile, according to a study.

Analysis of tree rings going back 400 years shows how rare the current drought is, Duncan Christie, a researcher at

the Center for Climate and Resilience in Chile, told Reuters. It is unrivalled for duration or intensity.

He said the Andes mountain range - which he called the country's "water towers" - were not getting being replenished, meaning that as snow melted in spring, there was far less water to fill rivers, reservoirs and aquifers.

An engineer and water specialist who went to measure snow cover near the Laguna Negra station in central Chile ended up finding "nothing" to measure.

Original Article: [Sky News by Victoria Seabrook](#)

New insights on distributive politics from a new way to measure aridity

Climate change and natural disaster mitigation are at the top of the global policy agenda.¹ In recent years, there have been several calls for a more thorough economic analysis of their causes, consequences, and possible remedies (Fernando 2012, Azmat et al. 2020). Some progress in this direction has been made. The Journal of Economic



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Geography, for instance, devoted a special issue in 2021 to the “Economic Geography of Climate Change”. As pointed out by the editors (Peri and Robert-Nicoud 2021), the special issue stresses the heterogeneous impacts across space of climate change and natural disasters, as well as their effects on the reallocation of people and economic activity. These aspects are also discussed in several Vox columns (Kocornik-Mina et al. 2016, Peri and Sasahara 2019, Albert et al. 2021, Conte et al. 2021, Di Falco et al. 2022). Macours et al. (2012), instead, discuss how providing financial training and access to capital can help to buffer the shocks of severe weather and, hence, adapt to natural disasters.

In this column, we restrict our attention to droughts. We first discuss an important methodological aspect related to its measurement and conclude that an alternative index – the Standardised Precipitation-Evapotranspiration Index (SPEI) – is superior to precipitation-based indices of aridity. Then, we present the main results of Boffa et al. (2022), where we use the SPEI to contrast the optimal assignment of drought-motivated relief with the actual assignment, providing a deeper understanding of how distributive politics works.

The Standardised Precipitation-Evapotranspiration Index

Water shortages are more difficult to measure than other natural calamities. Indeed, the notion is more elusive, both geographically and temporally, than it is for other natural disasters (e.g. tornados or floods). Until now, the economic literature has mostly used precipitation as a measure of water shortages, defining droughts as a long period of abnormally low rainfall. Such measures appear to be unreliable, as they lead to measurement error, inducing potentially important endogeneity issues.

What mostly matters – indeed, both for the ecosystem and for economic activities – is the degree of moisture (i.e. the humidity of the soil), which clearly depends on rainfalls but also on factors such as ground composition and average temperatures. Importantly, those same factors are crucial for the endogenous decision to settle in a given area or to cultivate a given crop. Therefore, when precipitations are used as a proxy for aridity, the measurement error likely correlates with important economic variables that are studied in combination with droughts, such as migration and cultivation decisions. A more compelling measurement of water shortage requires the combination of rainfalls and evapotranspiration (that is, the amount of water released by the soil).²

The meteorology literature (Vicente-Serrano et al. 2010) solved this problem over a decade ago with the Standardised Precipitation-Evapotranspiration Index (SPEI), which combines precipitations and evapotranspiration (which measures loss of water from the soil, due to both evaporation and plant transpiration), thereby allowing us to obtain a proxy for the actual moisture of the ground at any point in time.

In particular, the SPEI is computed as the difference between precipitation and potential evapotranspiration, net of their historical mean and standardised using the historical standard deviation. A dedicated website (<https://spei.csic.es/index.html>) describes the



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index in detail and presents its comparative advantages vis-à-vis the most commonly used precipitation-based index: the Standardised Precipitation Index (SPI).³

The impact of evapotranspiration on ground moisture cannot be neglected both because its impact on soil moisture is significant and because it varies substantially over time. Hence, SPEI performs better than SPI both in cross-section and cross-time analyses. In particular, given that evapotranspiration depends on temperature, SPEI's ability to account for time variability is extremely relevant in the context of global warming.

Despite its superiority compared to standard precipitation indices, only recently has it gained traction among economists. Only a few (in progress) works have incorporated it to the best of our knowledge: Cavalcanti (2018) studies the relationship between aridity and corruption; Albert et al. (2021) study labour and capital reallocation as a consequence of aridity; and Cavalcanti et al. (2022) study the impact of aridity on agricultural productivity.

Droughts and distributive politics

In a new paper (Boffa et al. 2022), we use the SPEI index to measure aridity in Brazil. Using a regression discontinuity design, we study how aridity only partially explains the assignment of drought-motivated aid reliefs, while another important role is played by political alignment.

The previous literature on distributive politics has convincingly shown that central government allocates resources to regional governments based on criteria that diverge from societal needs. Data suggest a possible bias in favour either of swing districts (Johansson 2003) or of the ruling party's strongholds (Brollo and Nannicini 2012, Bracco et al. 2015, Curto et al. 2018, Catalinac et al. 2020).

We innovate compared to the previous literature by distinguishing between local and federal elections. We show that politicians distort the allocation of transfers only before local elections. The mechanism in our theoretical setting explains this result based on the different electoral mechanisms in place: in mayoral elections, a separate contest takes place in each municipality and what matters for the federal government is the number of municipalities won by each party. Instead, in federal elections, what matters is the total number of votes across the country (irrespective of the distribution of votes across municipalities). Consequently, before local elections, the political strategy aims at flipping the result in swing municipalities. Before federal elections, instead, political campaigns target single voters that are easier (or cheaper) to flip.

Original Article: [VOX EU by Federico Boffa, Francisco Cavalcanti, Christian Fons-Rosen, Amedeo Piolatto](#)

Africa: 'Day Zero' Just the Beginning for Water-Stressed Cities of the World
#AfricaClimateCrisis



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Cape Town — Over the last several years, major cities such as Cape Town, Sao Paulo and Barcelona have faced 'Day Zero' scenarios, characterised by the very real possibility of running out of water. As the world continues its urbanising trend, there are important lessons to be learned from these water crises: Why do they happen, what was the impact and the response? These lessons will be central to tackling future urban water-related risks and vulnerabilities especially given the uncertainties created by increased climate change and variability.

At the same time, Covid-19 has exacerbated many water-related impacts brought on by a changing climate and increasing urbanisation: water-related risks and vulnerabilities vary in relation to demographic factors such as race, class, age and gender. Similarly, densification (a term used in urban planning and urban design to refer to the number of people inhabiting an urbanized area) in the face of inadequate service provision, including access to water and sanitation, results in inefficient responses. The coronavirus pandemic reveals how existing systems of service delivery reduce the risk of water insecurity for some but heighten it for others. However, this pandemic provides the opportunity and the incentive to build back better, ensuring a form of urban water resilience for the benefit of all.

In *Towards the Blue-Green City: Building Urban Water Resilience*, a diverse set of scholars reflect on the causes and consequences of Cape Town's near 'Day Zero' event and the lessons to be learned for cities around the world. The shadow of Day Zero still looms over South Africa, with the nation still battling extremities of water availability on multiple fronts.

Tackling a global water crisis

With this in mind, the Institute for Poverty, Land and Agrarian Studies (PLAAS), an independent Policy Research Institute within the Faculty for Economic and Management Sciences at the University of the Western Cape (UWC), held a webinar to celebrate the launch of *Towards the Blue-Green City: Building Urban Water Resilience*.

The session was chaired by Professor Mafaniso Hara from PLAAS at UWC, in South Africa. Hara introduced Professor Ernst Conradie, Head of the Department of Religion and Theology, who recalled how Professor Philip Clayton from the Institute for Ecological Civilization said that Cape Town became an international symbol of dealing with escalating water shortages. "So the observation from the Institute for Ecological Civilization was that there are many cities all around the world that are facing similar situations. In fact, also within the South African context, it may be wise and interesting for such cities to compare notes ... to discuss the way forward in addressing such escalating water shortages," Conradie added.

Conradie described how the planning for the publication of *Towards the Blue-Green City: Building Urban Water Resilience* was made during the early lockdown period following the Covid-19 outbreak, and what, if anything, that was learned from the Day Zero crisis and could be utilised.



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"The question that we will need to explore is whether lessons of Cape Town 2015 to 2017, when we had a three year period of drought, whether these lessons have been learned and what these lessons actually are. Some of you might know that currently we are experiencing a very dry 2022. So the question is, if we have a similar cycle, which is bound to happen at some point, what are the lessons that we need to learn? And how can the experiences of the previous dry period be helpful as we plan ahead?" he said.

Professor Larry Swatuk of the School of Environment, Enterprise and Development at the University of Waterloo, briefly explained how he collaborated with Conradie on the book. "I mean, I would love to do it again without Covid. But it was quite an amazing exercise," he said. Swatuk went on to say that with rising populations in major urban centres, particularly in tropical regions, Day Zero, together with climate change, provided the impetus for the book project.

Swatuk added further context by saying that the severity of water shortages without a functional means to address them leads authoritative figures to turn to prayer in desperation.

"I spent many years in Botswana, and I was at a water meeting one time where the Minister of Minerals and Water Resources, gave the speech at the opening of the annual water net meeting, but then he ended by saying at the end of the day, we pray for rain. And I thought to myself this is absolutely an inadequate management and strategy to pray. Right. I've nothing against prayer. Prayer is very useful. But in terms of managing your water resources, we have to do a lot more than just pray for rain."

Citing a list of several cities, Swatuk said that flooding and ageing infrastructure are a common theme and that collaboration on solving these problems would be ideal. "And then and so our challenge was to write around the challenges through these entry points, and then to try to come together and see what we can do as a collective and is there common ground? And yes, there is common ground."

The need for water in the face of drought

Jenny Day, from the Institute for Water Studies at UWC. "So the section that I was dealing with was water and the natural environment. I am a freshwater ecologist. And one of the things that bothered me greatly during the drought was how difficult it was for water managers to be able to balance the requirements for water for humans against the damage to the natural environment that will occur as a result of the drought."

Day said that Cape Town was used as a case study because of its rich biodiversity. However, the city faces a dire future based on current climate trends, as Day explained: "By 2050, the rainfall in the Western Cape is likely to have decreased by about 30% from current levels, and Cape Town will essentially be a perpetually water-stressed city. At the same time, the population of Cape Town is still increasing somewhat less rapidly than it has been; there's going to be more people wanting more water, although less is going to be available."



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Day summarised by emphasising that future preparations need to be made to prepare Cape Town for the effects of climate change. "When we talk about the long term, we're not just talking about the next five-year plan, we actually need to be talking about the next 50 years. Because the ways in which drought is going to hit different cities are going to increase over time, at least for the next 50 years. And that will be if there's planet managers to reduce the rate of climate change. And to get in with regard to planning, there needs to be proper environmental impact assessments, and independent auditing of the proposals made, so that the people who make the final decisions are held accountable by independent auditors."

Original Article: [All Africa by Andre van Wyk](#)

Amid dust storms and drought, Turkey and Iran are at odds over transboundary water management

Water is slowly emerging as yet another potential cause for dispute between Ankara and Tehran. As of late, the two neighboring states have been at loggerheads over a number of issues, including Syria and Iraq, where they have opposing interests. After years of quiet diplomatic juggling, the issue of transboundary water management is gradually taking center stage in the two countries' relations, a development that could, in the medium run, have serious repercussions for regional security, not least because Tehran has started to frame it in national security terms.

Last month, for instance, Iranian Foreign Minister Hossein Amirabdollahian and a number of Iranian MPs blamed Ankara's ambitious dam-building projects for increased drought in Iraq and Syria and more frequent dust storms in Iran, calling Turkey's approach "unacceptable." Turkey, for its part, refuted the Iranian claims as unscientific and instead accused Iranian policymakers of trying to turn Turkey into a scapegoat to deflect public attention away from the regime's own dire mismanagement of the country's water resources.

At the heart of the issue is Turkey's multibillion-dollar Southeast Anatolia Project, which has been in the making for the past five decades. Led by the government-owned State Hydraulic Works, the project includes 22 dams and 19 hydropower plants on the Tigris and Euphrates rivers that have caused severe drought in large parts of Syria and Iraq. Viewed from Tehran, however, it is the Ilisu Dam on the Tigris River that poses the most acute environmental threat to its resource-rich yet highly impoverished southern and western provinces. According to Iranian officials, the recent uptick in dust storms in these regions is the direct result of reduced water flows in the Tigris and subsequent droughts in Iraq caused by the Ilisu Dam.

Although Turkey and Iran hold regular meetings to jointly monitor water flow from the former to the latter, a practice that has its roots in their bilateral agreement dating back to 1955, one should not discount the likelihood of prolonged contestation between the two regional heavyweights over the issue of water in the coming years. Of paramount



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importance is the fact that the interests of four sovereign nations are at stake, and thus bilateral arrangements will only have limited utility. This issue is made even more pressing as Turkey, unlike the other three countries, is not a signatory to the 1997 New York Convention on the non-navigational use of transboundary waters, meaning there is no foundation for the development of a multilateral approach.

Even if Ankara were bound by an international convention, it is not at all clear how successful Tehran would be in generating support for its position given its status as a pariah on the global stage. Nor are Iraq and Syria capable of exerting any meaningful pressure on Turkey to address their concerns over its aggressive dam-building projects and its broader approach to water management. The Syrian government is still preoccupied with the ongoing civil war while political instability in Iraq, and Turkey's own influence over some political constituencies in the country, severely limit Baghdad's ability to demand policy changes from Ankara. In fact, some Iranian analysts argue that Turkey has taken advantage of Iraq's weakness in recent years by accelerating its dam-building efforts, knowing full well that the government in Baghdad will not be able to challenge Ankara as long as it remains preoccupied with recurring rounds of political crisis and turmoil.

Taken together, all of this leaves Iran with no option but to expand its bilateral arrangements with Turkey while simultaneously taking the lead on developing a joint approach with Iraq and Syria to exert collective pressure on Turkey. To be sure, there is no shortage of reasons for the trio to be keen on pursuing such an initiative. Dust storms endanger public health and necessitate the full shutdown of cities and businesses, harming economic productivity, while droughts directly reduce crop cultivation, negatively impacting the agricultural sector and weakening food security.

As the three countries embark upon this effort, however, they are likely to get entangled with the broader dynamics of Iran-Turkey strategic competition in the region. This, in turn, will only further complicate an already complex and dire situation. A look at Iran and Turkey's water management dossiers reveals that their views on water resources are full of realpolitik language. They consider their ability to control the flow of water as an instrument of power and influence — one that can complement their grand strategies to become the leading player in their neighborhood. Therefore, Iran's attempts at alliance building will almost certainly be perceived as an opportunistic endeavor aimed at clipping Turkey's wings and reducing its influence in the region.

Already, some Turkish analysts have linked the water dispute with an increasing influx of Afghan refugees, accusing Tehran of trying to weaponize immigration to extract concessions from Ankara. Turkey is also likely to highlight Iran's own dam building as a cause of drought in order to cast doubt on the sincerity of Tehran's claims that it is seeking a win-win outcome for all parties. Doing so would be particularly easy in Iraq given that both Baghdad and Erbil have already made numerous complaints about Iran's efforts to divert tributaries of the Tigris at their expense.



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As Iraq and Iran prepare for another week of dust storms, one can be certain that the issue of transboundary water management will dominate relations between Iran and Turkey in the years to come. While the two states are likely to continue their bilateral efforts and expand the mandate of their established working groups, it is not at all certain if such efforts will lead to any meaningful result when it comes to addressing the root causes of the dispute. For that to happen, Iraq and Syria must be invited to participate, but as yet there is no sign of any move in that direction. More importantly, Ankara and Tehran need to opt for responsible statesmanship and avoid issuing emotional or rhetorical statements. Unfortunately, there seems to be little appetite for pragmatism at the moment as populist politics benefit the two governments, helping to galvanize nationalist sentiment and distract the public from the worsening economic situation in both countries. For Turkey's ruling party, in particular, this would come in handy in an election year.

Original Article: [MEI@75 by Nima Khorrami](#)

As taps run dry, Mexican drought fuels anger over water inequality

The heat is stifling in Jaime Noyola's modest house in the Mexican industrial hub of Monterrey, but he can't quench his thirst with a glass of water from the kitchen tap - the supply to his neighborhood has been cut for 12 hours a day.

Monterrey has been hard hit by a drought affecting nearly 60% of Mexico, where restrictions on domestic water use are fueling anger about water concessions that critics say grant businesses - including drinks firms - almost unlimited supplies.

"I'd always drunk water from the tap. Now I've no choice but to play into the companies' hands and buy water from them," said Noyola, 57, an activist who filed a complaint with Nuevo Leon's human rights commission in April accusing state authorities of failing to provide water to residents.

Jaime Noyola poses next to the plastic containers where he collects water during the drought in Monterrey, Nuevo Leon. May 15, 2022. Thomson Reuters Foundation/Diana Baptista

"We have to defend our water. Our own lives are at stake," Noyola, 57, told the Thomson Reuters Foundation.

Noyola said it felt bitterly ironic to have to buy water from a leading drinks firm that extracts water from a well close to his home, and he has joined a number of protests at bottling plants since rationing began earlier this year.

Nuevo Leon's water authority said in February that the three reservoirs that provide drinking water for the northern state were too low to last the spring and summer, prompting rationing that halts the flow to homes from 6 a.m. to 6 p.m. daily.

As the drought drags on, residents in some parts of Monterrey - especially those living in the city's poorer fringes in the hills - said the taps had been dry for days at a time.



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"Last week, we had no tap water at all. Not even a drop," domestic worker Maria Juarez said earlier this month, as she stood in her backyard among the plastic buckets she fills up whenever possible.

"We had to shower with bottled water," she said.

'CRITICAL SITUATION'

Climate change is increasing the severity and frequency of droughts worldwide, including in water-scarce Mexico, where a lack of clean drinking water is a historic problem in many areas including poorer parts of the capital.

It is also stoking tension over who should be allowed to exploit the country's water resources.

In 2020, U.S. brewer Constellation Brands was forced to scrap plans for a \$1 billion factory in the northern border city of Mexicali after local residents rejected it in a referendum.

And last March, violence erupted when police evicted protesters who had occupied a water bottling plant owned by France's Danone in the central eastern state of Puebla.

A 30-minute drive from Monterrey, the water levels at the La Boca reservoir are so low that relatives of missing people and law enforcement officers have been sifting through the soft ground for human remains. More than 6,000 people are currently registered as missing in the crime-plagued state.

"Two of our dams are in a critical situation, we are practically a couple of days from running out," Juan Ignacio Barragan, director of Nuevo Leon's Water and Sewage Institute, said by phone.

Barragan, along with state Governor Samuel Garcia, are named in a separate rights complaint lodged by the Ciudadanos Desconocidos (Unknown Citizens) group.

The current drought is linked to the effects of the La Nina weather phenomenon, which has become more marked due to climate change and led to increasingly erratic rainfall since 2015, Barragan said, adding that he was unaware of the complaint.

Acknowledging public anger over the rationing, he said the state government was looking into alternative water sources, such as deep wells, as well as extending the piped water network and improving infrastructure to prevent leaks and illegal use.

He said previous administrations had failed to invest in infrastructure improvements even as the reservoirs dried up.

Last month, Mexican President Andres Manuel Lopez Obrador announced a \$110 million investment to build a new dam for Nuevo Leon, set to be completed by late 2023. The leftist president has criticised water concessions for companies, but has not so far announced reform plans.

WATER CONCESSIONS

While the rights complaints target state authorities, much of their anger is directed at big companies and the water concessions that allocate them supplies.



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"If you compare the quantities (of concessions given to these companies) with the policy of drinking water allocated for domestic users, there is a great inequality," said Gonzalo Hatch Kuri, professor of geology at the National Autonomous University of Mexico, who has investigated water inequality.

Water concessions are granted by a federal body, the National Water Commission (CONAGUA), and Barragan said some of them dated from as far back as a century.

Original Article: [Thomson Reuters Fondation by Dianna Baptista](#)

BRICS bank-financed water project brings hope to rural people in India

A rural water supply project funded by the New Development Bank (NDB), or BRICS bank, is well in progress in the difficult terrains of India's northern hilly state of Himachal Pradesh, bringing hope to over half a million people suffering from water woes.

Himachal Pradesh lacks sustainable infrastructure for the rural water supply. Hilly and difficult terrain makes the task more challenging.

According to the NDB, around 42 percent of the habitations in the state have limited access to clean drinking water and are classified as partially covered for water supply. Non-availability of reliable water supply also causes the rural population to spend up to 2 hours for water fetching and storing related activities.

The NDB's loan of 80 million U.S. dollars was sanctioned in December 2021, and the project has already got reimbursement its first installment worth around 330 million Indian rupees (about 4.25 million U.S. dollars).

The total estimated cost of the project is 100 million dollars. The remaining 20 million dollars are to be borne by the Indian side.

The soft loan has been provided to the Indian Government, which in turn has been passed on to the Himachal Pradesh state government. The loan is to be repaid in 20 years, with an additional five-year "grace period".

The project is to be completed within a period of 44 months, including six "grace months." It is to benefit people living in as many as 1,255 villages located across eight districts.

A Xinhua correspondent recently visited the project site at the Kangra district's Indora sub-division and witnessed the work of laying of pipelines being carried out, and the work on constructing storage tanks about to begin.

Water is to be first lifted from a source situated in the plains, then stored in huge tanks, and finally distributed among the villagers through pipelines with taps in almost each household.

The locals are upbeat about the project, hoping that their long-standing water woes would be resolved soon.

Raman, a resident of village Makroli, told Xinhua that the water supply at his home has been quite erratic ever since his birth.



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“Since my childhood I have never seen a regular water supply at my home. I hope this scheme funded by the NDB will ensure a regular water supply to us,” said Raman, who did not reveal his full name.

Engineer-in-Chief of the project Sushil Justa said that the NDB-funded rural water scheme would prove to be a boon for the inhabitants in the upper reaches of Himachal Pradesh.

He said that the people staying in some of the top hilly terrains aren’t able to get a regular potable water supply, and that the ladies in these areas have to fetch water from far flung areas to meet their daily needs.

He said that the NDB has been helping with the funding of water supply projects. “The NDB has funded 24 water supply schemes in eight districts of Himachal,” he said.

“Work on most of them has started. This loan and project agreement was signed in December 2021. The loan is effective from January 25 this year only,” he said.

Headquartered in Shanghai, the NDB was established by BRICS nations, namely Brazil, Russia, India, China and South Africa. The bank formally opened in July 2015.

B.R. Deepak, Professor of Chinese & China Studies at India’s Jawaharlal Nehru University, praised the NDB as playing an extremely important role in developing hard and social infrastructure across BRICS countries.

Original Article: [Macau Business by Xinhua News Agency](#)

Water imbalance in Asian region to put 2 billion people at risk

Rapid global warming has worsened the water imbalance for almost 2 billion people in the Third Pole region -- including India, Bangladesh and Nepal - where about 90 per cent of water is used for irrigation, a new study has warned.

This will lead to greater water demand in densely populated downstream countries, according to a new paper published in the journal Nature Reviews Earth & Environment.

The Third Pole, which includes the Tibetan Plateau and the surrounding Hindu Kush Himalayan mountain ranges, is known as the "Asian water tower".

With the largest global store of frozen water after the Antarctic and Arctic, the Third Pole region, located in the Qinghai-Tibet Plateau, is home to headwaters of over 10 major Asian rivers.

The "Asian Water Tower" region has gotten out of balance between solid water in glaciers and liquid water in lakes and rivers under the global climate change impact, reports Xinhua news agency.



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The rise in temperatures with changes in the westerlies and the Indian monsoon led to glacier retreat and more precipitation in the region's northern part and less in the southern.

The spatial imbalance will alleviate water scarcity in the Yellow and Yangtze River basins while increasing scarcity in the further-south Indus basins, the study said.

"Such imbalance will likely pose a great challenge to the supply-demand balancing of water resources in downstream regions," said Yao Tandong, lead author of the study and an academician at the Chinese Academy of Sciences.

The Highest water demand is projected to be in the Indus Basin, said Walter Immerzeel, co-author of the study and researcher at Utrecht University in the Netherlands.

Original Article: [On Manorama](#)

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