

Veles Water Weekly Report

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March 17th 2022

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VelesWater



WATER FUTURES MARKET ANALYSIS

Welcome to ***WATERTALK***

by Joshua Bell

CLICK THE LINK BELOW

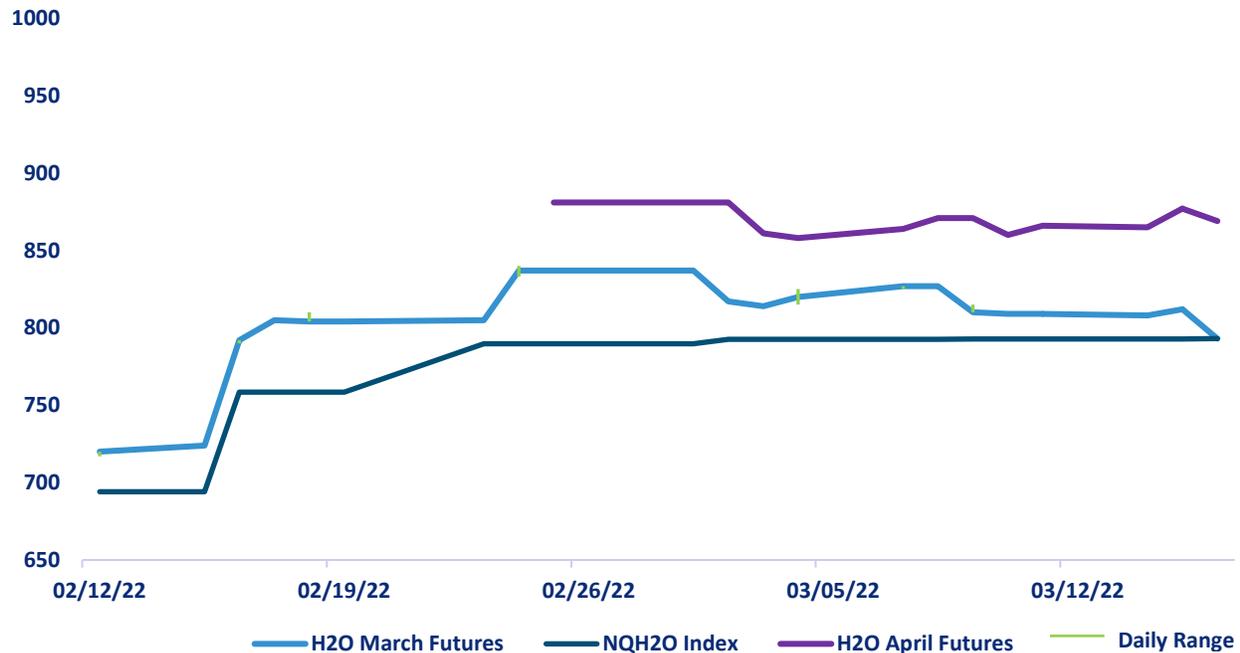
"A 2 minute technical analysis video of H2O futures"

<https://vimeo.com/689199304>



NQH2O INDEX PRICE vs H2O FUTURES PRICE

1 Month Price Performance NQH2O Index vs H2O Futures



Price Chart Based upon Daily Close

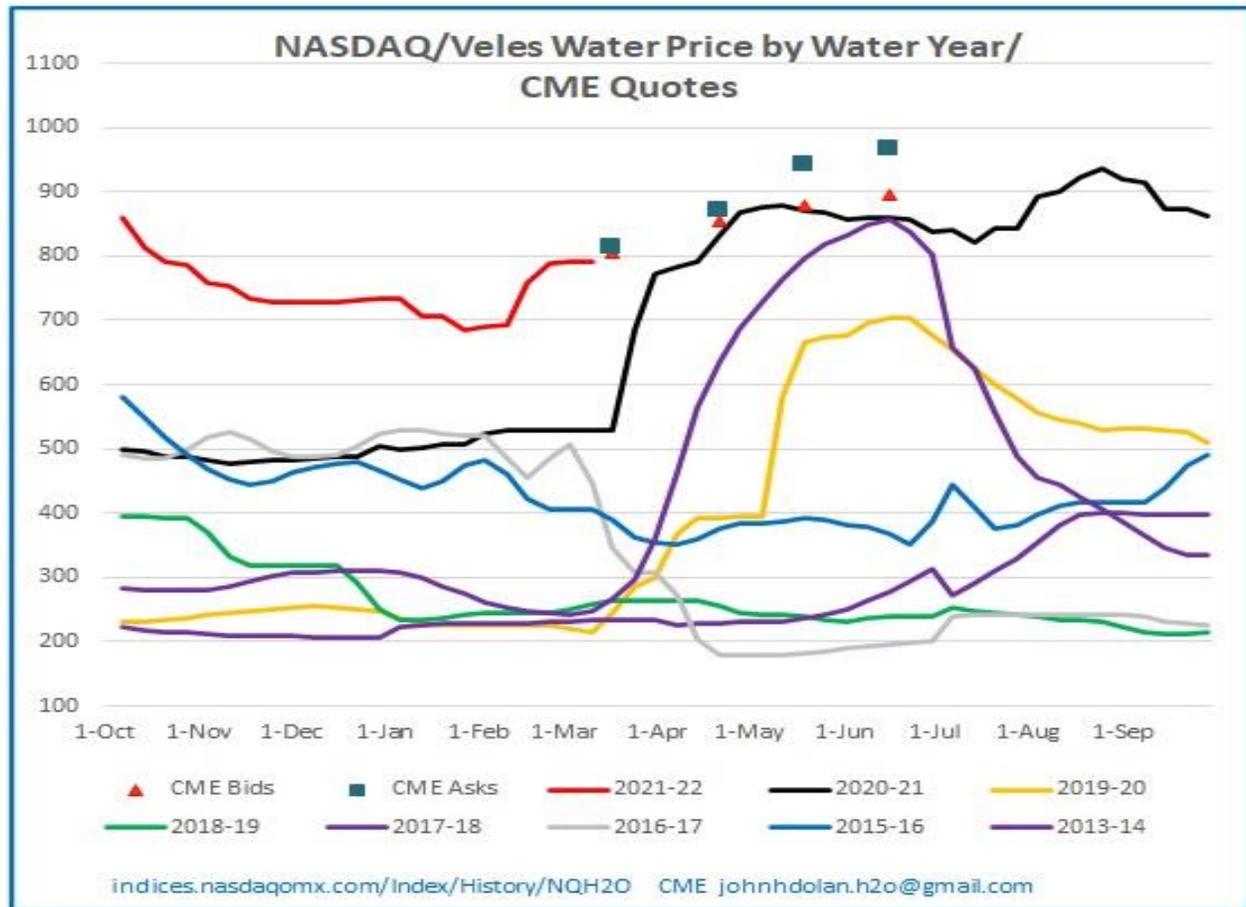
The new NQH2O index level of \$793.06 was published on the 16th of March, up \$0.29 or 0.04%. This is the March Futures settlement price. Over the past week the March futures have been trading at a premium of +\$15.23- \$19.23 The April Contract is now considered the front month and has been trading at a premium ranging from +\$67.23 to +\$84.23 to the index over the past week. We expect a further convergence of the futures and index prices with the most likely move being from the index upwards to catch the futures.

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

April 22	861@872
May 22	880@920
June 22	910@970
Sept 22	920@1050



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.

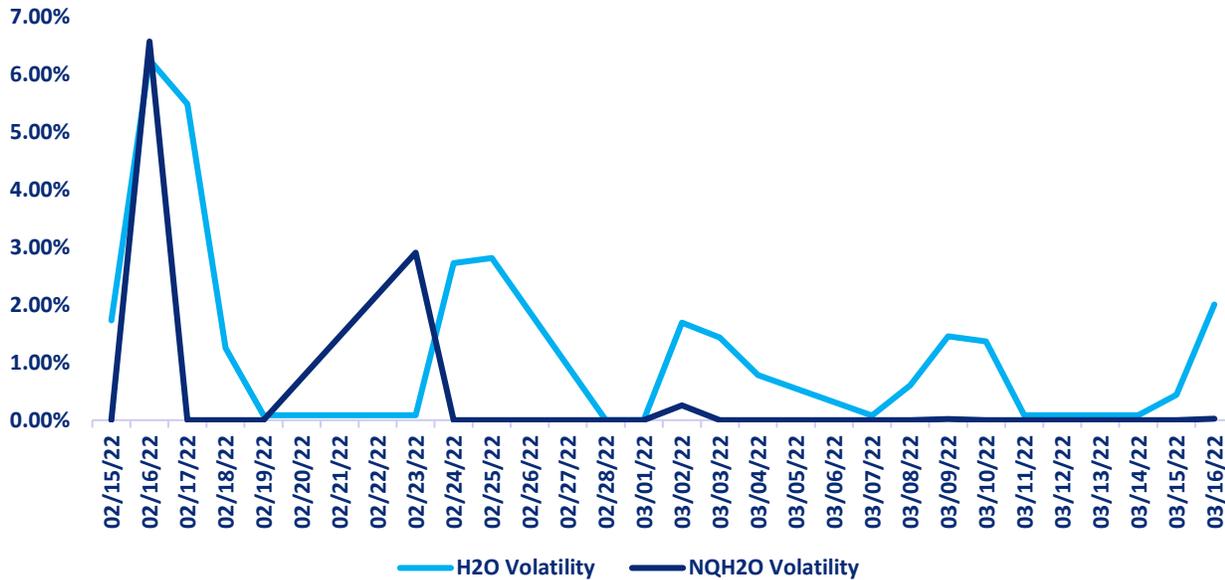
The graph for 2021 is highlighted in red. It shows the same seasonal climb, but at record-high values above each of the last eight years since February. Current bids and offers in the market are still higher than historic prices showing that expectations are that this is an exceptionally dry year and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

(John H Dolan, CME Market Maker)



H2O FUTURES AND NQH2O INDEX VOLATILITY ANALYSIS

Daily H2O Futures Volatility vs Daily NQH2O Index Volatility



DAILY VOLATILITY

Over the last week the March daily future volatility high has been 2.00% on March 16th and a low of 0.9% on March 11th

ASSET	1 YEAR (%)	2 MONTH (%)	1 MONTH (%)	1 WEEK (%)
NQH2O INDEX	36.14%	10.36%	3.98%	0.010%
H2O FUTURES	N/A	12.18%	11.20%	2.47%

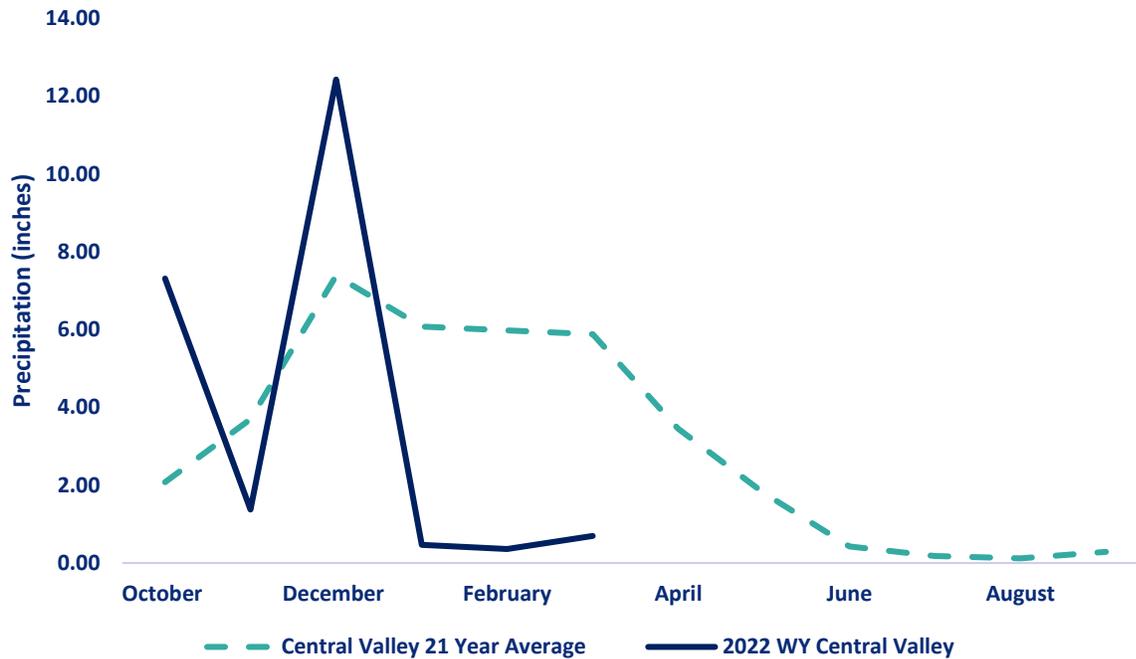
For the week ending on the March 16th the two-month futures volatility is at a premium of 2.84% to the index, down 1.01% from the previous week. The one-month futures volatility is at a premium of 7.22% to the index, up 4.84% from last week. The one-week futures volatility is at a premium of 2.46% to the index, up 0.18% from the previous week. We would expect convergence between the index and futures volatility, the most probable move is for the index volatility to increase.

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



CENTRAL VALLEY PRECIPITATION REPORT

Central Valley Precipitation Index



Central Valley average is calculated using data from 19 weather stations in the Central Valley, California.
Data as of 16/03/2022

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)	0.65	0.00	11.15%	53	71
TULARE 6 STATION (6SI)	0.88	0.00	22.27%	40	68
NORTHERN SIERRA 8 STATION (8SI)	0.56	0.26	7.12%	50	81
CENTRAL VALLEY TOTAL	2.09	0.09	13.52%	48	73

RESERVOIR STORAGE

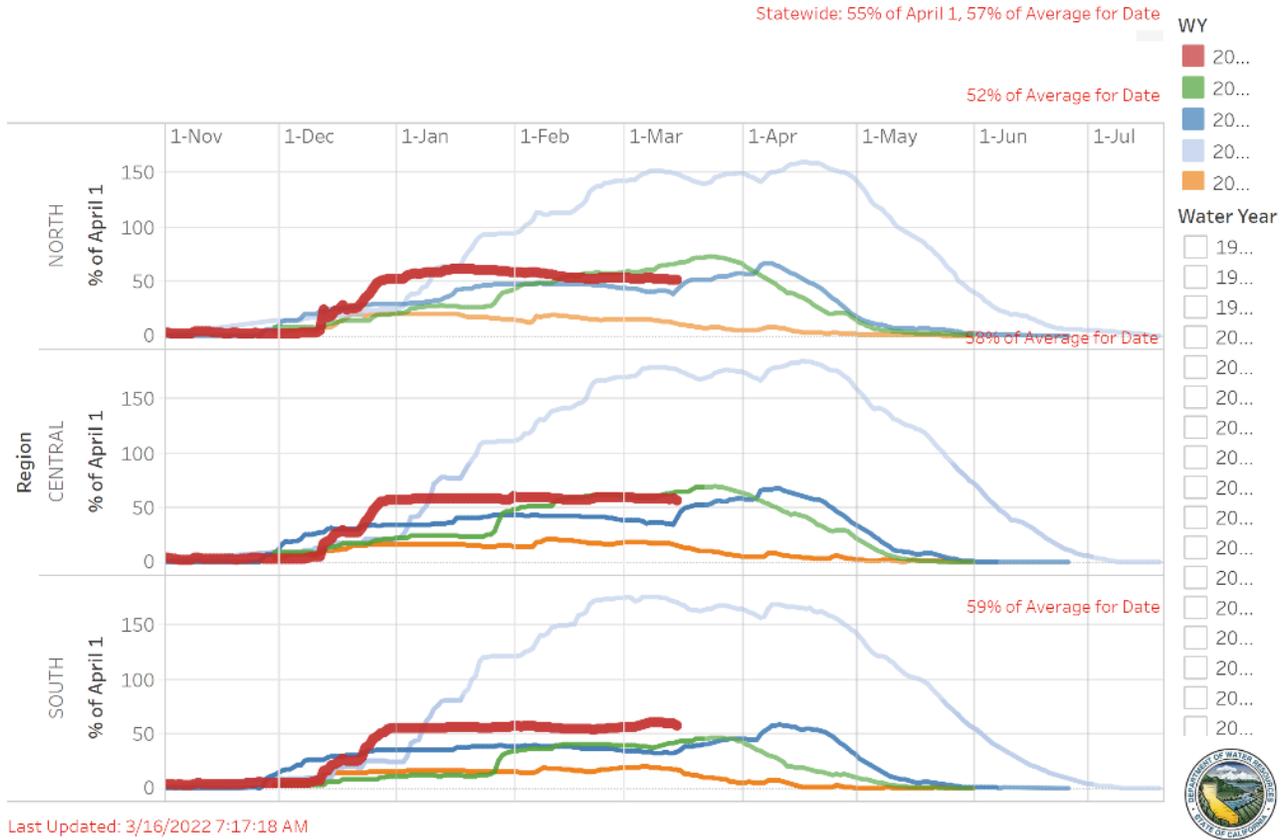
RESERVOIR	STORAGE (AF)	% CAPACITY	LAST YEAR % CAPACITY	HISTORIC ANNUAL AVERAGE CAPACITY %
TRINITY LAKE	794,546	32	52	46
SHASTA LAKE	1,708,396	38	51	50
LAKE OROVILLE	1,611,240	46	39	68
SAN LUIS RES	892,113	44	56	52

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



SNOWPACK WATER CONTENT

Snow Water Equivalent Dashboard



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	14.6	-0.40%	67	52	51
CENTRAL SIERRA	16.7	-0.70%	66	58	56
SOUTHERN SIERRA	14.4	-0.80%	44	59	57
STATEWIDE	15.5	-0.60%	61	57	55

*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.

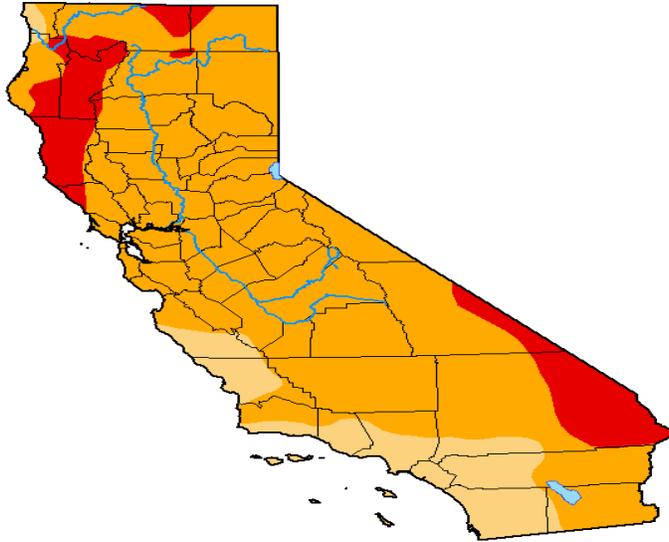
** April 1st is used as the benchmark as it when the snowpack in California is generally deepest. It has been used the benchmark date since 1941 by DWR and can be used to predict spring river flow.



DROUGHT MONITOR

U.S. Drought Monitor California

March 8, 2022
(Released Thursday, Mar. 10, 2022)
Valid 7 a.m. EST



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	100.00	86.98	12.82	0.00
Last Week <small>03-01-2022</small>	0.00	100.00	100.00	86.98	12.82	0.00
3 Months Ago <small>12-07-2021</small>	0.00	100.00	100.00	92.43	80.28	28.27
Start of Calendar Year <small>01-04-2022</small>	0.00	100.00	99.30	67.62	16.60	0.84
Start of Water Year <small>09-28-2021</small>	0.00	100.00	100.00	93.93	87.88	45.66
One Year Ago <small>03-09-2021</small>	0.75	99.25	90.89	58.59	29.54	3.75

Intensity:

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

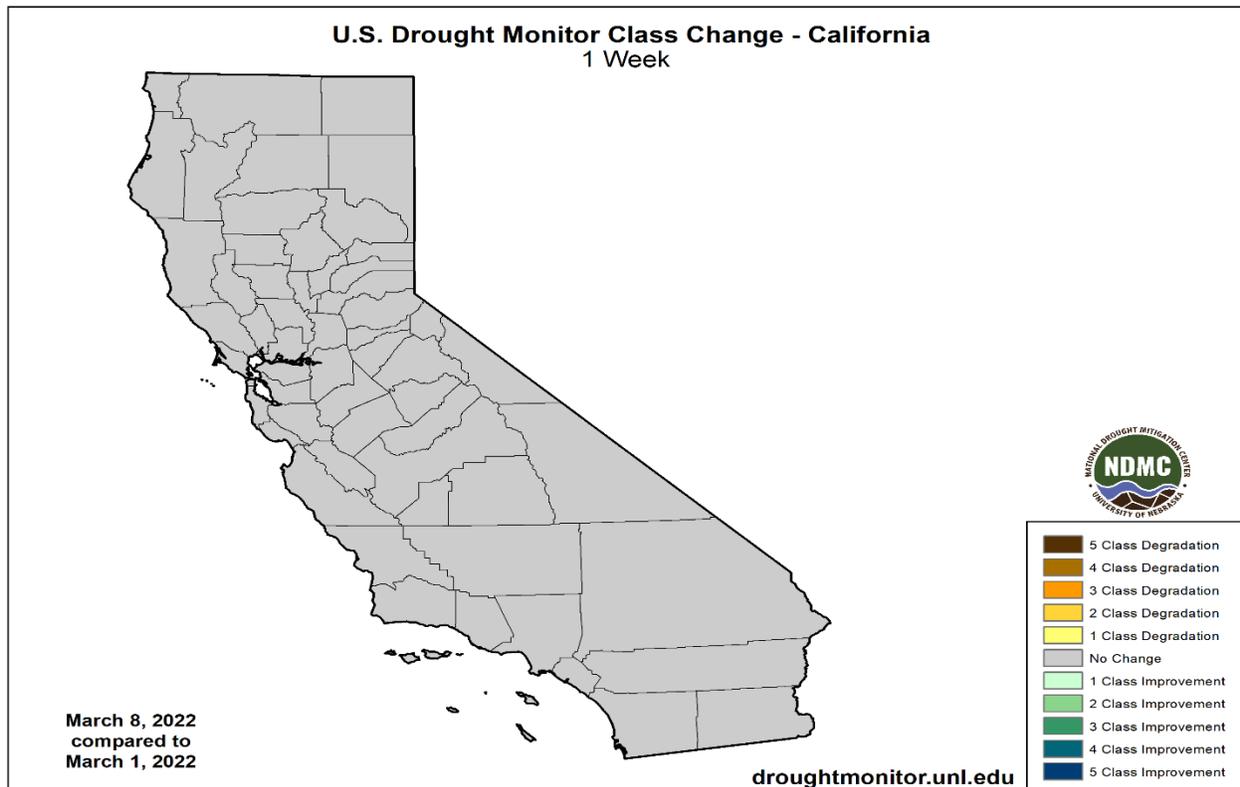
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

Brian Fuchs
National Drought Mitigation Center



droughtmonitor.unl.edu

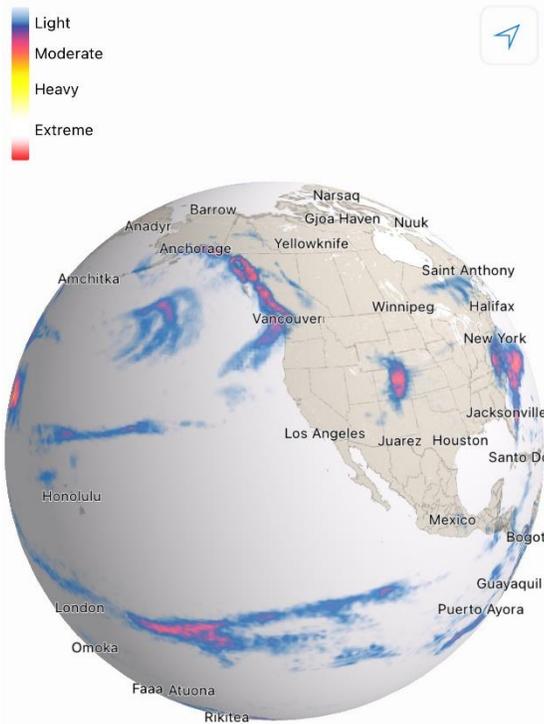


The US Drought Monitor release their statistics with a 1-week lag to this report. Over the past week the has been 0% change in drought conditions.

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



CURRENT SATELLITE IMAGERY



Map Reference: Dark Sky

The current satellite picture is showing a frontal system hitting the coast of the Northwestern US with a dry Southwestern US, with the remnants of a frontal system moving eastwards over Texas plus a large storm system over the Eastern US. The frontal system is expected to bring precipitation to the Southwest over this weekend reaching the Central Valley regions.

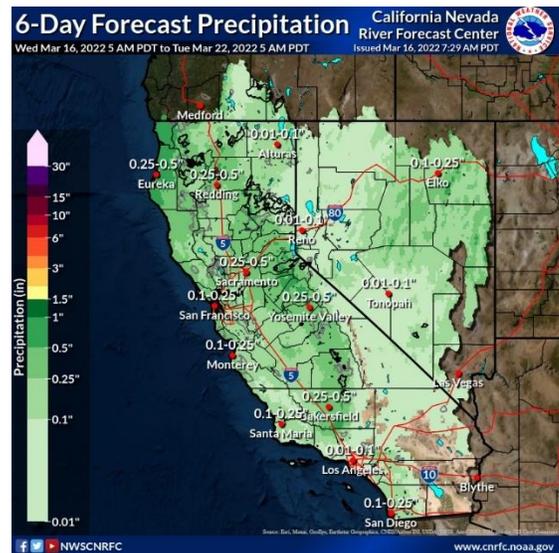
There is another frontal system brewing over the Northwestern Pacific and this may bring some precipitation to Northern California in about a weeks time.

The high-pressure system which is sitting over the SW US has weakened and the frontal system will move eastwards bringing precipitation to the Northern Sierra Mountains.

There is no Monsoonal effect at this time of the year as the current weather systems dominate.

10 Day Outlook

General trend for the weekend forecast was to slow down the onset of the frontal system Friday evening, as WPC shifted more in line with deterministic models. As such, expect precipitation to start along the North Coast in earnest after midnight Friday into Saturday morning. The EC, and along with it the GEM, continues to be the most aggressive with timing and southern extent, bringing precipitation into the rest of Northern CA early Saturday, vs later in the morning for the GFS and WPC. Current forecast reflects a solution closer to WPC. The system does still move through the region rather quickly, focusing over the Sierra and SoCal overnight, and pushing into NV by Sunday morning. Dry conditions expected for the rest of Sunday into Monday.



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



WESTERN WEATHER DISCUSSION

Cooler than normal temperatures were common over the region with departures of 2-4 degrees below normal over much of the West. Some precipitation in the Rocky Mountains, central Utah and Nevada as well as the Pacific Northwest did help with seasonal snow values, reversing a dry trend that most areas have had. In California, there are many who fear that the snowpack has peaked for this season at 61% of normal, which will lead to further drought issues later on. Improvements were made to moderate drought and abnormally dry conditions in northern Idaho and western Montana. Northern Oregon had improvements to severe and extreme drought as well as to abnormally dry conditions. Extreme drought was expanded over portions of southern Oregon. Extreme drought was improved over northwest Colorado as both short- and long-term conditions were improving. A small area of moderate drought was improved over eastern Wyoming while moderate and severe drought were expanded over portions of southern Idaho. The dryness in the southern Plains is also impacting portions of southern and eastern New Mexico, where drought intensified this week. A new pocket of exceptional drought was added in southwest New Mexico while moderate and severe drought expanded in southern New Mexico and extreme drought expanded over eastern New Mexico.

Reference:

Brian Fuchs, National Drought Mitigation Center

Denise Gutzmer, National Drought Mitigation Center



WATER NEWS

CALIFORNIA WATER NEWS

Westlands Growers Fear Groundwater Power Grab by GM Birmingham

Divisions are deepening within the giant Westlands Water District as some growers fear the district's longtime, controversial general manager is amassing too much power.

In mid-February, district staff proposed new groundwater rules that would give General Manager Tom Birmingham almost total control over how groundwater is accounted for and to which grower accounts it would be credited, according to district growers.

It was a move that shocked some and prompted a group of growers to send letters to the district opposing the rules and demanding fair governance. They say giving that much power to one staff person creates a situation ripe for favoritism and abuse.

"(Birmingham is) a very controversial person to start with and he has a history of, I'll say it, abusing his power, his authority," said a district grower who requested anonymity due to the sensitive political nature of the issue. "We have big growers, we have little growers, everybody in between, and a lot of people are frustrated."

Fresno-headquartered Westlands is the largest agricultural water district in the country and covers more than 600,000 acres on the west side of the San Joaquin Valley from south of Firebaugh to just north of Kettleman City.

The Proposed New Rules

According to the grower letters sent to Westlands on Feb. 14 and 22, under the proposed new rules Birmingham could single-handedly approve or deny groundwater credit transfers, groundwater carryover credits, the number of credits issued for recharge, the amount of pumping allowed in subsidence-prone areas, and which part of the aquifer gets water credits.

These rules, and how they're applied, are critically important as water districts and farmers struggle to comply with the state's Sustainable Groundwater Management Act (SGMA), which requires overdrafted aquifers come into balance by 2040. Generally, that means more water shouldn't be pumped out than goes back in.

"As SGMA implementation continues, it is up to the groundwater sustainability agency (GSA) boards how projects and programs are developed and managed," wrote a spokesperson for the Department of Water Resources, in an email. "Since these are new and developing types of programs, we can anticipate that once programs are set up, more of these types of authorities can be deferred to General Managers or other delegates.

"Delegating these authorities, however, should be discussed and voted on in a public forum, and discussion should also be included in the groundwater sustainability plan (GSP) and GSP updates."



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Aside from this dustup over groundwater accounting rules, growers have also knocked Westlands and Birmingham for not being proactive enough on creating more recharge programs to grab water in flush years and pack it underground, nor in coming up with creative solutions to SGMA in general.

“(Board members) are not making the hard decisions,” the grower who spoke anonymously said. “They’re just punting. That’s not going to fly.”

Original Article: [GV Wire by Lois Henry/ SJV Water](#)

Bay Area salmon fishing will be shorter this year to protect Northern California fish

California commercial and sports salmon fishers will get even fewer days on the water than last year and the Bay Area commercial season will start two months later than usual to protect stocks of fish in Northern California.

That’s according to different possible scenarios for the upcoming seasons from the Pacific Fishery Management Council, the federal agency that manages fishing seasons on the West Coast. After the public has time to weigh in, the council will announce the final dates of the sports and commercial fishing seasons on April 14.

Though they vary throughout the state, all three “provide significantly reduced levels of opportunity compared to last year,” for commercial fishing, according to a statement Monday by the Pacific Fishery Management Council.

In all three scenarios, the Bay Area commercial fishing season would start July 1 and end on Sept. 30, with many gaps in between; there would also be short opportunities to fish on part of the coast in October. Commercial fishing would start as usual on May 1, however, south of Pigeon Point (San Mateo County) and end in July or August. The local sports fishing season would start at the usual time, on April 2, but would likely have some significant closures before it ends in the fall.

The limits may come as a surprise to many after wildlife managers announced earlier this month that the number of adult Sacramento River fall-run chinook, the type caught by most fishers on the coast, is predicted to be 396,500 this year, which is about 45% higher than the 271,000 that were estimated at this time last year.

The main reason for the restrictions is to protect Klamath River fall-run chinook salmon, which are currently in an overfished status, said Harry Morse, spokesman for the California Department of Fish and Wildlife. Fish from that Northern California river have shown up in the San Francisco area and even farther south.

“Those stocks have been overharvested three years in a row,” said Morse. The fishery managers “put very stringent requirements on that. And that cuts days back.”

Mike Conroy, executive director of the Pacific Coast Federation of Fishermen’s Associations, said the high cost of fuel this year will be an extra cause of stress in addition to the reduced fishing time. When fishing is only allowed for a week or 10 days at a time,



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as it likely will be during most of the season, it can be challenging if the weather happens to be bad or the fish are hard to find during open periods.

Original Article: [San Francisco Chronicle by Tara Duggan](#)

California Governor Gavin Newsom's Administration Boosts State Funding by \$22.5 Million for Drought Emergency

After California recorded its driest January and February in more than 100 years of records in the Sierra Nevada, Governor Gavin Newsom's administration is spending an additional \$22.5 million to respond to the immediate drought emergency.

The additional \$22.5 million allocation includes more funding for the Department of Water Resources, State Water Resources Control Board and the California Department of Food and Agriculture.

More than a third of the money – \$8.25 million – will be used to increase outreach efforts to educate Californians on water conservation measures and practices.

“These investments continue to provide crucial drought support to communities impacted around the state,” wrote Chief Deputy Finance Director Erika Li in a letter to Legislative budget and appropriations leaders.

The funds requested are part of a comprehensive effort by the Newsom Administration to increase water conservation. Earlier this month, the state launched new video ads to encourage Californians to reduce outdoor watering.

On March 1, the survey of the state's snowpack showed levels were dropping sharply after robust storms in December. Current snowpack readings are about one-third below average. The Department of Water Resources is analyzing the latest snowpack data and has indicated it may revise its current forecast for State Water Project deliveries in 2022.

With the infusion of additional state budget funds, the Save Our Water campaign is gearing up to reach Californians with water-saving tips via social media and other digital advertising, geo-targeting counties with high water use. The campaign also is securing partnerships with retailers and other organizations to urge Californians to reduce water use in the immediate term and also make permanent changes to landscaping to build resilience in the long-term.

Original Article: [Sierra Sun Times by Office of The Governor CA](#)



Congress approves second half of \$412 million needed to fix Whittier Narrows Dam

A \$412 million project to repair the Whittier Narrows Dam is about to become a reality. The second half of funding, \$219.5 million is included in the \$1.5 trillion packaged to fund the federal government in the current year approved by the House of Representatives.

Assuming President Joe Biden signs the bill, the money will fund a project that has been under consideration for most of the past decade.

It began in 2016 when the Army Corps of Engineers upgraded the dam's flood risk from high urgency to very high urgency. The re-inspection revealed a greater threat of erosion and breach which could cause massive downstream flooding to at least 1 million Southern California residents in the event of a severe storm event.

Potential communities that could be affected include Artesia, Bell Gardens, Bellflower, Carson, Cerritos, Commerce, Compton, Cypress, Downey, Hawaiian Gardens, La Palma, Lakewood, Long Beach, Lynwood, Montebello, Norwalk, Paramount, Pico Rivera, Rossmoor, Santa Fe Springs, Seal Beach, South Gate and Whittier.

"I am proud it funds the Whittier Narrows Dam safety project to completion, federal money I have worked to garner with Congresswomen Linda Sánchez and Judy Chu," said Rep. Grace Napolitano, D-El Monte, who led the fight to make Whittier Narrows Dam a top budgetary priority.

In March 2020, Napolitano guided U.S. Rep. Marcy Kaptur, D-Ohio, chairwoman of the House Appropriations Subcommittee on Energy and Water Development, and 13 other congressional members on a tour of the dam. The mission: persuade them of the need for the money.

Nine months later, \$192.5 million was approved for the project.

Pico Rivera City Manager Steve Carmona, whose city lies south of the dam, praised the passage.

"I think it's great news," Carmona said. "It's definitely something I know our congressional leadership has been working toward. We're happy they were able to secure the final funding to complete the project."

Still, the project will impact city facilities, including the golf course, the Streamland Park baseball field and Pico Rivera Sports Arena.

All but the Sports Arena will be forced to close at least temporarily, possibly as early as this fall. Access to the arena may become a problem, but the details are as yet unclear.

Original Article: [Pasadena Star News by Mike Sprague](#)



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Water Law Alert: California State Water Resources Control Board Modifies Annual Water Diversion and Use Reporting Deadlines for 2022 and Updates on Drought Curtailment Orders

Modified Annual Water Diversion and Use Reporting Deadlines

On September 23, 2021, Governor Newsom signed Senate Bill (“SB”) 115 into law, modifying the deadline and reporting period for annual water diversion and use reporting for all water right holders. Per the State Water Resources Control Board’s (“SWRCB”) website, the reporting deadline has been modified to April 1, 2022, for Appropriative Rights (Licenses), Stockpond Certificates, Registrations and Statements for the transitional reporting period from January 1, 2021 to September 30, 2021. Thereafter, starting February 1, 2023, water use reports will be due February 1 of each year for the reporting period from October 1, 2021, to September 30, 2022.

The new deadlines are listed in a table provided by the SWRCB, reproduced below:

Reporting Period	Reporting Begins	Reporting Deadline
January 1, 2021 -September 30, 2021	January 1, 2022	April 1, 2022
October 1, 2021 - September 30, 2022	October 1, 2022	February 1, 2023
October 1, 2022 - September 30, 2023	October 1, 2023	February 1, 2024

Failure to file an annual report by the due date is a violation of the SWRCB’s regulations and may subject violators to a monetary fine of up to \$500 per day for each day of delinquency. More information can be found at SWRCB’s website linked here: [Annual Water Diversion and Use Reporting Help | California State Water Resources Control Board](#)

Updated Delta Watershed Curtailment Status List, effective March 2, 2022

Due to the ongoing drought conditions in the state and in response to water availability forecasts, the SWRCB has temporarily suspended curtailments on tributaries and reimposed curtailments on some Central Valley Project (“CVP”) and State Water Project (“SWP”) water rights, effective March 8, 2022. The updated curtailment includes a subset of eight post-1914 appropriative water rights associated with the CVP and SWP in the San Joaquin River watershed and in the Legal Delta, including rights in the upper San Joaquin River and Stanislaus River subwatersheds. The next curtailment status update is expected for release by the SWRCB on or before March 15, 2022.

Original Article: [JD Supra by Elizabeth Ewens, Janelle Krattiger and Heracilo Pimentel](#)

Calif. awards \$49M for drought relief

With California preparing for a third dry year, the state’s Department of Water Resources (DWR) announced its sixth round of local assistance through the Small Community Drought Relief program.



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DWR has allotted \$49 million in funding for 18 projects across the state. 15 of those projects will directly support disadvantaged communities, including five Tribes, with infrastructure repairs, well rehabilitation, and hauled water.

“As California’s drought continues, we cannot let our guard down when it comes to preparing vulnerable communities for the dry months ahead,” said Kris Tjernell, DWR Deputy Director of Integrated Watershed Management. “We will continue working with the State Water Board to invest in long-term solutions to bolster drought resilience and help ensure that every Californian has access to safe, clean water.”

DWR coordinated with the State Water Resources Control Board to determine these funding commitments, which complement the Board’s historical and ongoing financial assistance to small, economically disadvantaged communities for their water infrastructure needs. Recipients of the \$49 million in phase six include:

- **Lundy Mutual Water Company:** In Mono County, the Lundy Mutual Water Company water system is struggling to meet demands due to leaks. The company will receive \$2.6 million to repair leaks in its current water infrastructure.
- **Kashia Band of Pomo Indians of the Stewarts Point Rancheria Kashaya Utility District:** In Sonoma County, the Stewart’s Rancheria water supply is decreasing due to drought. The State will award \$1.5 million to help drill a new well that will provide additional water supply for the community.
- **California Environmental Indian Alliance (for Manchester Band of Pomo Indians, Round Valley Indian Tribe, Yokayo Tribe):** In Mendocino County, the Manchester Band of Pomo Indians, Round Valley Indian Tribe, and Yokayo Tribe are struggling to meet demands with their vulnerable water systems. The State will award \$3.2 million to construct back-up source connections and storage tanks.
- **Konocti County Water District:** In Lake County, a mobile home community has been supplied water by Konocti County Water District (KCWD) through a temporary intertie. The district will receive \$4.3 million to replace existing leaky pipelines and expand the distribution system to consolidate the Cache Creek Mobile Home Estates and Creekside Mobile Home Park. Furthermore, the project includes the construction of interties between KCWD, Lower Lake County Water District, and Highlands Mutual Water Company.
- **Redwood Valley County Water District:** In Mendocino County, the Redwood Valley community does not have a reliable water source and must purchase surplus water from neighboring districts to meet demands. The district will receive \$1.8 million to drill a new well.
- **County of Santa Cruz:** In Santa Cruz County, the community of Waterman Gap is struggling to meet daily demands due to its dwindling water supply. The County of Santa Cruz will receive \$113,200 to improve its current water system and start a hauled water program.



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- Yurok Tribe: In Del Norte County, the two water systems serving the Yurok Tribe are vulnerable to drought. The Tribe will receive \$12.6 million to consolidate with neighboring systems and construct 10 miles of pipelines and two booster pump stations.

In addition, DWR announced funding for two emergency projects in Mendocino and Kings counties that were awarded in late December.

- In Mendocino County, the Redwood Valley Little River Band of Pomo Indians received \$104,523 to rehabilitate its existing well to provide the community with a stable water supply.
- In Kings County, the Kettleman City Community Services District received \$165,200 to purchase water for the health and safety needs of the community.

Original Article: [Water World](#)

Water board looks to raise fees again

The State Water Resources Control Board has given an early forecast of fee increases for the next fiscal year based on current state budget projections.

While spending is expected to change little, staff are hoping to reach a 5% fund reserve for water quality programs, which could translate to a 5% increase in Irrigated Lands fees and more in other programs. Water board fees have already risen about 130% over the past decade for some programs.

Farm groups pushed back, arguing a third year of drought is not the time to build a reserve. Agricultural Council of California President Emily Rooney noted the board has dipped into the reserve in the past to prevent drastic fee increases, but she urged only a moderate approach to funding the reserve. Rooney plans to ask lawmakers to use the general taxpayer fund to double the reserve and offset foundational costs for the programs—a years-long effort by farm interests.

Water rights fees could increase 7% as well, due in part to new data modernization spending. Bob Gore, a policy advocate for the Gualco Group, pointed out the information has a broad public benefit in helping the state respond to drought, and farmers should not bear the cost. But staff responded that farmers are covering 50% of the cost through fees, which is better than the typical 70% share.

Staff will have a better estimate on fees for the June meeting, after tax revenues have come in.

Original Article: [Agri Pulse by Brad Hooker](#)



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Metropolitan Increases Call for Conservation With \$10.5 Million Investment in Public Outreach

With California moving into a third year of severe drought, Metropolitan is expanding its call for residents and businesses to use water as efficiently as possible to help ensure the region has the water it needs for the coming months.

Metropolitan's Board of Directors today approved entering a \$10.5 million agreement to expand advertising and outreach efforts to increase public awareness of the drought and the need for conservation. The multilingual campaign will bring the conservation message to radio, digital, social media and outdoor advertising platforms through a three-year agreement for media placement services with GP Generate, a minority-owned, small business advertising agency based in Los Angeles.

"We're asking everyone across Southern California to immediately look at their water use and consider what they can do to use less," Metropolitan board Chairwoman Gloria D. Gray said. "We'll be out there to help, in communities throughout our service area, reminding people what they can do – with rebates and tips to save money and save water – and helping our region be more resilient, more sustainable and more successful as we navigate this drought and long-term climate change."

While the call to conserve is being made across Southern California, it is particularly strong in communities more dependent on water from the State Water Project, including parts of Ventura, Los Angeles and San Bernardino counties. These communities have been particularly affected by the severely limited deliveries from Northern California during the state's ongoing drought because they cannot physically receive water from the Colorado River and have limited local supplies.

"The limited rain and snowfall we've received this winter is far from enough to meet the state's water demands. That means another year of further drawing down our already depleted reservoirs. We can't do that forever. But the less water we use now, the longer we can stretch these stored supplies into the summer and fall, and next year, if needed," Metropolitan General Manager Adel Hagekhalil said.

"We're your partner in the effort to use water wisely," he added.

Metropolitan offers a multitude of resources at bewaterwise.com to help residents and businesses save water, including rebates for water-efficient appliances, irrigation and landscaping; classes and water-saving tips.

The latest outreach effort builds on a conservation campaign launched last August, featuring popular Southern California lifestyles and designed by in-house staff. That campaign – featured on digital and social media, outdoor billboards and radio – has generated 85 million impressions and more than 100,000 visits to bewaterwise.com.

With drought conditions continuing unabated, Metropolitan remains under a drought emergency, declared in November, and a water supply alert, declared in August.

Metropolitan also is making immediate and long-term investments to help make Southern California more resilient to drought and climate change, including investing in



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local supplies, conservation, storage and system flexibility, and seeking state and federal support for these investments.

"We're seeing climate conditions unlike anything we've ever experienced and far sooner than anticipated. We need to take action now. And we need everyone to join us," Hagekhalil said.

Original Article: [Business Wire by Metropolitan Water](#)

US WATER NEWS

There are millions of acres of 'failing' rangelands, data shows

Data released today reveals that 54 million acres of land managed by the Bureau of Land Management fail to meet the agency's own "land-health standards." While standards vary between states and bioregions, they generally measure biological conditions, including soil health, water quality, plant species diversity and the quality of habitat for threatened and endangered species. The standards define the minimum benchmarks land managers need to achieve and maintain in order for landscapes to function and be used sustainably.

The BLM oversees 246 million acres of land — the vast majority of it in the Western U.S. The agency's mission is to "sustain the health, diversity, and productivity of public lands for the use and enjoyment of present and future generations," but according to records obtained by bipartisan watchdog organization Public Employees for Environmental Responsibility (PEER), it is failing to do so on nearly a quarter of the land that's leased for grazing. "We must all work together to improve conservation practices on public lands," said Chandra Rosenthal, PEER's Rocky Mountain Office director. "This map is a wakeup call for the BLM to not only improve and modernize their data collection and mapping efforts, but also to take action to address the vast amounts of degraded lands." PEER obtained 78,000 records spanning three decades through Freedom of Information Act requests. The data, which covers 13 Western states from 1997 to 2019 and holds information from every BLM field office in those states, plots 21,000 allotments on one interactive map. "This map is useful for individuals to be able to see what's going on around them, become active and really work to hold the BLM accountable in the areas that are important to them," Rosenthal told High Country News. "It's really empowering for people to be aware of what's going on on their public lands." (Disclosure: Rosenthal is a sibling of HCN's managing digital editor.)

The data shows that vast areas of the land are degraded. Some acreage isn't assessed at all, and of the roughly 109,000 million acres that are, half fail to meet rangeland health



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standards. Struggling allotments, while documented across the West, are predominantly found in cold desert ecoregions, often in the rain shadow of mountain ranges. These areas are characterized by lack of moisture and extreme temperature swings.

In six states — California, Colorado, Idaho, Nevada, Oregon and Wyoming — more than 40% of assessed lands are failing land-health standards. In Nevada, 83% of assessed allotments do not meet standards, while data from Idaho recorded that 78% of assessed allotments failed rangeland health standards. In New Mexico, however, only 2% of assessed allotments are failing.

High Country News reached out to the BLM with questions prior to publication, and the agency responded with a written statement after the story originally went to press: "While we disagree with some of PEER's conclusions as the analysis was at a large scale and missed some on the ground improvements, we acknowledge there is work to be done in the face of a changing climate and other challenges," according to the statement. "The BLM will prioritize assessments for areas where land health standards have never been evaluated or where standards are not being met and is also working to improve how it reports land health data."

Flourishing landscapes are integral to the public and economic health of the West's communities and Indigenous nations, particularly those whose ancestral lands are involved. Research by Headwaters Economics and the Center for Western Priorities extensively documents the tremendous value that public lands hold for nearby gateway communities. But a prolonged megadrought in the Western U.S. poses an ongoing threat to already stressed landscapes and the communities that depend on them, as do overlapping issues, including climate change, the spread of invasive species like cheatgrass, and the increasing frequency and intensity of wildfires.

PEER's analysis finds that livestock grazing is the primary culprit behind land degradation. The BLM leases more than half of its acreage to ranchers as grazing allotments for cattle, sheep and other livestock. Although everything from drought and wildfire to off-road vehicles can impact rangeland health, livestock grazing is a significant cause of the failing land-health standards of 72% of the public land. That's about 40 million acres.

Original Article: [High Country News by Kylie Mohr](#)

3M to Invest \$165 Million to Improve Water Quality at Minnesota Plant

After state regulators fined the company for a hazardous waste spill last year, manufacturing conglomerate 3M is making a significant investment to improve its factory just east of Minneapolis.

The maker of adhesives, personal protective equipment, and healthcare supplies said Feb. 14 that it will spend \$165 million to improve water quality and slash water use at



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its plant in Cottage Grove, Minnesota. Minnesota's pollution control agency fined 3M \$80,000 last May after an investigation found that the company didn't properly store and dispose of perfluorochemicals used in certain chemical products that contaminated local drinking water.

In August, 3M said it would stop using an incinerator to process waste at the Cottage Grove site, which formerly pumped, processed, and treated its own water. In a news release announcing the new investment, 3M said it now utilizes an experienced third party for waste management — a move that will cut on-site energy use by about 25%. 3M added that the investment will help the company achieve its sustainability goals, which include becoming carbon-neutral by 2050.

"3M continues to proactively evolve our manufacturing capabilities to better serve our customers, enhance our ability to deliver science at scale, and advance our commitment to environmental stewardship," 3M Chairman and CEO Mike Roman said. "This investment in Cottage Grove is another example of how 3M invests in and partners with the communities in which we operate."

In 2010, the state of Minnesota sued the company over its waste-handling practices in Cottage Grove going back several decades. 3M settled the case in 2018 for \$850 million, of which \$700 million was used by the state for a wastewater cleanup plan.

Original Article: [Thomas Net by Mike Hockett](#)

Closed Chevron mine near Questa cannot sell water rights

After the Chevron Questa Mine closed in 2014, the company prepared to divest of surplus land and water rights accumulated decades ago by the mine's previous owner, Molycorp.

But the Office of the State Engineer's denial last month of two water rights transfer applications — one to an El Rito family hoping to create a small commercial farm and one to Wild Earth Llama Adventures — has Chevron and Questa officials wondering if their efforts to further economic development goals in the community are in jeopardy. Patrick Shaw and his wife, Jennifer KostECKI-Shaw, gave Chevron a down payment toward a heavily discounted right to 4 acre-feet of groundwater per year. He said his family was trying to do the right thing by purchasing commercial water rights before expanding their family farm: It wouldn't be legal for them to use a portion of their residential water rights to grow food for sale.

"You're not allowed to sell anything," Shaw said.

The Office of the State Engineer, however, denied the Shaws' application, putting the family's enterprise on hold.

Ramona Martinez, a district manager for the agency, said the applications for the transfers to the Shaws and the llama business were denied because the water rights in question "simply don't exist" anymore. They weren't put to use, so after the mine's shutdown, she said.



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Chevron knew the water rights in question were no longer valid, she added.

“Chevron submitted proof of beneficial use, which means they’re providing us with documentation of all the water they beneficially used,” Martinez said. “From 2014 to 2016, they put 1,264 acre-feet per year down to beneficial use, and the remaining 1,433 acre-feet were not put to beneficial use.”

She said the company asked the engineer’s office to make an exception in 2016 “and recognize those unused acre-feet under the basis that they wanted to be good neighbors and help the community.”

But “we don’t make exceptions,” Martinez said, adding the basin in which Taos County sits is “a fully appropriated basin, meaning all the water is allocated.”

Chevron said it will appeal the state’s decisions on the water rights sales.

“It is Chevron’s belief that the recent denials reflect the current position of the OSE, because in May 2020, OSE staff shared with us an internal draft memo arguing that these rights are valid,” said Christian Isely, Chevron’s economic development adviser in Questa.

Original Article: [Santa Fe New Mexican Taos News by Geoffrey Plant](#)

Lake Powell water levels could mean trouble for Southern Utah’s electricity

St. George City officials are concerned about the sinking water levels of Lake Powell.

If Lake Powell falls 35 more feet, the Glen Canyon Dam will stop producing power for people across many states. St. George, among many other cities, gets power from the dam. According to St. George News, the dam is one of 2,500 projects placed along the Colorado River that provide power for the upper and lower Colorado River Basin.

According to Bob Martin with the U.S. Bureau of Reclamation, which owns the dam, as many as 3 million customers across Arizona, Colorado, Wyoming and Utah could be affected.

Figuring out a plan of action for Lake Powell

Lake Powell’s water levels are expected to, at least temporarily, get too low to power Glen Canyon Dam. City officials have met to discuss what would happen if/when this became a reality. The city is revising its water-use ordinance, as well as meeting weekly to discuss how to conserve water to prevent Lake Powell from sinking any lower.

Martin says that the effort to conserve water will have to come from more than just the city officials.

“The less water being pulled out of Lake Powell [and Lake Mead], the better,” he said.

“Everybody plays a part in this. [If] you live in the west, there is no escaping the fact that the water in the Colorado River is declining.”

While concerns over Lake Powell’s lowering water levels surround Glen Canyon Dam operations, Martin says one of the benefits of it is it’s cheap.



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“Federal hydropower is a bargain to utility companies, just cause [of] our low overhead,” Martin said.

According to Martin, the real issue is that Lake Powell only rose two to three feet in 2021.

“Last year was just such a poor year for runoff,” Martin said. “What we’re seeing now is the effects from not getting that water.”

The St. George News reports that spring runoff will help refill Lake Powell and the Bureau intends to take measures to keep the lake full enough to power Glen Canyon Dam.

Original Article: [KSL News Radio by Devin Oldroyd](#)

San Angelo City Council Set to Spend \$62 Million on Hickory Water Supply Expansion Tuesday

The Hickory Water Supply wells are located on the Ford ranch south of Melvin, TX.

The Hickory Water Supply consists of four major components: wellfield; groundwater storage and pumping; transmission piping; and groundwater treatment using ion exchange technology. The current capacity of the Hickory system is approximately 9,400 acre-feet per year (ac-ft/yr). This project will expand the Hickory system to reliably produce and treat the maximum production capacity from the Hickory Aquifer of 12,000 ac-ft/yr.

The \$62 million will be used for new production wells, treatment facilities, land clearing and standby generators.

In addition to the Hickory system improvements, rehabilitating and upgrading the clearwell at the Water Treatment Plant (WTP) is also included in this project. The existing clearwell was constructed in 1947 and since that time the concrete structure has deteriorated and maintenance and repairs are becoming more extensive and expensive. In addition, the way the current clearwell is built, the utility has severe limitations on making necessary repairs or performing maintenance without impacting the operations of the WTP and potentially impacting water deliveries. The proposed improvements include building and replacing the existing clearwell with two 2,000,000 gallon prestressed concrete tanks. This improvement will allow for increased flexibility in maintenance and operation, as well as optimization of disinfection strategies.

On February 15, 2022, City Council approved Hydro Resources - Mid Continent, Inc. for WU-05-22 Hickory New Production Wells, PLW Waterworks, LLC for WU-06-22 Hickory Treatment Plant and Well Field Improvements, and the City Manager was authorized to negotiate scope and contract pricing to be brought back for future City Council consideration.

The construction amount allocated in the original loan closed with the Texas Water Development Board (TWDB) was for \$48,895,259. With the negotiated proposal pricing for Hydro Resources, PLW Waterworks, and the estimate from ONCOR at \$61,861,796, this leaves a balance of \$12,966,537 necessary to perform this expansion project.



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It is also recommended on the March 15, 2022 City Council meeting to adopt a resolution to seek this additional funding from TWDB. The Water Capital Fund fund balance will be utilized until the funding is secured. A budget amendment is a part of this agenda item to allow for this use. If TWDB funding is pursued, it is anticipated to receive approval and funding in late fall of 2022.

Original Article: [San Angelo Live by Yantis Green](#)

Study: Irrigation boosts western Kansas land values by \$3.8B

A recent report of the value of water in western Kansas by two Kansas State University agricultural economists has concluded that land values in that part of the state are \$3.8 billion greater today than they otherwise would be without access to the Ogallala Aquifer.

“It’s a large, substantial number and it provides evidence of just how valuable irrigation is in western Kansas,” said Gabe Sampson, an associate professor in K-State’s Department of Agricultural Economics.

The study takes a look at ways water is captured in order to make a judgment on its value.

In this case, farmers draw water from the aquifer to irrigate farm crops and raise livestock; in 2013, the USDA’s National Agricultural Statistics Service listed sales from eight western Kansas counties overlying the aquifer at \$4.7 billion, or about one-third of total agriculture revenue in the entire state.

“Putting a value on water is a challenge because with other commodities, we have a price for those,” said Nathan Hendricks, a professor of agricultural economics. “If you want to know the value of corn or wheat, those are traded and we have a price to assess their value.

“Water is not traded, per se, because it’s very difficult to make trades, so there’s not a well-functioning market for water in western Kansas. It makes it more difficult to place a value.”

The two economists studied the value of land in western Kansas counties overlying a portion of Ogallala Aquifer, also known as the High Plains Aquifer.

In a 2019 study, they reported a difference of 53% in price between non-irrigated and irrigated land.

They arrived at the \$3.8 billion added value on irrigated land by assuming an average price of \$1,662 per acre on non-irrigated land, and approximately 2.57 million acres irrigated in Kansas counties overlying the aquifer.

“Any premium the irrigated land has over otherwise similar non-irrigated land provides evidence to the value that buyers and sellers put on irrigation production,” Sampson said.

The Ogallala Aquifer in western Kansas is considered North America’s largest aquifer, stretching more than 175,000 square miles under eight states.



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Farmers' ability to pump water from the Ogallala – which has been going on for nearly 100 years — is considered a major reason for the transformation of a dry wasteland into America's breadbasket.

The resource, however, is finite. And in another part of their study, Hendricks and Sampson were able to determine a market value for water coming out of the aquifer.

"One concern with the aquifer is depletion over time," Sampson said. "The best way to look at the valuation that depletion has is to look at small changes in water stocks over time. What we look at is what's called saturated thickness, which is a common measure of groundwater stock. We looked at the difference in irrigated land values between parcels that differ only in their groundwater stock under the parcel."

What they found is that a one foot change in the groundwater stock is associated with a change between \$3-\$15 per acre in the value of irrigated land.

Calculated out over 2.57 million acres, the market valuation associated with a uniform one foot increase in saturated thickness of the aquifer is between \$8-\$41 million.

"Hydrologists have created predictions of what saturated thickness is likely going to do leading up to the year 2050, assuming no other measures are taken and that we continue on the path that we are on," Hendricks said.

"Under that simulation, we expect that in Kansas, the returns to land are expected to decrease by \$34.1 million annually by 2050, compared to what those are today, because we are going to have less saturated thickness in 2050."

Hendricks added that the situation may differ across parts of Kansas, but "those places that are already significantly depleted is where they are going to feel the hardest impacts of continuing depletion."

Original Article: [The Mercury by Kanasa State University](#)

Governor Hochul Announces \$725 Million to Fund Water Infrastructure Projects

Governor Kathy Hochul announced that the New York State Environmental Facilities Corporation Board of Directors has approved more than \$725 million in financial assistance to help 13 municipalities and public authorities advance critical infrastructure projects that protect or improve water quality. The short-term financings and previously announced grants approved by the EFC Board of Directors will provide capital to local governments to help them get shovels in the ground for critical projects. The board also approved several long-term financing conversions that provide interest relief for existing projects and reduce debt for municipalities.

Of the project financings announced, more than \$650 million in financial assistance will help the New York City Municipal Water Finance Authority make improvements at several of the city's water pollution control plants. Nearly \$6 million in grants and financing will help the City of Elmira in Chemung County to replace lead drinking water



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pipes, and a \$2.75 million grant and financing package will help improve the Village of Cobleskill's wastewater treatment plant in Schoharie County.

"Every single community in New York deserves access to clean water, which is why investing in clean water infrastructure is a top priority," Governor Hochul said. "With a surge in funding from the federal Bipartisan Infrastructure Law and historic investment in clean water initiatives in my Executive Budget, we will work together with local governments to modernize New York's water infrastructure to protect public health and the environment and help ensure a robust economy."

Environmental Facilities Corporation (EFC) President and CEO Maureen A. Coleman said, "Governor Hochul's commitment to meeting New York's water quality goals is underscored once again with another significant investment in water infrastructure projects. EFC is pleased to provide cost-effective solutions for local governments through the State Revolving Funds and state water grants."

Department of Environmental Conservation (DEC) Commissioner and EFC Board Chair Basil Seggos said, "Since Governor Hochul took office, she has made protecting New York's water quality one of her top priorities. Working with more than a dozen municipalities and public authorities is a critical milestone in the State's ongoing efforts to provide communities with the resources necessary to provide access to clean drinking water and make critical wastewater treatment improvements to protect public health and the environment."

New York State Health Commissioner Dr. Mary T. Bassett said, "From treating newly-regulated emerging contaminants that threaten drinking water quality, to ensuring the proper wastewater removal, these fiscal commitments will benefit the health and well-being of all New Yorkers. We are pleased to be able to support these communities as they work to upgrade and modernize outdated water delivery and septic systems."

The Board's approvals include financings through the Clean Water State Revolving Fund (CWSRF) and Drinking Water State Revolving Fund (DWSRF) and grants pursuant to the Water Infrastructure Improvement Act (WIIA). Visit EFC's website to learn more about water infrastructure funding opportunities.

Original Article: [NY Governor Office](#)

The companies using high tech systems to manage water use

Water is critical to the functioning of any civil society, enabling complex sewage systems to work, clothes, dishes, and bodies to be cleansed, and people, plants, and pets to stay hydrated.

As a result, we use a lot of it: According to the US Geological Survey (USGS), the US uses an average of about 322 billion gallons of water per day, with the average American family using 300 gallons of water per day, according to the Water Research Foundation. Naturally, several companies have built businesses around harnessing technology to manage this load for cities, utilities, and companies. Two such examples are Ketos and



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Hydropoint. The former does water-quality monitoring, and the latter helps businesses manage their water use. Each uses tech like automation and IoT to give real-time updates on key water metrics to cities, utilities, and businesses—let's break them down.

Water watchers

In basic terms, Ketos' pitch is this: It uses a combination of hardware and software to make sure the water that reaches homes and businesses is clean and free from harmful chemicals and contaminants.

Between 1982–2015, anywhere between 9 to 45 million Americans were drinking water from a source that was considered unsafe under the guidelines established by the Safe Drinking Water Act, according to a 2018 study.

“In the US, water is clear—but clear water doesn't mean clean water or safe water,” Meena Sankaran, CEO of Ketos, told Emerging Tech Brew. “So by the time [you've] been impacted, it's already six months too late. It's the small concentration of different chemicals and toxicity that's in the water that eventually can literally affect health.”

More Stories

The company was founded in 2015 and has raised just under \$30 million in venture funding since, with its most recent round coming in 2020.

Its “robotic system,” dubbed Ketos Shield, is trained to detect over “33 parameters,” including toxic or otherwise harmful chemicals in water (e.g., boron, lead, arsenic) and can notify users of their presence in real time, Sankaran said. The system is installed at the water source—and so is some form of connectivity—where it then relays information about the quality and purity of the source back to its web-based platform. Customers can access the information, which also includes machine learning-based diagnostics and maintenance predictions, anywhere they have a connection.

Original Article: [Morning Brew by Jordan McDonald](#)

Lake Powell's levels projected to drop below critical threshold

Lake Powell's water levels are on the cusp of dropping below a critical benchmark and federal officials don't expect the reservoir's supply to be replenished until May.

As of Thursday, the lake's levels were hovering inches above 3,525 feet, which is the threshold local officials set as the “target elevation” while drafting the 2019 Drought Contingency Plan Agreements.

The threshold is a 35-foot-buffer above the lowest point where the Glen Canyon Dam can continue generating hydropower. The dam supplies power to millions of customers in the West.

The lake, located along the Arizona-Utah border, releases water downstream to Lake Mead, which serves as an important water resource for Arizona, Nevada, and California.



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The Bureau of Reclamation announced this month it expects the lake to temporarily drop below the 3,525-foot threshold until the spring runoff can restore water levels over the next couple of months.

Sporadic weather patterns have contributed to the lake levels dipping beneath the threshold, the agency said.

“This year the Colorado River Basin has experienced extremely variable conditions with a record high snowpack one month, followed by weeks without snow,” said Reclamation Acting Commissioner David Palumbo. “This variable hydrology and a warmer, drier west have drastically impacted our operations and we are faced with the urgent need to manage in the moment.”

After the Drought Contingency Plan was settled in 2019, it required the Upper Basin states and the bureau to develop a coordinated strategy to send down water from upstream reservoirs to Lake Powell once its levels dropped below 3,525 feet.

The bureau has already taken steps to keep water levels above the target elevation by reducing monthly releases from Glen Canyon Dam and sending 161,000 acre-feet of water from Blue Mesa and Flaming Gorge reservoirs to Lake Powell.

Officials said the spring runoff should be enough to replenish the lake back above the threshold. But they expect levels to drop below the benchmark again later this year.

At this same time 10 years ago, Lake Powell's level was at 3,635 feet and has been steadily declining in the following years, according to the bureau's data.

Original Article: [12 news](#)



GLOBAL WATER NEWS

\$35m Murray Irrigation Limited upgrade will tick basin environment goals: Water Minister

THE federal government will fund a \$35-million infrastructure upgrade to one of the nation's largest irrigators, maintaining Murray-Darling Basin environmental outcomes can be delivered through engineering solutions, rather than just volumes of water.

Murray Irrigation Limited will use the money to increase the capacity of its existing channel escapes, which will allow environmental water to fill up to 100 ephemeral wetlands and 373km of creeks, which otherwise would only get wet during large over bank flows

Water Minister Keith Pitt said the project was about making the available water "work harder and smarter", and would allow the government to achieve important environmental assets in the Edward Wakool river system.

"This is the sort of project that demonstrates that water recovery isn't the only way we can achieve good environmental outcomes and the Australian Government is open to innovative approaches to improve river and wetland health.

"We put an end to buybacks because of the damage they have done to regions like this - stretching beyond the individual farmgate and impacting on the efficiency or whole irrigation networks."

Environment Minister and Farrer MP Sussan Ley said regional communities - including large irrigators such as MIL - had done the hard yards through buybacks to put water in the hands of the Commonwealth Environmental Water Holder.

"Production changes, reduced inflows and untargeted buybacks have reduced water delivery in the MIL by 40 per cent in the past 30 years, leaving valuable water infrastructure stranded - for farmers and environmental water holders," Ms Ley said.

"This project will help us make water for the environment work just as hard as farmers work their water."

Original Article: [Farm Online National by Jamieson Murphy](#)

Vietnam's Water Crisis Threatens Food Security

Vietnam's water shortage, especially during the long drought seasons, is widening the gap between rich and poor farmers. Access to a sufficient amount of clean water for agriculture is becoming a luxury in the Southeast Asian nation adjacent to the Mekong River.

Over 13 million Vietnamese do not have sufficient access to clean water for their daily activities, including 2.5 million people in rural areas, where many farmlands are located.



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Contaminated water accounts for nearly 80 percent of diseases in the country, including cholera, typhoid, dysentery and malaria each year.

But contamination is not the only water-related crisis afflicting Vietnam, as the country is grappling with a shortage of water - having only 4,400m³ water resources per capita each year, a far cry from the world average of 7,400m³ per capita. Water resources from Vietnam's 2,000 plus rivers go mainly into boosting the country's source of food security: agriculture.

Agriculture accounts for over 70 percent of the total water use in Vietnam and provides about one-third of the country's employment, but farmers still appear to struggle. Increasingly severe droughts due to climate change, a rise in dams built in upstream Mekong and insufficient administrative intervention have all led to water contamination, imbalanced water distribution, salination and a yawning wealth gap in the nation.

Improved Irrigation Might Not Bridge Wealth Gap

Organisations have been pitching in to develop irrigation and drip systems to help the farmers use water efficiently. The World Bank, for instance, developed an improved irrigation system that allegedly benefited 215,000 farming households and drove up average yields by up to 15 percent and, in turn, farmers' income.

A study showed that a total of VND 100,000 billion has been spent on developing over 8,000 irrigation systems and 2,000 pumping stations.

However, while these systems did help rice yield to spike by up to 35 percent, the study added that irrigation system did not significantly help poor farmers.

"Simply providing irrigation water to the poor will not improve their situation unless they make good use of the irrigation water, regardless of how well the irrigation system is functioning," the researchers wrote.

Their stance echoes that of Dr Dennis Wichelns, former senior researcher at the Stockholm Environment Institute's Asia Centre in Bangkok.

"Irrigation, alone, is not a sufficient input. Farmers need access also to affordable seeds, plant nutrients and pest control inputs. They must also have viable markets available to them. These additional considerations often can be quite challenging for poorer, small-scale farmers," Dr Wichelns told FairPlanet.

Gaining access to irrigation water in Vietnam can also be challenging, even when systems are designed to serve an array of farmers across an irrigated basin.

"In many countries, wealthier farmers can gain access to irrigation supplies, either because they have a greater ability to pay for water or because they have stronger connections with water purveyors," Dr Wichelns added. "This can harm poorer farmers who are unable to gain access to sufficient irrigation water. Achieving equity in the distribution of water in an irrigation scheme can often require targeted policy interventions, such as implementing a system of water allocations or water rights."

Original Article: [Fair Planet by Sahsa Kong](#)



Research shows voters favor financial relief after disasters, but we need climate action too

Within two months, Australians will vote in a federal election. It comes after a political term marked by major societal challenges, including catastrophic drought, bushfires and floods.

Such natural hazards are expected to become worse under climate change. So how does a person's experience of disasters affect the way they vote?

This is the question I set out to answer in my new research into the last federal election. I found when people experienced drought, they tended to place more importance on economic security, not environmental policies, in deciding how to vote.

Crucially, on election day this translated to more votes for micro-parties and fewer votes for the incumbent Coalition. The findings may provide insight into how the current floods in southeastern Australia will influence the next election.

Cast your mind back

Heading into the May 2019 election, much of Australia was gripped by heatwaves and drought.

The four months to April had been the hottest period on record. Dams were low and farmers were barely getting by.

The parched Murray–Darling Basin had experienced mass fish kills and nationally, rainfall in Australia that year would be 40% below average, the lowest on record.

In light of these conditions, political parties and candidates took drastically different drought strategies to the election.

Labor and the Greens promised significant cuts to Australia's greenhouse gas emissions, to varying degrees. Labor also pledged to promote renewable energy and offered farmers climate adaption programs, and the Greens promised to help farmers implement sustainable agricultural systems.

In contrast, the Liberal-National government largely offered economic relief for rural communities, rather than pledging to mitigate climate change and future drought.

Various micro-parties largely favored the Coalition's compensation approach. But importantly, they also tended to advocate strongly for local measures.

For example, Katter's Australian Party agitated for more money to local councils. One Nation said Australia should withdraw from international climate agreements and advocated for greater local ownership of water resources.

Research shows a local experience of abnormal weather tends to increase public belief in climate change, as does low rainfall.

In some cases, extreme weather events lead to support for "green" policies and politicians. And incumbent governments that fail to prepare for or remedy harm from disasters can do worse in elections.



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But belief in climate change does not always translate into political support for climate action. For example, previous research has shown how after a natural disaster, voters in the United States favor politicians who offer disaster relief spending over those who invest in disaster preparedness.

Original Article: [Phys.org by Hannah Melville-Rea, The Conversation](#)

How India's depleting groundwater levels are changing the shape of the land above

Beneath the vast, fertile northern plains of India, groundwater has been vanishing at a rampant rate. According to the National Aeronautics and Space Administration, the groundwater in north India has decreased by 8.8 crore acre-feet in the last decade.

The unsustainable use and decline of groundwater leads to water becoming scarce for future generations, but it is not limited to that. Scientists are actively studying how the reduction in underground water is compacting the land above, causing irreversible changes in the aquifers.

Experts warn as the water from the aquifers keeps disappearing, the land may suddenly or gradually sink, leading to a phenomenon known as land subsidence.

The underground water exists deep in the earth's surface, where it occupies the void left by soil pores or rock cracks. At those depths, water is pressurised and it pushes the earth up. "The weight of the earth is shared by both the water and the matter underneath," said Shagun Garg, a civil engineer and researcher at the University of Cambridge. "When the underground water is drawn out excessively, the matter underneath becomes the sole entity for managing the load."

Effect on land

India is ranked number one for its excessive groundwater usage. Even within India, the northern Gangetic plains are exploited more than other parts. The impact of disappearing groundwater is accelerating changes on the shape of the land surface.

Garg studied the alluvial aquifers in India in the Delhi NCR region and found that the land has sunk and continues to sink at a substantial rate. Certain parts of Delhi like Kapashera, near the Indira Gandhi International airport, witnessed a land subsidence rate of 11 cm per year during 2014-2016, which grew to more than 17 cm per year during the two years that followed.

Apart from Garg, other researchers have also studied the Gangetic region from Punjab to West Bengal and Gujarat and have found prevalent evidence of land sinking.

The sinking of the earth depends on many factors, including the fragility and type of earth. "If limestone presence in the ground is high, it can dissolve in the water," further leading to compaction, explains Garg. "In some cases, other reasons like excessive mining of coal or petroleum can also play a role."



VELES WATER WEEKLY REPORT

But in cases where the earth matter is made up of thin soil particles, like the alluvial deposits of fertile Gangetic plains, the sinking of land becomes more prevalent when compared with the hard rocks, explains Vivek Grewal, a hydrogeologist, who also runs a Twitter microblog “Groundwater Resources of India”, discussing the groundwater scenario of the country.

However, Grewal emphasises that the compaction of land that we are witnessing is fully driven by anthropogenic activities. The movement of tectonic plates which may also result in land subsidence happens over millions of years. “But”, he said, “changes as dynamic as a movement of land by 1 cm per year is not geological time, it is anthropogenic time”. Garg added, “Over 80% of land subsidence happens due to groundwater loss.”

Original Article: [Scroll.in by Monika Mondal](#)

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