

Veles Water Weekly Report

1. **WATERTALK**
TECHNICAL ANALYSIS BY JOSHUA BELL
2. **NQH2O INDEX VS H2O FUTURES PRICE PERFORMANCE**
3. **NQH2O INDEX HISTORY**
4. **NQH2O INDEX AND H2O FUTURES VOLATILITY ANALYSIS**
5. **CENTRAL VALLEY PRECIPITATION REPORT**
6. **RESERVOIR STORAGE**
7. **SNOWPACK WATER CONTENT**
8. **CALIFORNIA DROUGHT MONITOR**
9. **CLIMATE FORECAST**
10. **WESTERN WEATHER DISCUSSION**
11. **WATER NEWS**
 - I. CA WATER NEWS
 - II. US WATER NEWS
 - III. GLOBAL WATER NEWS

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VelesWater



WATER FUTURES MARKET ANALYSIS

Welcome to ***WATERTALK***

by Joshua Bell

CLICK THE LINK BELOW

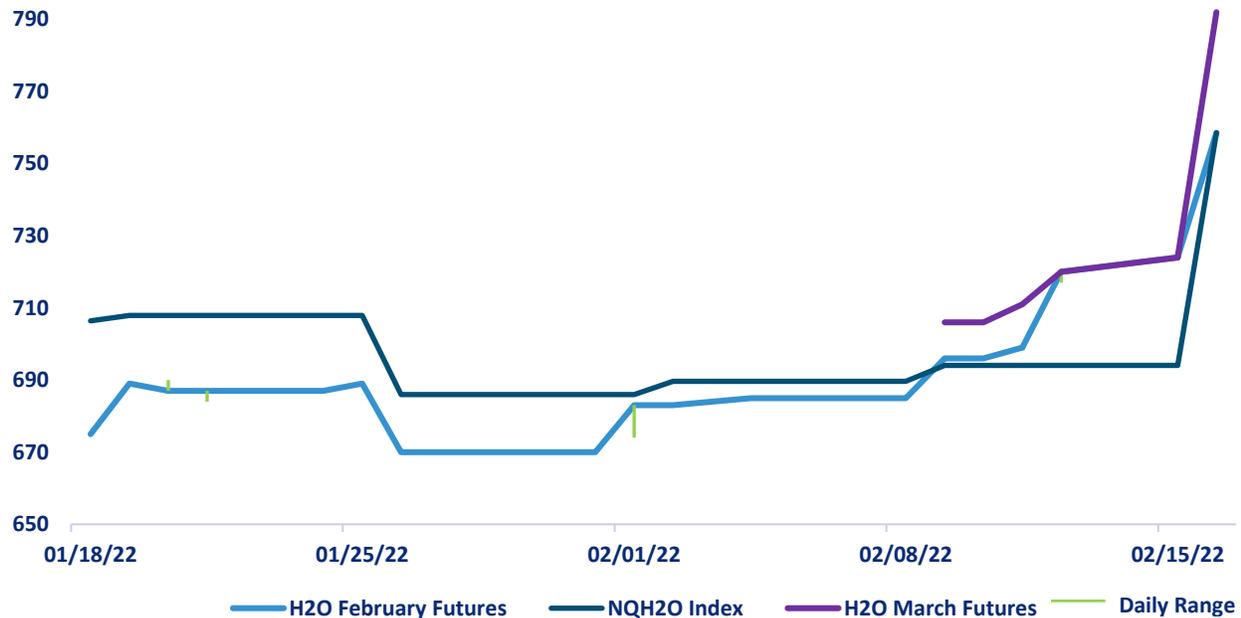
"A 2 minute technical analysis video of H2O futures"

<https://vimeo.com/678649172>



NQH2O INDEX PRICE vs H2O FUTURES PRICE

1 Month Price Performance NQH2O Index vs H2O Futures



Price Chart Based upon Daily Close

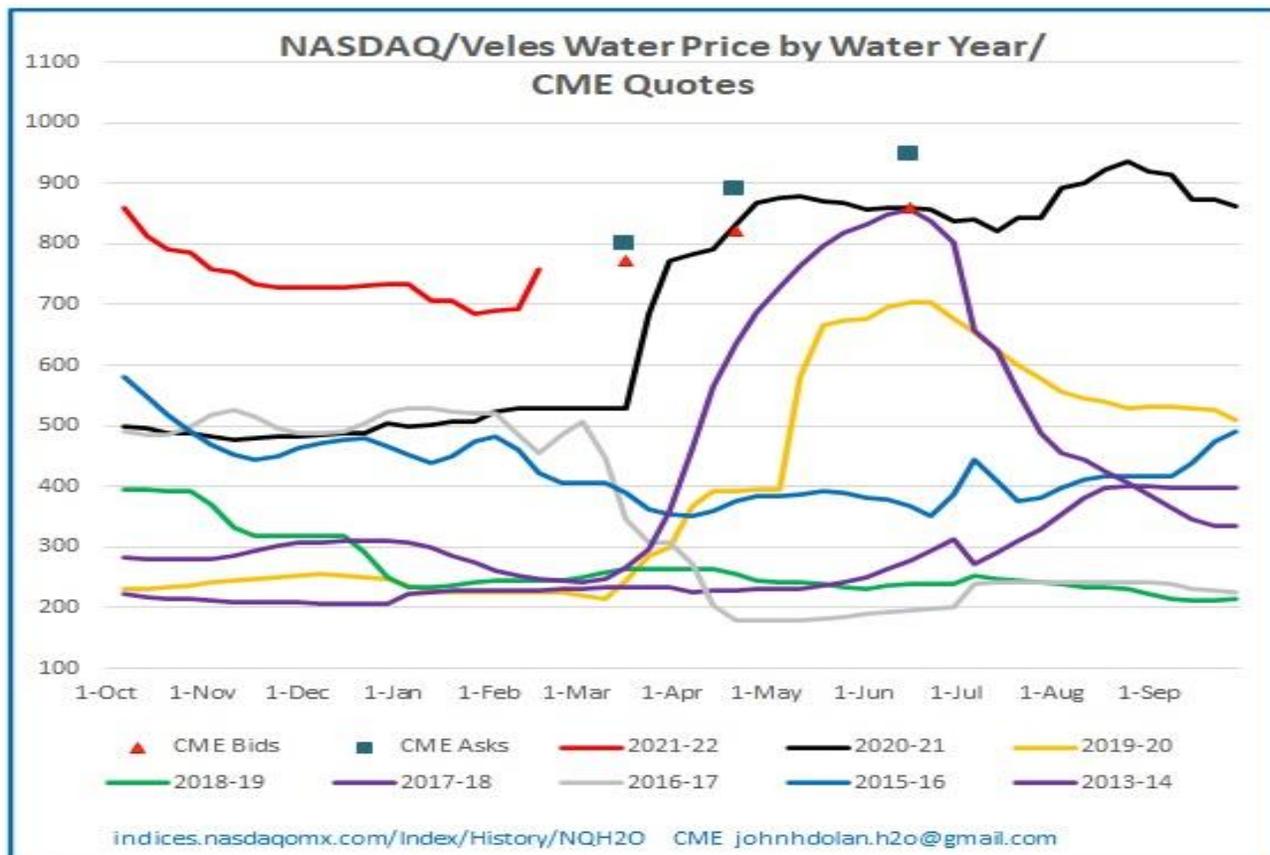
The new NQH2O index level of \$758.55 was published on the 16th of February, up \$64.47 or 9.29%. This is the settlement price for the February futures contract. The February Futures had been trading at a premium to the index ranging from +\$1.92 to +\$29.92. The March Contract is now considered the front month and is trading at a premium ranging from +\$11.92 to +\$33.45 to the index over the past week.

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

March 22	766@793
April 22	810@889
June 22	850@950



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.

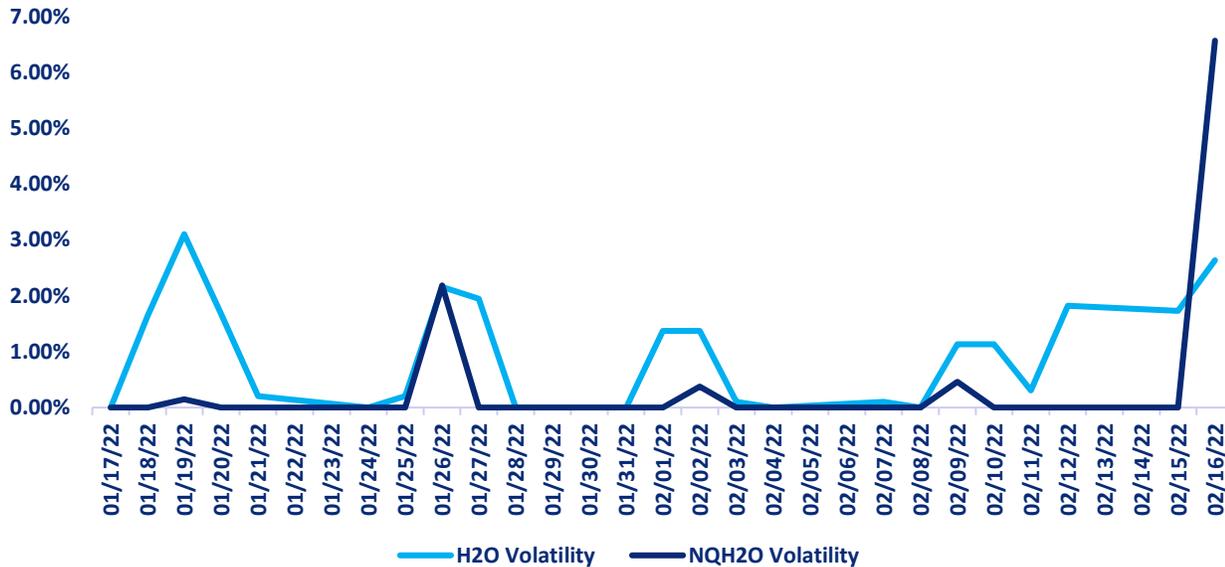
The graph for 2021 is highlighted in red. It shows the same seasonal climb, but at record-high values above each of the last eight years since February. Current bids and offers in the market are still higher than historic prices showing that expectations are that this is an exceptionally dry year and 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 February daily future volatility high has been 2.63% on February 16th and a low of 0.30% on the 11th.

ASSET	1 YEAR (%)	2 MONTH (%)	1 MONTH (%)	1 WEEK (%)
NQH2O INDEX	36.01%	9.84%	10.52%	8.640%
H2O FUTURES	N/A	8.92%	6.29%	3.76%

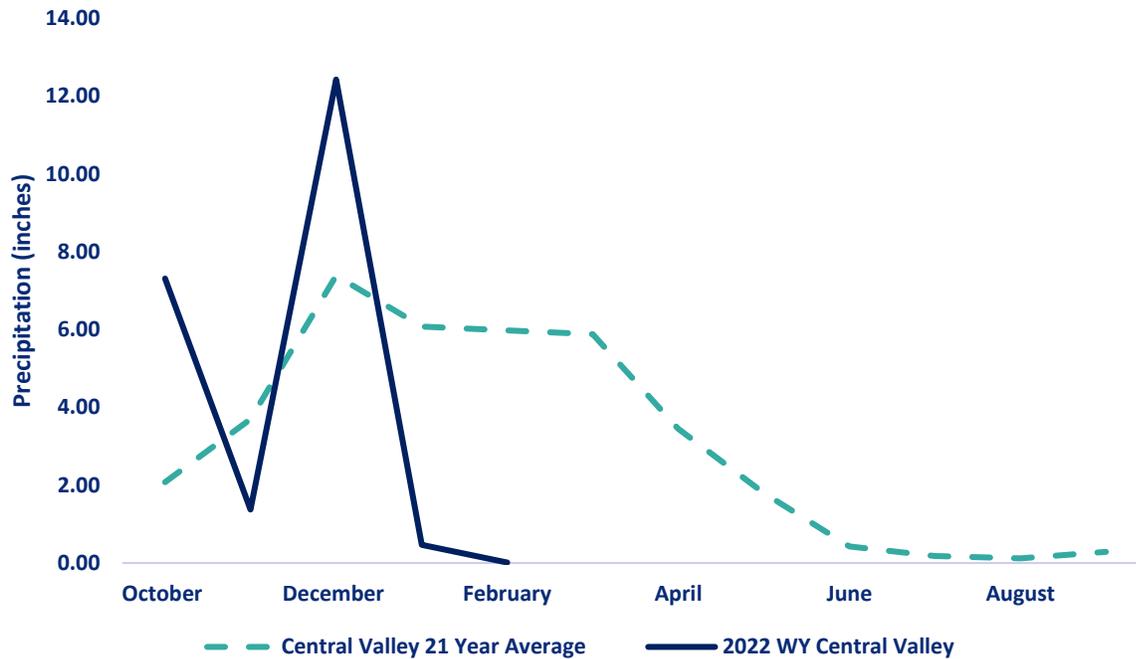
For the week ending on the February 16th the two-month futures volatility is at a discount of 0.92% to the index, a reversal of 3.70% from the previous week. The one-month futures volatility is at a discount of 4.22% to the index, a reversal of 5.65% from last week. The one-week futures volatility is at a discount of 4.88% to the index, a reversal of 6.18% from the previous week. These large discounts to the index are unusual and reflect that the futures underestimated the index moves. We expect this to level out over this week.

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



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 16/02/2022

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	0.00	0.00%	60	87
TULARE 6 STATION (6SI)	0.01	0.00	0.24%	47	80
NORTHERN SIERRA 8 STATION (8SI)	0.03	0.03	0.38%	54	100
CENTRAL VALLEY TOTAL	0.04	0.01	0.21%	54	89

RESERVOIR STORAGE

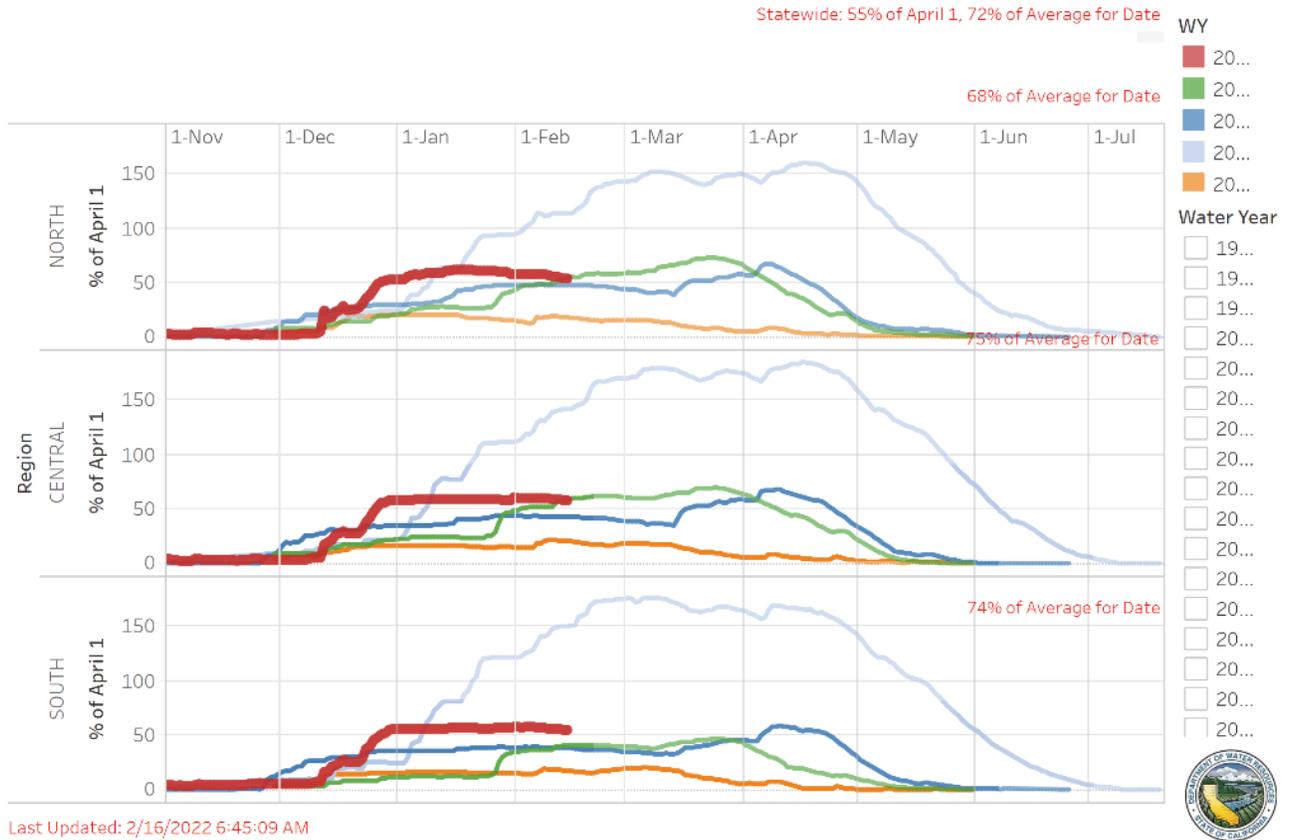
RESERVOIR	STORAGE (AF)	% CAPACITY	LAST YEAR % CAPACITY	HISTORIC ANNUAL AVERAGE CAPACITY %
TRINITY LAKE	777,519	32	51	48
SHASTA LAKE	1,663,606	37	49	53
LAKE OROVILLE	1,650,098	47	37	77
SAN LUIS RES	923,410	45	55	58

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	16.7	-0.10%	67	81	58
CENTRAL SIERRA	16.5	-0.20%	73	82	57
SOUTHERN SIERRA	13.9	-0.10%	54	83	55
STATEWIDE	15.8	0.00%	66	82	57

*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.

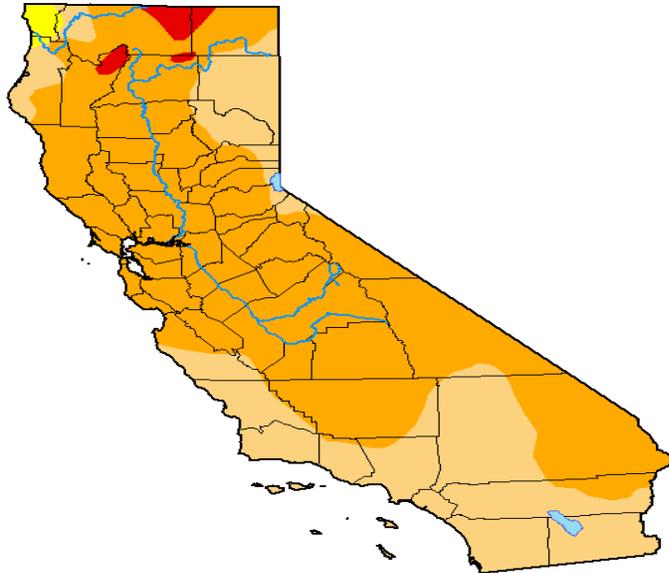
** April 1st is used as the benchmark as it when the snowpack in California is generally deepest. It has been used the benchmark date since 1941 by DWR and can be used to predict spring river flow.



DROUGHT MONITOR

U.S. Drought Monitor
California

February 8, 2022
(Released Thursday, Feb. 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	99.25	66.39	1.39	0.00
Last Week 02-01-2022	0.00	100.00	99.25	66.39	1.39	0.00
3 Months Ago 11-09-2021	0.00	100.00	100.00	92.43	80.28	37.62
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 02-09-2021	0.64	99.36	85.10	57.87	31.41	3.75

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

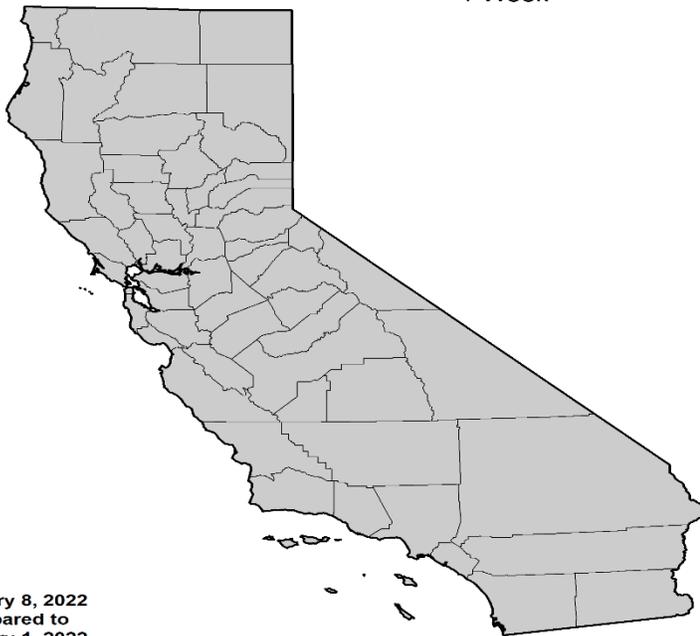
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:
Deborah Bathke
National Drought Mitigation Center



droughtmonitor.unl.edu

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



February 8, 2022
compared to
February 1, 2022

droughtmonitor.unl.edu

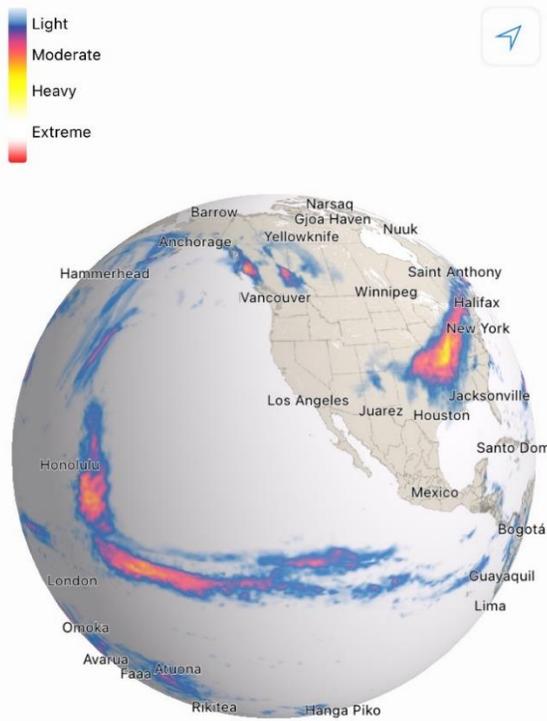


The US Drought Monitor release their statistics with a 1-week lag to this report. Over the past week the has been 0% change in all classifications of drought. Still important to note that 0% of California is classed as being in Exceptional (D4) drought conditions and 100% of California is in some form of drought.

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 shows once again a dry SW US region with a large storm affecting the eastern US ranging from Houston up to Maine and into Eastern Canada.

There is some weak frontal activity moving south along the Western Canadian coastline moving into the Vancouver region.

This is expected to bring some light precipitation and moisture to the NW US.

During the week this frontal system may bring further precipitation to Northern California as it moves southwards and eastwards. There is the possibility of a dusting of snow over the Northern Sierras.

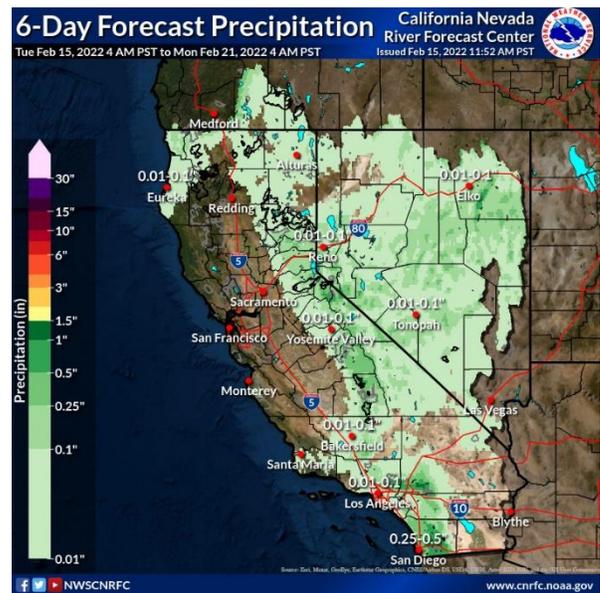
There is no Monsoonal effect at this time of the year as the current weather systems dominate.

Our models are still showing that there is still the possibility for some precipitation over the next 2 months but while these are still probable the likelihood is slowly decreasing.

10 Day Outlook

Minor changes to the forecast this afternoon, but overall the pattern remains the same. High pressure will sit over the eastern Pacific Friday keeping conditions dry. The ECMWF still shows a small upper low just off the coast of norCal Friday, but the 12z run pulls this low offshore as it moves down the coast into Saturday while also speeding up the timing compared to the 00z run. The GFS is now showing a similar more organized feature than the 00z run, but does not have the same depth or organization as the ECMWF. Either way, it appears unlikely this feature will produce any precipitation given the new trajectory. Models also only show about 0.2-0.5" PW, so not much moisture there anyway.

This upper low will exit off to the south later Saturday as the next upper trough approaches on Sunday. Not much moisture with this system either (0.2-0.5" PW),





VELES WATER WEEKLY REPORT

however, this time do expect some showers across the region Sunday and Monday. Precipitation is forecast to reach the CA/OR border as early as Sunday morning. Uncertainty remains in terms of timing and movement of this system as model differences remain as well as a wide range of QPF for the ensembles. By early Monday morning, for example, the deterministic GFS has half an inch along the north coast while the ECMWF has less than a tenth. This may be due to the fact the GFS has the trough further westward over CA than the ECMWF. The best chances for precipitation look to be along the northern/central Sierra and eastward as well as along the north coast and over the south OR Cascades. For now amounts remain similar to this morning of a few hundredths to just over a tenth of an inch and locally 0.25+".

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

WESTERN WEATHER DISCUSSION

Weather across the West was once again dry this week. Western Oregon saw expansions to moderate (D1) and severe (D2) drought increased. Another week of dry weather increased water-year-to-date precipitation shortfalls and lowered streamflow values. The far northern Oregon Cascades saw improvement. Snowpack here is near normal for the water year. Extreme drought (D3) was expanded in Utah as increasing precipitation deficits have dried out soils and lowered streamflow. The rest of the West remains unchanged. Several weeks of dry weather has caused high elevation snowpack in parts of the west to drift away from the above-normal values at the start of the new year.

Reference:

Deborah Bathke, National Drought Mitigation Center
Richard Tinker, NOAA/NWS/NCEP/CPC



WATER NEWS

CALIFORNIA WATER NEWS

The Not-So-Bright Future of Sustainable Groundwater Use in Agriculture

Many experts agree that sustainable groundwater use is important for the future of agriculture, but doing so will mean a significant reduction in crop yields.

Researchers at Dartmouth College recently studied the impact sustainable water use will have on production potential of major US crops. The study, published in *Earth's Future* last month, dives into how the production of corn, soybeans and winter wheat—which account for 52 percent of the country's irrigated land—could be dramatically reduced if a sustainable water supply was used to grow them.

Many farmers rely on irrigation, which uses groundwater from aquifers—underground water sources naturally fed by rainfall, snowmelt and other water that infiltrates the soil. Depleting the aquifers of water faster than it can refill results in reduced groundwater quantities and, therefore, reduced crop yield potential. Aquifers are relied on not only for agriculture but also for drinking water, and they are essential for healthy lakes and rivers. The depletion of aquifers can negatively impact entire ecosystems. “Sustainable” use of groundwater would mean limiting water uses to meet the rate of natural aquifer recharge. And with more than 50 percent of the West's land classified as experiencing “extreme or exceptional drought” as of October 2021, the rate of future recharge isn't particularly hopeful.

To evaluate how a more sustainable use of groundwater would impact these three major US crops, researchers used a crop model to simulate irrigated agriculture from 2008 to 2012. That model, which used weather data, crop varieties, soil properties and farm management, was then compared to USDA survey data to confirm its accuracy.

The findings show that if the water were to be used in a sustainable manner, a decrease in the production of each crop would be necessary. There would simply not be enough water to nourish the amount of crops already grown. The study simulated the reduction in crop production under four scenarios, ranging from most optimistic to most pessimistic in regards to water amounts available, with the most optimistic simulating the highest possible aquifer recharge percentage. The less optimistic scenarios simulate lower recharge percentages and also account for leaving water in the aquifers to maintain a healthy ecosystem.

Original Article: [Modern Farmer by Shae Swenson](#)



VELES WATER WEEKLY REPORT

Implementing SGMA at Ground Zero—Challenges and Opportunities for the San Joaquin Valley

The San Joaquin Valley—California’s largest farming region—has the biggest groundwater overdraft in the state. This makes the valley ground zero for implementing the Sustainable Groundwater Management Act (SGMA). In collaboration with numerous research and stakeholder partners, PPIC has done extensive work on what SGMA means for this region. This has included analyzing promising solutions for bringing basins into balance, and reviewing how well the first groundwater sustainability plans (GSPs) for the region’s 11 critically overdrafted basins—submitted in early 2020—address key challenges.

Our remarks today recap the nature of the overdraft problem facing the valley, areas for improvement in the region’s sustainability plans, and some near-term priority areas where the state can play an important role in supporting local success.

Tackling the Valley’s Overdraft Problem

In *Water and the Future of the San Joaquin Valley*, we estimated that the region’s annual groundwater overdraft for the 1988–2017 period was nearly 2 million acre-feet (maf), or 11% of net water use. The consequences of this overdraft are widespread—affecting communities, the regional economy, and the environment. Falling water levels have caused wells to go dry and reduced groundwater reserves, sinking lands are damaging critical infrastructure, and overdraft is posing risks to water quality and ecosystems. As the region’s main water user (nearly 90% of net water use), agriculture will need to lead adaptation efforts.

Ending overdraft involves reconciling groundwater math and socioeconomic. The groundwater math problem is straightforward: attaining balance requires augmenting supplies, reducing demands, or some combination of these strategies. The socioeconomic problem involves picking the portfolio of solutions that brings the most benefits to the region, relative to the costs. We estimate that about a quarter of the region’s groundwater deficit could be met by augmenting water supplies at a cost farmers can afford—mainly by expanding groundwater recharge efforts. The balance will likely need to be met by managing demand—i.e., using less groundwater. Water trading can significantly lower the regional costs of managing demand—in terms of jobs, revenues, and GDP—by enabling water to go to the most productive farmlands.

Successful implementation of this mixed portfolio will require substantial coordination among parties both within and across basins—both to develop water trading and recharge agreements and to expand shared infrastructure needed to support these actions, such as regional water conveyance. This represents a major governance challenge in this region, where basins are large, with a diverse array of stakeholders. Although SGMA has brought many parties together for groundwater sustainability planning, ongoing institutional fragmentation will pose significant challenges to developing the level of coordination required.



VELES WATER WEEKLY REPORT

Areas for Improvement in Sustainability Plans

SGMA requires local groundwater sustainability agencies (GSAs) to develop and implement plans to bring their basins into long-term balance. It provides a flexible timeline, but with guardrails: following plan adoption, local entities have 20 years to attain sustainability, but groundwater use must not cause significantly unreasonable undesirable results along the way.

The Department of Water Resources recently released its statutory reviews of plans for 10 of the valley's 11 critically overdrafted basins. To the surprise of some, DWR judged them all to be "incomplete"—and outlined improvements GSAs must incorporate by this summer. The stakes are high: basins that fail to address the concerns could see their plans judged inadequate, potentially triggering intervention by the State Water Board. DWR's reviews highlight several key areas for improvement: (1) plans generally need to do more to address undesirable results of groundwater use, such as impacts on drinking water wells and land subsidence; (2) some plans need to improve coordination on data, methods, and management approaches within their basin; and (3) some plans need to flesh out supply and demand management actions to bring basins into balance. Addressing these gaps will be essential to meeting the goals of SGMA.

Our work highlights some additional issues that could limit success:

- **Overdraft optimism.** Some plans likely underestimate the extent of historical overdraft in their basins, and hence the need for solutions.
- **Supply optimism.** Most plans appear overly optimistic about the potential for new supplies to fill the gap. In the aggregate, the plans assume that new supplies will address more than three-quarters of overdraft, while demand management will save less than one-quarter. This is the inverse of our estimates, which considered both the costs and the amount of water that might be physically available.
- **Avoidance of demand management.** Since reducing water use largely means reducing the amount of irrigated cropland, there's been reluctance to seriously consider the demand side at this early stage of SGMA implementation. To their credit, GSAs in a few basins have begun establishing pumping allocations and exploring flexible tools that could reduce the economic costs, such as fees tied to volumes pumped, groundwater trading, and monetary incentives for land fallowing.
- **Climate and drought complications.** The warming, changing climate is making droughts more intense, something the plans generally did not anticipate. The return of severe drought so soon after the last one makes balancing groundwater basins even harder. Drought means fewer opportunities for recharging basins (the key supply solution), and more groundwater pumping—with more risks of causing undesirable results such as dry drinking water wells and land subsidence. This makes it more urgent to put solutions in place now to address these impacts and manage demand.



VELES WATER WEEKLY REPORT

Near-term Priorities

SGMA gives local stakeholders the lead in managing their basins. Since the law was enacted, valley stakeholders have made significant gains in understanding their groundwater basins, and in organizing efforts to manage this vital resource. But with increasingly intense droughts, the clock is ticking. Here are five priority areas where the state can provide strategic support:

1. Address undesirable results of pumping. DWR's reviews rightly underscore the importance of addressing these impacts, either by avoiding pumping in vulnerable areas, or by mitigating impacts when feasible. Holding GSAs accountable through the regulatory oversight process is the best way to ensure they take this seriously.
2. Accelerate demand management. The state can lend vital technical and financial support to local efforts by promoting robust accounting systems—an essential underpinning of effective demand management programs. Making common tools available could facilitate consistency across planning areas.
3. Promote realistic efforts on new supplies. Groundwater recharge provides the best opportunity for augmenting supplies in this region, but current local plans anticipate two to three times more water than is likely available. DWR and the State Water Board should jointly help determine what's available, incentivize local cooperation on harnessing these supplies, and facilitate permitting.
4. Assess smart infrastructure investments. The state can be a key partner in identifying and investing in the smart regional infrastructure improvements—such as conveyance—that can help the region flexibly recharge and trade water.
5. Plan for successful farmland transitions. At least 500,000 acres of farmland are likely to come out of irrigation by 2040 to meet groundwater sustainability goals. The state can encourage coordinated approaches so that this land is well managed in alternative uses (e.g., solar energy, habitat). The new Department of Conservation program to support multi-benefit farmland repurposing is a helpful step in this direction.

Local stakeholders must play a central role in attaining groundwater sustainability, and the path ahead may seem daunting. The state can help chart the way with strategic regulatory guidance, technical support, and financial incentives that promote more cooperation both within and across basins—a key to efficient, equitable SGMA solutions. Original Article: [PPIC by Ellen Hanak and Alvar Escriva Bou](#)

Current drought is worst in 1,200 years in California and the American West, new study shows

The drought that has parched California and the American West for much of the past two decades ranks as the driest 22-year period in at least 1,200 years, according to a new study published Monday.



VELES WATER WEEKLY REPORT

Measuring historical moisture patterns by looking at thousands of tree rings, scientists concluded that the West is in a “megadrought,” the likes of which have not been seen in the region since at least 800 A.D., when Vikings sailed the North Atlantic and Mayans built temples in Mexico and Central America.

Climate change, which is leading to increasing temperatures, is making the current dry period more severe than it otherwise would have been, the researchers concluded.

“Here we are 22 years into a bad drought, and because of climate change we are now surpassing the severity of megadroughts that have always been thought of as the worst-case scenarios,” said Park Williams, an associate professor of geography at UCLA and lead author of the study.

“Scientists are the eyes for society,” Williams added. “It’s like when your eyes tell you that your head is about to hit a tree branch. You have to do something to avoid that. We see a danger now, right here in front of our eyes.”

Over the past 20 years, California has had three stretches of short-term drought: 2000-2003, 2007-2009 and 2012 to 2016. Each drought ended with a soaking year, most recently in 2017, when heavy rains caused flooding that damaged Oroville Dam and submerged parts of downtown San Jose.

The past two years have seen another sharp period of drought, which is still underway in California and much of the West. Despite rains in December, reservoirs across the state remain at lower than average levels, wildfire danger is rising, and the Bay Area hasn’t seen any rain in five weeks.

Taken together, the last 22 years now exceed the previous worst 22-year period, 1571 to 1593, in the historical record, measured by soil moisture. And with only two more months left in California’s winter rainy season, odds are this drought will continue, Williams said.

“It’s extremely unlikely that this drought can be ended in one wet year,” he said.

As of last week, 66% of California and 64% of the American West were experiencing “severe drought,” according to the U.S. Drought Monitor, a weekly update.

Last summer, two of the largest reservoirs in North America — Lake Mead and Lake Powell, both on the Colorado River — reached their lowest recorded levels. California’s largest reservoir, Shasta Lake, near Redding, was 36% full on Monday, and its second largest, Lake Oroville, in Butte County, was 47% full.

Experts said Monday that the study, published in the journal *Nature Climate Change*, is the latest example of how California and the West are entering a new era that is already posing significant challenges for water supplies, wildfire risk and extreme heat events.

“Our approach to Western water allocation for the past century-and-a-half has been based on the unjustified optimism that good years and good runs of years are typical,” said biologist Chris Field, director of Stanford University’s Woods Institute for the Environment “This new paper drives home the point that profound droughts are part of the history and are getting worse.”



VELES WATER WEEKLY REPORT

“We need to find a way to live within the real-world, increasingly limiting constraints,” said Field, who was not part of the research.

Global temperatures have risen 2.1 degrees Fahrenheit since 1880, mostly due to the burning of fossil fuels, which traps heat in the atmosphere. The 10 warmest years since 1880 on Earth have all occurred since 2005, according to NASA and NOAA.

Williams and his colleagues studied records of tree rings from roughly 30,000 trees in nearly 1,600 locations around the West to measure the amount of rainfall and soil moisture over the centuries. In a paper published two years ago, they found that the first 19 years of this century were the second-driest back to 800 A.D., which is about as far back as the tree-ring estimates in their research are reliable.

After the most recent two dry years, the current period became the driest in the West in at least 1,200 years. Human-caused climate change is responsible for about 42% of the soil moisture deficit since 2000, the paper concluded.

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

Judge: Kings Co. water pipeline blockade can continue

A push by one of Kings County’s largest farming outfits and water players to resume construction on a mysterious water pipeline will continue to face a literal blockade of heavy equipment, including some provided by one of its top competitors.

At the center of the controversy, a physical barrier stopping Sandridge Partners, the diversified farming and water giant owned by Santa Clara County native John Vidovich, from constructing a water pipeline in southern Kings County.

Two weeks ago, Tulare Lake Canal Company sued Vidovich’s Sandridge Partners claiming construction to occur underneath its eponymous canal could potentially damage its ability to convey water later in the year.

Shortly thereafter, it placed heavy equipment, including some owned by the J.G. Boswell Company (a heated rival of Sandridge).

Sandridge responded to the initial suit by filing a cross-complaint against Tulare Lake Canal Company. Last week, it also filed for a temporary restraining order hoping to compel Tulare Lake Canal and Boswell to remove its equipment from a canal berm.

Thursday, Kings County Superior Court Judge Valerie Chrissakis heard argument on the temporary restraining order.

Per a report from SJV Water, Tulare Lake Canal and Chrissakis pressed Sandridge to demonstrate irreparable harm if it was unable to proceed with construction uninhibited by heavy equipment blocking its path:

In arguing that Sandridge didn’t meet the urgency requirement for its restraining order request, Tulare Lake Canal Company attorney Leonard Herr asked “Where is the water going? When will it be used? Who is going to use it? Without that information, your honor, I don’t think this case is entitled to the emergency that (Sandridge is) claiming.”



VELES WATER WEEKLY REPORT

Sandridge said it needs to complete the pipeline and start moving water quickly to “pre irrigate thousands of acres.” It did not, however, provide any contracts or cropping information as to the need for the pre irrigation, which Judge Chrissakes noted in her denial of the restraining order.

Original Article: [SJV Sun by Les Hubbard](#)

Water scholars pitch new laws for drought and climate change

A handful of California law professors and former state officials have presented lawmakers with a set of recommendations for updating water laws to address drought and climate change.

“This is not a ‘blow up the water rights boxes’ approach,” they wrote in a new report. “It is a focused approach to updating existing laws, regulations and funding.”

The group includes Tam Doduc, who resigned from the State Water Resources Control Board last year in protest to growing momentum for voluntary agreements over freshwater flows into the Sacramento-San Joaquin Bay-Delta.

The recommendations reflect her views by encouraging the state water board to adopt the second half of the controversial Bay-Delta Plan and to dedicate a portion of freshwater flows to supporting fish populations. They suggest updating the water code to allow the state water board to better investigate claims to water rights and to push local groundwater agencies to prioritize domestic wells in sustainability plans.

The report also calls for more funding for monitoring water flows and various other needs and more attention to environmental justice.

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

The Sierra finally gets some snow. But it’s of little relief in drought-ravaged California

Finally, some fresh snow. Just not very much of it. California’s worsening drought received a bit of relief late Monday with a light dusting of snow in the Sierra Nevada. UC Berkeley’s Central Sierra Snow Lab recorded 1.6 inches of new snow at its measuring station near the Donner Summit — the first measurable snowfall in the area in 37 days. The lab said the dry spell was the longest it had ever recorded in its 51 years of monitoring Sierra winters, surpassing a 31-day stretch without snow in 1990.

The Sierra was pelted with record snowfall in December, raising hopes that the drought was easing. California officials agreed to release more water from the State Water Project to its member cities and farm-irrigation districts. And then the faucet shut off, making it increasingly likely that California is heading into a third straight year of drought. Climate experts say a high-pressure system parked over the Pacific has pushed wet weather northward and away from California. In the meantime, the snowpack has begun melting and evaporating. In a month’s time, the snowpack shrank by more than



VELES WATER WEEKLY REPORT

2 feet at Phillips, the familiar measuring spot near Echo Summit used by the state's snow surveyors. The only good news is that the water has disappeared at a less alarming rate. Since peaking five weeks ago, the Sierra snowpack has lost an estimated 5% of its water content, according to the Department of Water Resources. Still, any water loss could be critical. The snowpack is a major part of California's elaborate water system, acting as a second set of reservoirs that can store supplies for summer and fall usage. An early-spring heat wave last year robbed the system of an estimated 800,000 acre-feet of water, largely because of snowpack evaporation. That's nearly enough water to fill Folsom Lake.

Original Article: [The Sacramento Bee by Dale Kasler](#)

State groundwater management may require metered wells, additional fees

The lengthy, multifaceted work of the Sonoma Valley Groundwater Sustainability Agency reached a benchmark in December 2021 when its board approved a Groundwater Sustainability Plan (GSP) and sent it off to the state for review and potential approval. The plan, including references and appendices, came in at a hefty 1,285 pages, though attentive readers can get the gist in the 28-page executive summary. The final plan is online at sonomavalleygroundwater.org, or available in hard copy at the Sonoma Valley Regional Library, 755 W. Napa St., Sonoma.

Probably the most notable part of the plan is the section dealing with potential groundwater user fees and permits — necessary steps to assure the plan is viable and effective.

A Groundwater Sustainability Plan is a 20-year blueprint to sustainable use of a groundwater basin, in this case the Sonoma Valley Subbasin. The focus on groundwater conservation was given teeth in 2014 with implementation of the state's Sustainable Groundwater Management Act (SGMA), which empowered the state to manage groundwater policy in any district that fails to craft its own local plan. The SGMA holds out the possibility of imposing fees on groundwater accessed through private wells, a significant challenge to the traditional perception that what's underground belongs to the owner.

In the Sonoma Valley, as the GSP makes clear, the threats to sustainability come from three primary sources: depletion of groundwater resources due to unchecked agriculture and other human usage; climate patterns that put at risk the replenishment and preservation of the groundwater reserves; and saltwater intrusion from San Pablo Bay into groundwater, a process that renders the water undrinkable and unsuitable for agriculture.

Among the findings of the Sonoma Valley agency's research is that the "amount of groundwater stored in the aquifers has declined on average by about 900 acre-feet per year (AFY) during the drier climate conditions of the current water budget period of



VELES WATER WEEKLY REPORT

2012–2018,” although groundwater levels for the majority of shallow aquifer monitoring wells are “generally stable.”

Will Sonoma Valley residents accept fees for groundwater use or access? A survey of Sonoma Valley well owners conducted early in 2021 showed local support for groundwater sustainability actions, said Andrea Rodriguez, a senior programs specialist at Sonoma Water. “The Sonoma Valley focus group understood and was concerned about groundwater and the impact of the drought and long-term groundwater use on their wells. They were interested in the GSA providing data about water use and long-term changes in groundwater levels. They were also interested in programs and projects that could make the basin more sustainable,” she said.

While the response rate of the 1,572 well owners was only 25%, that was still higher than the number of responses in the other two county water subbasins, Petaluma Valley and the Santa Rosa Plain.

All three of these regional groundwater sustainability agencies delivered their GSPs to the state Department of Water Resources (DWR) at the beginning of 2022. There’s an open period for public comment until March, after which the proposed plan for Sonoma Valley undergoes analysis by the state, which will issue a decision on the plan’s worth — “approved” or “incomplete” and in need of further research.

Ann DuBay, the GSA administrator for Sonoma Water, said the state DWR “has a department dedicated to implementing the Sustainable Groundwater Management Act, and it’s these folks who are reviewing plans. They also provide technical assistance and, to date, have been very helpful when we’ve reached out with questions.” All of the state’s GSP records, and their current status, can be accessed at sgma.water.ca.gov.

DuBay said all three local GSPs are roughly at the same stage of undergoing state review, a process that may take up to two years. While the plans are under this extended review process, they are in effect. “In the meantime, the GSA will begin implementing the draft plan to ensure that the basin can reach its sustainability goals,” DuBay said.

Among those proposals are fees that can be applied for water use, including well access and usage (which would require the metering of wells) and perhaps added district fees to customers. Matt Fullner, managing director of Valley of the Moon Water District (VOMWD), said he expected some fees would be coming from the GSA in the near future. “The exact costs are not yet fully understood, but whatever they are, they will affect our groundwater cost and thus our Tier 1 rates.”

Like all water districts in the state, VOMWD is obligated to justify split rates based on actual cost of the water delivered, so water sourced from the Russian River-fed Sonoma Valley Aqueduct has a different cost than water sourced from wells in the Sonoma Valley itself.

Original Article: [Kenwood Press by Christian Kallen](#)



VELES WATER WEEKLY REPORT

Groundwater Authority celebrates victory lap after plan approval, begins steps towards future

At the Indian Wells Valley Groundwater Authority board meeting on Feb. 9, the IWVGA took a brief victory lap to celebrate that the California Department of Water Resources had approved the IWVGA's groundwater sustainability plan. The IWVGA board then set their sights on the future goal of reconciling the list of corrective actions DWR recommended for the GSP.

IWVGA general manager Carol Thomas-Keefer led a presentation to summarize the 51-page DWR approval letter, which is available in full on the IWVGA website at iwvga.org/gsp-chapters.

"It seems like we should have some balloons, confetti, and some fanfare for this item," Thomas-Keefer said as she began her presentation in the sparsely populated and socially distanced Ridgecrest City Hall Council Chambers. Only two of the five board members were physically present as the others participated online.

Without confetti or any balloons, Thomas-Keefer continued, "The day after our last board meeting in January, we received notice from the Department of Water Resources that our groundwater sustainability plan for the Indian Wells Valley Groundwater Basin had been approved."

It was a seemingly rigorous approval process. Thomas-Keefer said that of the 42 groundwater sustainability agencies that submitted GSPs, DWR only approved eight. Furthermore, the IWVGA GSP was the only one which received approval in Kern County, according to Thomas-Keefer.

DWR found that the IWVGA GSP presented projects that are technically feasible for the basin, that it has measures to fill in existing data gaps, that the IWVGA has adequately responded to stakeholder comments which raised credible issues, and that the sustainable management criteria are justified.

The board then turned their attention to the future. The first GSP update is due by January 2025. IWVGA will need to show progress on their sustainability plan and implementation, as well as progress on corrective actions which DWR recommended in the approval letter.

Original Article: [The Daily Independent by Michael Smit](#)

California to build solar panels over canals following UC graduate's research

A consortium in California has announced its ambition to construct a network of solar panels over a segment of the state's canal system. The project, named Project Nexus, will build on research by a UC Merced environmental engineering graduate, which we originally reported on back in May 2021.

The graduate, Brandi McKuin, was part of a team who demonstrated that covering California's 4,000 miles of water canals in solar panels could potentially reduce water



VELES WATER WEEKLY REPORT

evaporation by 82%. This reduction would save 63 billion gallons of water per year, enough to irrigate 50,000 acres of farmland or meet the residential water needs of 2 million people.

Covering the entire state's canal system in solar panels would also generate 13 gigawatts of renewable energy, equal to 17% of the state's current solar capacity. The move would deliver half of the projected new solar capacity required by California to meet its 2030 decarbonization goals, including a commitment to generate 50% of its electricity from renewable sources.

Having recently been approved by the Turlock Irrigation District (TID), a pilot network of solar panels will be constructed over several canal segments in the San Joaquin Valley. Project Nexus will be the first project of its kind in the United States, with \$20 million in funding allocated. Construction is set to begin in 2024 by a partnership consisting of TID, the Department of Water Resources, Solar AquaGrid, and UC Merced.

McKuin, now a postdoctoral researcher at UC Santa Cruz, will return to UC Merced as a project scientist to conduct studies related to the pilot project, in collaboration with engineering Professor Sarah Kurtz. Challenges to be addressed by the team include the relatively high cost of the solar canal structures, the need to maintain access to the canals for maintenance, and the most effective means to deliver the electricity to a wider network.

In addition to improving the project's design in response to these challenges, the team will also map the state's canals to identify which design solutions are most beneficial for each segment and to eliminate segments deemed unable to accommodate solar panels. A life cycle assessment will also be generated on the system to understand its long-term cumulative environmental impact.

Original Article: [Archinect by Nail Patrick Walsh](#)

Water district customers request more water than current state allocation

Continued dry weather may reduce the current Table A allocation for the Tehachapi-Cummings County Water District and other State Water Project contractors.

But even if the 15 percent allocation announced by the state Department of Water Resources on Jan. 20 stands, the volume of water requested by the district's M&I (municipal and industrial) and agricultural customers is more than the amount of water the district might be able to import.

A 15 percent Table A allocation would amount to 2,895 acre feet — only about 30 percent of the the five-year average of SWP water delivered to the district (9,473 acre feet). Of this, more than 55 percent has gone to agriculture and 28 percent to recharge. This water is in addition to groundwater available to various entities due to established rights. Average California household water use is between one-half and one acre-foot of water per year.



VELES WATER WEEKLY REPORT

The district's board of directors will review 2021 operations and provide staff with direction for 2022 at its regular monthly meeting Wednesday, Feb. 16. The meeting will begin at 3 p.m. and will be held at district headquarters, 22901 Banducci Road, Tehachapi.

Water priorities

The board's Water Priority Committee, comprised of President Robert W. Schultz and Director Kathy Cassill, met with General Manager Tom Neisler, Operations Manager Jon Curry and Board Secretary Cat Adams on Feb. 10.

According to meeting minutes, Neisler presented a forecast of 2022 supply and demand. Tallying the requests made by district customers and other district obligations, Neisler said they equate to 8,624 AF or a 45 percent allocation.

"We know this will not happen," he said.

The increase in allocation from zero percent announced in December to 15 percent on Jan. 20 was a surprise, Neisler said previously. But it has been common in recent years for the state to allocate far less than customer contracted amounts of water. In 2021, a 10 percent allocation was reduced to 5 percent. In 2020 the allocation was 20 percent. Last year, the district was able to draw on water it had banked in the San Joaquin Valley during previous wet years. With only a five percent allocation last year, the district used 3,000 AF of that water to meet customer needs. Now only 190 AF of that water remains. State law requires that health and safety be prioritized over all other water uses, Neisler said. Beyond that, the board will have some choices as to how to allocate remaining water. Irrigation for Tehachapi Cemetery and Benz Visco Park, as well as priorities for ag customers must be determined.

Water retailers, including the city and community services districts in Bear Valley Springs, Golden Hills and Stallion Springs, are expected to be able to continue to provide water to customers but programs to purchase state water for water banking are at risk with such a low allocation.

The board will also be asked to establish the year's priorities for ag water. In the past, Neisler said in his staff report, the board has prioritized irrigation of higher value more permanent crops and food crops have been prioritized over non-food crops.

Other options

In his staff report Neisler also described some potential options for purchasing or "borrowing" additional water, subject to availability.

Such programs might offer water at prices ranging from \$600 to \$850 per acre foot — compared to about \$200 per acre foot paid by the district for its Table A SWP allocation. If available, available water might be offered to the district's public agency partners and ag customers as voluntary purchases, Neisler noted.

Original Article: [Tehachapi News by Claudia Elliott](#)



VELES WATER WEEKLY REPORT

California Dept. of Water Resources to Receive \$1.5 Million to Return Salmon to Historical Habitat

The California Department of Fish and Wildlife (CDFW) announced that the Department of Water Resources (DWR) will receive \$1.5 million in funding for the Juvenile Salmonid Collection System Pilot Project in the McCloud Arm of Shasta reservoir.

The project will see the first test of a collection system that will be key to reintroducing the endangered winter-run Chinook salmon and other runs of salmon back to their historical habitat.

Original Article: [Seafood News](#)

Climate crisis and systemic inequities drive push to reform California water laws

California's mountain snowpack is shrinking, and climate change is intensifying the severe drought. Streams have dwindled and reservoirs have declined as vast quantities of water are diverted for farms and cities. Endangered fish are struggling to survive. And in farming areas in the Central Valley, hundreds of families are struggling with dry wells as groundwater levels continue to drop.

A group of prominent legal experts has presented a blueprint for updating California's system of water laws to fix long-standing weaknesses and adapt to the worsening effects of climate change. They say their proposals, if adopted by the Legislature, would help the state better manage surface water and groundwater, protect vulnerable communities and ecosystems, and improve state oversight of the water rights system.

The group presented their 11 proposals this month, saying the reforms would represent a major revision of laws that govern diversions from streams and rivers, and would give state officials better tools to deal with mounting strains on the state water system.

"California's water laws, they were adopted a long time ago ... in a California that was a very different place," said Holly Doremus, a UC Berkeley law professor who was part of the group.

"It's past time to take a broad look," Doremus said. "Climate change makes the situation that much more acute."

The group recommended changing state law so that decisions about water rights, including approvals of new diversions from streams and rivers, would require regulators to consider the effects of climate change. With the heating of the planet bringing more extreme droughts, the legal experts said there is an urgent need to change how California administers water rights, and to start monitoring in real time how much water is taken from rivers.

They called for measures to protect vulnerable Californians in low-income rural communities, who have unsafe contaminants in their tap water or wells that are at risk of running dry.



VELES WATER WEEKLY REPORT

The group urged the Legislature to require completion of a long-delayed water-quality plan to protect threatened fish in the Sacramento-San Joaquin River Delta, the heart of the state's water system. And they said the state needs to change the rules governing water releases from dams so that agencies must consider not only the flows that fish need but also the water temperatures — because warmer temperatures have taken a worsening toll on endangered salmon and other species.

"We are in a time of crisis. We have a climate crisis, we have wildfire crisis, and we have droughts intensifying over time," said Jennifer Harder, a member of the group and a law professor at University of the Pacific's McGeorge School of Law.

Original Article: [The Los Angeles Times by Ian James](#)

Where California's key reservoirs stand after the 2nd driest January ever

California hasn't seen rain in over a month, and some of the state's key reservoirs are starting to be impacted.

Shasta Lake, the state's largest reservoir, was at 54% of its historical average as of Feb. 9, compared to 72% last year, the California Department of Water Resources said. San Luis Reservoir on the eastern slope of the Diablo range is at 59% of its historical average, compared to 71% last year.

Other reservoirs are up from where they were at this time last year.

"This would be expected given that last year was the 2nd driest year for CA in our observed record and the 2020-2021 two year period set a new record for dryness," Michael Anderson, the state climatologist for the Department of Water Resources, wrote in an email.

Oroville, the state's second-largest reservoir, is at 78% of its historical average, compared to 60% at this time in 2021. The moisture plume of an atmospheric river that brought historic amounts of rain to Northern California in October passed over Oroville, helping to replenish its supply.

Anderson said that the snowpack is another key source of California's water supply, and while a torrent of storms in December built up a hefty snow pack, it's quickly diminishing.

"The lack of continuing to build the pack in the manner that it did in December is the most concerning aspect," Anderson said. "The continued anomalously dry and warm weather will not only limit the growth of the pack, but will begin to melt it as sun angle and length of day increase."

The snowpack was 79% of normal for this time of year on Feb. 11, compared to 64% of normal at this time last year.

The Sierra snowpack is one of California's most important water sources, with its spring and summer runoff feeding rivers and reservoirs, watering crops, and filling bathtubs and water glasses. Mountain snowpack provides about 30% of the yearly freshwater supply for California.



VELES WATER WEEKLY REPORT

January 2022 was the driest January in California's recorded history, the National Oceanic Atmospheric Administration said in its latest report. February has also gotten off to a dry start, and there's no strong signal for rain in the next five days. The National Weather Service's Bay Area office said there's a slight chance for rain Feb. 19 to 20, but confidence in the forecast is low.

This prolonged dry spell is occurring at a time of year when California usually sees its wettest weather.

Original Article: [SF Gate by Amy Graff](#)

Critics rip 'half-baked' federal plan to save California salmon

Fishing groups and water suppliers fighting the Biden administration's proposed drought rules for California's water system told a federal judge Friday the emergency plans won't stop the demise of endangered salmon.

With California trudging through another disappointingly dry winter, the federal government and state officials have agreed upon a set of temporary rules they claim are necessary to preserve enough cold water on the Sacramento River for Chinook salmon this spring and summer. The rules call for new water temperature targets and improved collaboration between federal and state officials on the management of California's two main water conveyance systems.

But the Pacific Coast Federation of Fishermen's Associations and other conservation groups cast the "interim operations plan" as a half-baked measure that will lead to a third consecutive year of salmon die-offs. They want the feds to hold off on upcoming water deliveries and subsequently store more cold water behind Shasta Dam in the event hydrological conditions remain dreadful.

In addition, a group of water agencies claim the interim plan was untested and, if implemented, would likely violate their contracts with the U.S. Bureau of Reclamation. The overarching issue are endangered species permits or biological opinions adopted by the Trump administration in 2019 that critics said severely weakened protections for salmon and water quality in the Sacramento-San Joaquin River Delta.

The drainage point of California's largest rivers, the delta is the largest remaining estuary on the West Coast. Stretching across 1,100 square miles and five counties, the delta is the hub of massive federal and state water projects that prop up the state's \$50 billion agricultural industry and provide drinking water for over 25 million people.

The area is ecologically rich; a diverse array of species thrive in the massive estuary. However, those species have been steadily eroding, particularly in dry years when salt water from the San Francisco Bay pushes further up the delta.

Environmental groups and state officials claimed rules were poisoned by political influence and meant to help former President Donald Trump back up his campaign promise to "open up the water" to California farms. Once the Trump administration signed off the rules, a stream of lawsuits ensued in the Eastern District of California.



VELES WATER WEEKLY REPORT

The complex cases, which have been consolidated under U.S. District Judge Dale Drozd's watch for over two years, appeared to gain a bit of clarity last year when the Biden administration announced it was scrapping the Trump-era rules and going back to the drawing board.

However due to required rounds of environmental review, new biological opinions aren't expected until at least 2024. Until the update goes into effect, the feds' Central Valley Water Project will remain under the challenged 2019 framework.

U.S. District Judge Dale Drozd, an Obama appointee, is responsible for working out the kinks in the meantime. Last fall, Drozd directed the dozens of parties to the cases to try and craft a temporary solution, but the request has thus far gone unfulfilled.

Original Article: [Courthouse News by Nick Cahill](#)



US WATER NEWS

Tired of mowing your lawn? Colorado could pay you \$2 a square foot to rip it out

Colorado would expand grass turf buyouts statewide and double existing city rip-and-replace programs in a bill aimed at solving misuse of precious water during the state's long-term drought.

The bipartisan bill would create a \$2 million to \$4 million annual pool from general fund money to pay homeowners, businesses or any other landlords willing to replace thirsty bluegrass on lawns, road medians, highway ditches and other places the decorative greens are draining state reservoirs.

Most current turf buyout programs in Colorado pay \$1 per square foot to replace grass with drought-friendly alternatives, and they only cover about 25% of the population. The turf buyout bill would match local spending to increase the buyouts to \$2 a square foot, and bring \$1 a foot buyouts to the other 75% of the state living without a buyout option, sponsors and environmental backers said.

"No one has a picnic on the strip of grass in the median at a shopping mall," cosponsor Sen. Jeff Bridges, D-Greenwood Village, said. With the Colorado River Basin draining in a decades-long drought, and neighboring downriver states threatening legal action to get their water rights from Colorado, Bridges said, "we need to do more to make sure we're getting the most possible use, the most benefit, from what we have here in the state."

Conservation groups, who have long argued it's time to trim nonnative grass watering that Colorado State University experts estimate makes up most of the 55% of Front Range urban water used on the outdoors, hail the statewide buyout idea as a great first step that they hope will expand.

"This is all part of a strategy to make Colorado landscapes more water efficient. And so we think a statewide turf buyback program is one great way to do that," said John Berggren, a water analyst with the nonprofit Western Resource Advocates.

"There's a growing recognition that we have to reduce the amount of irrigated turf we have, and a growing recognition that while some turf is definitely beneficial – parks, sports fields, parts of people's yards – we all know there's a lot of turf that doesn't get used," Berggren said.

House Bill 1151 is sponsored by Bridges, Sen. Cleave Simpson, R-Alamosa; Rep. Marc Catlin, R-Montrose; and Rep. Dylan Roberts, D-Avon.

Bill sponsors and conservation supporters estimate all the buyout programs in the state currently spend about \$1.3 million a year, and they want to at least double that amount. Legislators are still negotiating on the general fund amount they will ask for.



VELES WATER WEEKLY REPORT

Some southwestern cities have more aggressive buyout programs. Las Vegas offers \$3 a square foot to help tear out grass and design low-water gardens and landscaping.

A \$2 million to \$4 million budget would be tiny in the big picture – Denver Water revenues in 2021 from water sales were projected at \$311 million. But advocates see public acceptance of buyouts as an important initial goal as climate change and shorter-term drought shrink the amount of water available in Colorado.

Environmental groups also believe city water departments need to participate more in conservation efforts – 80% to 85% of Colorado's water goes to agricultural use, but conservation advocates say they want rural and urban areas to cooperate on long-term water demand issues. Front Range cities rely heavily on river water diverted from the Western Slope.

Original Article: [Centennial Citizen by Michael Booth/ The Colorado Sun](#)

Governor Hochul Announces \$41 Million Approved for Clean Water Systems and Local Drinking Water Infrastructure Projects Statewide

Governor Kathy Hochul has announced the Environmental Facilities Corporation Board of Directors approved \$41 million in funding that includes low-cost loans and previously awarded grants, enabling the recipients to access these loan and grant funds and move their water and sewer infrastructure projects forward.

The Board also approved an \$879 million leveraged bond financing to provide capital for various wastewater and drinking water projects for the New York City Municipal Water Finance Authority (NYCMWFA) and to refund certain prior bonds. Refunding bond sales deliver additional savings for EFC's municipal partners by refinancing the original bonds that funded their projects at an even lower interest rate. The transaction is estimated to save \$18 million for New York City ratepayers over the next 10 years.

"The State of New York is steadfast in our commitment to providing communities with the resources needed to make upgrades to water and sewer systems," Governor Hochul said. "These critical projects will help protect the health and safety of residents, the environment, and quality of life as we work together to assist residents in every corner of the state with access to safe, clean water and reliable sewer services."

Environmental Facilities Corporation President and CEO Maureen A. Coleman said, "Today's announcement highlights EFC's proactive approach to maximizing resources and stretching dollars for water infrastructure investments. Refunding bonds helps make New York's State Revolving Funds some of the most efficient and effective in the nation. The deal will free up capital to support additional infrastructure projects while providing interest rate relief to one of our biggest borrowers. Governor Hochul's commitment to clean water has been demonstrated yet again in her Executive Budget with unprecedented state funding for clean water



VELES WATER WEEKLY REPORT

infrastructure. We must ensure also that we maintain the high level of federal Clean Water State Revolving Funds the state receives. That is why it is critical that our municipal partners participate in the Clean Watersheds Needs Survey that opens next month."

Department of Environmental Conservation (DEC) Commissioner and EFC Board Chair Basil Seggos said, "Governor Hochul recognizes the challenges municipalities face in accessing resources to make necessary improvements to local water infrastructure. New York State is making generational investments to help communities across the state address long-standing needs to upgrade and improve aging water infrastructure. New York's Clean Water and Drinking Water State Revolving Funds, and grants provided through the Water Infrastructure Improvement Act, provide municipalities with the financing needed to complete these critical projects that protect public health and the environment."

New York State Health Commissioner Dr. Mary T. Bassett said, "New York's significant fiscal commitment to improving source water quality and drinking water statewide is demonstrated in the wastewater and drinking water projects being funded here today. The impact of these necessary upgrades will be measured in overall public health for years to come, and I urge eligible communities to take advantage of this assistance."

The Board's approval includes financing 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.

Municipal participation in the Environmental Protection Agency (EPA) Clean Watersheds Needs Survey (CWNS) starting in March is critical as it impacts how much federal CWSRF funding will be allocated to New York State to fund future clean water infrastructure projects. Municipalities will be asked to submit to EFC documentation of their community's wastewater infrastructure needs for submittal to EPA.

Original Article: [Governor NY](#)

SD1 receives nearly \$15 million for clean water projects from Kentucky Infrastructure Authority

Sanitation District No. 1 has received nearly \$15 million in funding from the Better Kentucky Plan's Cleaner Water Program created to deliver clean drinking water and improved sewer and water systems across Kentucky.

"Our Northern Kentucky region is a hub for economic growth," said Gov. Andy Beshear during a visit to Northern Kentucky on January 25 to present the funding to SD1 and other recipients. "We're proud to work with each of you to address needed infrastructure improvements that will bring safer, more reliable sanitary sewer services and clean, healthy drinking water to thousands of residents and area businesses."



VELES WATER WEEKLY REPORT

In partnership with the Northern Kentucky Area Development District, SD1 submitted funding requests for 10 Cleaner Water Program projects to the Kentucky Infrastructure Authority.

“SD1, on behalf of its ratepayers, is proud to receive funding through Kentucky’s Cleaner Water Program for important sewer improvement projects across our region,” said Adam Chaney, SD1 executive director. “Every dollar that is received through these types of community investment initiatives is a dollar that we do not have to collect from our ratepayers. The funds will be used to advance projects that will protect public health, property and the environment and support the economic vitality of our community.

“We thank Gov. Beshear and Kentucky’s lawmakers for recognizing the importance of these projects and providing this critical investment in Northern Kentucky’s infrastructure. We would also like to thank the three county judges executive and fiscal courts, along with Lisa Cooper and her team at the AD District, who administered regional priority efforts. Without a coordinated, comprehensive approach to project prioritization across our region, these awards would not have been possible.”

Original Article: [Northern Kentucky Tribune](#)

Ohio announces \$160M in water infrastructure loans

This week, Ohio announced that communities in the state are receiving over \$159.9 million in loans, including more than \$22 million in principal forgiveness.

The Ohio Environmental Protection Agency has stated that these loans will save about \$44.5 million compared to market-rate loans, while also helping improve the state’s drinking water, wastewater, and surface water quality.

The state had approved the loans between Oct. 1 and Dec. 31, 2021. The loans are distributed through two state programs: the Water Pollution Control Loan Fund for wastewater treatment systems and the Water Supply Revolving Loan Account for drinking water systems — both supported by Ohio’s state revolving funds.

A full list of the funded projects, sorted by region and amount, is provided below.

Northwest Ohio: \$15 million

Delphos is receiving loans totaling \$10.3 million for two projects: A \$6.97 million loan will fund the final phase of a project to replace filter membranes at the wastewater treatment plant. This phase will add a third treatment train to restore the treatment plant to its original average design flow. A \$3.35 million loan will fund a new elevated 500,000-gallon drinking water storage tank and improvements to sections of water distribution system piping along the Miami Erie Canal and on Lima Avenue.

Huron is receiving \$2.9 million to install tube settlers in the existing settling basins at the drinking water plant to optimize treatment as part of the harmful algal bloom general plan. A building also will be built over the tube settlers to allow better operation of the basins.



VELES WATER WEEKLY REPORT

Cridersville is receiving \$1.1 million to replace the sanitary sewer between Rail Road and South Dixie Highway. The sanitary sewer main also will be replaced on South Dixie south of East Main.

Shelby is receiving \$289,600 to replace 41 lead service lines in the drinking water system. This loan includes \$288,600 in principal forgiveness, which is the portion of a loan that does not have to be repaid.

Oak Harbor is receiving \$225,331 to make improvements to the 500,000-gallon elevated drinking water storage tank, including interior and exterior coating, to bring the tank up to standards.

Marblehead is receiving \$126,688 to design a project to build a new elevated drinking water storage tank at the southern end of the water distribution system.

Bucyrus is receiving \$107,877 to design a project extending a new waterline to connect the village of Nevada distribution system to the Bucyrus distribution system. Bucyrus has agreed to provide Nevada with the community's daily supply of drinking water.

Ayersville Water and Sewer District is receiving \$46,114 to design a project to construct an aeration system near the intersection of Shindler Road, Fullmer Road, and Ayersville Pleasant Bend Road to remove disinfection byproducts from the water distribution system.

Original Article: [Water World](#)

GLOBAL WATER NEWS

January 2022 was Earth's 6th warmest on record

The January global land and ocean surface temperature was 1.60 degrees F (0.89 of a degree C) above the 20th-century average, making it the sixth-warmest January in the 143-year climate record.

Last month was also the 46th consecutive January and the 445th consecutive month with temperatures above the 20th-century average.

South America saw its second-warmest January on record, behind January 2016. Asia had its fourth-warmest January on record, while Oceania's temperature departure tied with 2001 as the seventh highest. Despite North America and Africa's above-average January temperatures, they had their coldest January since 2009 and 2015, respectively.

Other notable climate events from January 2022

- Polar sea ice coverage was low. Antarctic sea ice coverage for the month was 440,000 square miles below average — the second smallest January sea ice extent



VELES WATER WEEKLY REPORT

in the 44-year record. Only January 2017 had a smaller sea ice extent. Arctic sea ice extent for the month was 208,000 square miles below the 1981-2010 average, though it was the largest January extent since 2009.

- Snow cover was about average. The Northern Hemisphere's snow cover during January was slightly above the 1981-2010 average, at 18.26 million square miles. This was the largest January snow cover since 2017.
- Tropical activity was near average. In January, six tropical storms formed around the world, which is typical for the month. The Northern Hemisphere had no tropical cyclones, which is also typical for January. Meanwhile, the Southern Hemisphere's strongest cyclone of January 2022 — Major Cyclone Batsirai — developed in late January and made landfall in Madagascar in early February.

Original Article: [NOAA](#)

Basin states agree to support ACCC Murray-Darling Basin water market reforms to regulate brokers and market behavior

Australian water brokers are a step closer to being regulated like real estate agents and financial professionals, according to a report about implementing Murray-Darling Basin water market reforms.

Basin state governments have agreed to provide in-principle support for Commonwealth legislation that would impose a mandatory code of conduct for water brokers, which is likely to include much of the existing voluntary code the industry has already developed, but not widely adopted.

Former Department of Agriculture and Water secretary Daryl Quinlivan was appointed by the Water Minister Keith Pitt as the principal advisor, overseeing a committee to develop a roadmap for implementing the ACCC's recommendations.

In an update of the progress made so far, Mr Quinlivan said the agreement for more regulation of water brokers was a significant development.

"It would require intermediaries to act in the clients' best interests, and have complaints handling processes, record-keeping obligations and the use of trust funds to handle clients' money," he said.

"The water broking community have been quiet strong supporters of this recommendation."

But there are still important details to be agreed upon before the roadmap is finalised, such as deciding who will be responsible for enforcing compliance.

Key points:

- State basin governments have backed tighter regulation of water brokers.
- Commonwealth legislation of water market behaviour has also been supported.
- A Water Market Agency to oversee all water trading is unlikely to be created.

More transparency



VELES WATER WEEKLY REPORT

State governments in the Murray-Darling Basin have also agreed to support new Commonwealth legislation that will prohibit market manipulation and insider trading.

The ACCC was directed to investigate water markets by Agriculture Minister David Littleproud in 2019, at the height of a recent drought when irrigation water prices were soaring.

Irrigators wanted to know if there were market participants manipulating prices.

While the ACCC, after a forensic analysis of trades, did not find any evidence of misconduct in the water market it did conclude it was possible such activity could take place.

Mr Quinlivan said the cross-border nature of water trading meant state-based regulation would be "unwieldy" and likely "inefficient".

"The principal is agreed [on the need for Commonwealth legislation], we just need to do a bit more work on how to implement it," Mr Quinlivan said.

Original Article: [ABC News by Clint Jasper](#)

Delivering a secure and sustainable water future for South Australia

A historic, state-building project that will boost South Australia's economy, create jobs and deliver a long-term sustainable water source in the state's north is one step closer to reality.

The Australian and South Australian governments have committed \$15 million for a business case to take the Northern Water Supply project forward and further secure the state's water future.

Among the options being considered is a desalination plant located in the Upper Spencer Gulf, which would reduce water reliance on the Great Artesian Basin and the River Murray.

If construction proceeds, the project could support up to 8,000 construction jobs and up to 6,000 ongoing jobs once operating.

Deputy Prime Minister Barnaby Joyce said delivering a secure and sustainable water source in the region would drive the growth of regional communities and industries.

"The Liberal and Nationals Government is committed to delivering the water infrastructure South Australians need and we are getting the job done," the Deputy Prime Minister said.

"Our \$5 million investment builds on the state's \$10 million commitment to progress a business case that will inform the future direction of this much-needed project.

"A safe, reliable and sustainable water source will improve water security, create jobs and help unlock the economic potential of new and expanded opportunities for businesses in the state's north.

"Since 2015, the Australian Government has committed more than \$75 million from the National Water Grid Fund towards projects in South Australia.



VELES WATER WEEKLY REPORT

“This includes projects supporting premium grape production in McLaren Vale, water security for farmers on the Coolanie Plains, and new water for agribusinesses through the Northern Adelaide Irrigation Scheme.”

Mines in northern South Australia rely on these sources for their groundwater, which can be expensive to extract and can be affected by salinity and other water quality issues.

Previous attempts to provide a sustainable water supply to this vast region have not been successful because they have lacked a strong customer base.

To support the business case, the SA Government has entered into a MOU with SA Water, BHP and Oz Minerals to progress the projects and address the regions water needs.

South Australian Premier Steven Marshall said this was why it has been important for the Government to play a coordinating role to bring together a range of potential customers to make this project possible.

He said the Northern Water Supply project has the potential to create thousands of jobs throughout South Australia.

“This project is a once-in-a-lifetime opportunity to secure a brighter future for South Australia and create jobs in an environmentally sustainable way,” Premier Marshall said.

“We are always looking for ways to ensure we are using water efficiently because ongoing and secure access to water is integral to economic growth and regional communities rely on industry for jobs, community strength and resilience.

“A desalination plant is an option we will investigate to provide a sustainable and sufficient water supply to support many industries, including the burgeoning hydrogen industry, mining, horticulture, pastoral, agriculture sectors and the transition to green steel.

“To be able to partner with some of South Australia’s biggest companies to decrease reliance on our finite water resources and future-proof our state in a changing climate is really pleasing.”

Premier Marshall thanked all the parties, including the South Australian Chamber of Mines and Energy, for their dedicated work to make today’s announcement possible.

Federal Member for Grey Rowan Ramsey said the expansion of the resources industry in the north of the state was a reality and not some dream in the far-off future.

“South Australia already relies heavily on the resources industry and water is an essential ingredient to mine, concentrate and process our product,” Mr Ramsey said.

“Currently, this water is sourced from either the Great Artesian Basin or the Murray River, and trying to extract more from these sources is not environmentally sound.

“We are well aware of the long-term issues with the Murray and the Great Artesian Basin is a national treasure which is vital to our traditional grazing industries and small communities that continue to thrive in our harsh environment.



VELES WATER WEEKLY REPORT

“While we know the basin replenishes, it is an incredibly slow process and maintaining the pressure in the basin is of paramount importance. Simply, we cannot continue to grow the resources industry without finding a new source of water. “It is encouraging that our two biggest players in the industry, BHP and OZ Minerals, recognise the need and are part of the MOU. Desalination would seem the obvious answer, but there will be a whole lot of community concerns which will need to be addressed along the way. This project will do that.”

BHP Asset President, Dr Jennifer Purdie, said BHP is pleased to be involved in a project that has the potential to support industry and agriculture in rural and regional South Australia, by improving water stewardship and creating opportunities for future investment and jobs.

“This is a positive step forward in BHP’s commitment to make our Olympic Dam operations more sustainable. We are taking action to reduce water use across our operations, and partnering with others in the communities and regions where we operate to help achieve this.

“South Australia has an important role to play in producing the high-quality copper the world needs to grow and decarbonise, and these types of projects can help us deliver more sustainably now and into the future.”

OZ Minerals’ Chief Executive, Andrew Cole, said the company is keen to play a part in collectively exploring a sustainable way forward that creates value for regional communities and industries.

“Water is an essential consumable for our operations and a critical resource for our stakeholders, particularly for the communities in which we operate, so we recognise the need to responsibly consume this water.”

“Although OZ Minerals does not draw from the Great Artesian Basin, we support this project for reducing consumption of groundwater and securing sustainable water sources for the future.

“Our South Australian Assets, Prominent Hill and Carrapateena, are in arid areas and use saline groundwater to sustain operations. Both Assets use hypersaline water drawn from aquifers that do not compete with demand from natural systems or other land-connected people, and one of our aspirations as a modern mining company, is to strive to minimise water use and add value when we do.”

SA Water Chief Executive David Ryan said the corporation was pleased to support this initiative aimed at securing South Australia’s water future.

“In the face of a changing climate it’s critical we’re thinking ahead to ensure fit for purpose water is secured for the long term,” Mr Ryan said.

“Collaborating with private sector partners in an investigative process like this promotes the diverse thinking that will ensure all sources, delivery and service options are considered.”



VELES WATER WEEKLY REPORT

Infrastructure Australia has recognised the importance of a new sustainable water source to improve water resilience and increase water supply to the northern parts of South Australia.

Original Article: [Premier of South Australia by Steven Marshal](#)

As Drought Worsens, Guangdong to Face ‘Severe’ Water Shortages

The worst drought to hit southern China’s Guangdong province in decades is only getting more severe as factories have restarted after the Lunar New Year break, workers have returned from visiting their hometowns, and any respite in the form of plentiful rain is yet to arrive.

Li Guoying, minister of water resources and deputy general commander of the State Flood Control and Drought Relief Headquarters, said during a meeting on water security on Sunday that increased consumption and limited inflow from the Pearl River’s tributaries would exacerbate water stress in Guangzhou, Shenzhen, and other major cities in the region, according to Sixth Tone’s sister publication The Paper.

The Pearl River Delta, home to more than 78 million people and one of China’s economic engines, will face “severe” water shortages, Li warned.

Because of reduced rainfall, 70% less water has flowed into the Pearl River system and the Han River, located in the province’s east, since last fall. Li Kuo, a researcher at the Chinese Academy of Agricultural Sciences, told Sixth Tone in a previous interview that the abnormal weather is linked to climate change.

The government has declared it the worst drought in 60 years. Water levels in rivers and reservoirs have fallen. According to the Guangdong provincial water resources department, the province currently faces a water deficiency of 900 million cubic meters. Department head Wang Lixin said that rainfall in the province is expected to remain limited, and that cities along the East River, a major Pearl River branch, may experience five salt tides — the phenomenon where a lack of river water allows seawater to push inland, threatening freshwater supplies.

To reduce the impact of salt tides, the Ministry of Water Resources has asked Guangdong authorities to discharge enough freshwater from dam reservoirs into the Pearl River system’s lower reaches this week to flush out the invading seawater, according to The Paper.

“Securing water supply is an arduous task,” Wang said.

Original Article: [Sixth Tone by Yuan Ye](#)

Pursuing carbon neutrality and water security in China

China has promised to become carbon neutral before 2060 and has coupled this ambitious target with stringent limitations on industrial water use by 2030. An international team of IIASA researchers and Chinese colleagues explored the effects of simultaneously pursuing these goals.



VELES WATER WEEKLY REPORT

Man-made carbon dioxide (CO₂) emissions need to fall by about 45% from 2010 levels by 2030, and reach "net zero" by mid-century to give the world a chance of limiting the warming of the planet to 1.5°C above pre-industrial levels and avoiding the worst impacts of climate change. China, which is currently the world's biggest emitter of CO₂, is one of a growing number of countries to have officially committed to achieving carbon neutrality by 2060, with a key focus on decarbonizing its industrial sector. In addition, due to severe water scarcity experienced in the country, the Chinese government has imposed stringent limitations on industrial water use by 2030, as China's industries not only account for half of national CO₂ emissions, but also for more than 20% of water withdrawals. The effect that emission reductions will have on industrial water use, however, remains unclear.

To shed light on this issue, IIASA researchers and Chinese colleagues used a model incorporating a self-developed, high-resolution provincial water use inventory based on enterprise census data covering over 140,000 enterprises in 31 Chinese provinces from 1998 to 2015. The new inventory was then used to develop an industrial water-use module to project the country's future multi-sectoral carbon emissions, economic indicators, and industrial water use under a business-as-usual scenario (without a carbon neutrality target) and under a carbon neutrality scenario (with a carbon neutrality target). The results of the study have been published in the journal *One Earth*. "We used a computable general equilibrium model – a type of economic model that uses real economic data to estimate how an economy might react to changes in policy, technology, or other external factors – to identify synergies and risks over time and across regions in 31 Chinese provinces. This sets our analysis apart from previous studies that focused more on water withdrawal from the energy sector, but neglected water-intensive industrial sectors, or only covered water use in a single region," explains study author Hancheng Dai from Peking University in China.

The study's results show that becoming carbon neutral will save 24% of China's industrial water use in 2060 and help to achieve the strict industrial water use targets in 22 out of 31 provinces studied. At a provincial level, it is however possible that 9 of the 31 provinces will struggle to meet water-use targets in a carbon-neutral future, unless more coordinated climate-water strategies are put in place. In addition, the researchers found that if inter-provincial industrial relocation occurs, water use could actually rise in certain provinces, reducing the water-saving potential.

"Different emission reduction expenditures and capacities have the potential to reshape industrial competitiveness and structure, eventually causing some industries to relocate to other regions. This can result in undesirable outcomes in terms of emission reduction and water use. At present, it is however uncertain whether the achievement of China's 2060 carbon neutrality goal would motivate industries to move, and how this might affect water savings and the ability of industries to meet water use targets," notes study



VELES WATER WEEKLY REPORT

author and Deputy Dean of the College of Environmental Sciences and Engineering at Peking University, Yong Liu.

Pursuing carbon neutrality also creates a number of co-benefits from key sectors. Notably, five energy- and/or water-intensive sectors, including power generation, light industry, chemicals, mining, and metal smelting and products, contributed to the bulk of national co-benefits, accounting for 48%, 14%, 13%, 9%, and 9% of total water savings in 2060, respectively.

“It will be important for regional governments to utilize and promote the co-benefits originating from the key sectors to fulfill more environmentally friendly water resource allocation while achieving carbon neutrality. The saved water use can, for instance, be returned to natural water bodies like rivers and lakes for ecological purposes. There is no doubt that the co-benefit effects will contribute to the development of an ecological civilization,” says study lead author Xiaoyu Liu, also from Peking University, who started this work as a participant in the IIASA Young Scientists Summer Program.

Due to the diversity of industry structure and differences in the availability of water resources between provinces, there are both opportunities and risks for Chinese industry in pursuing a carbon neutral future. Achieving the carbon neutrality target may, for example, enable 8 and 12 provinces to achieve the industrial water target set by the Chinese government in 2030 and 2060, respectively, mostly in northern China. The co-benefits produced by carbon neutrality are however not sufficient for the achievement of targets in 14 and 9 provinces in 2030 and 2060, respectively, mostly in the southern and northwestern regions of China.

“While risks are created by industrial restructuring and consequent spillover effects across and inside provinces, water use management that only relies on water-use intensity control and co-benefits from reducing carbon emissions is not enough to achieve China’s overall water-use goals. This once again highlights the importance of imposing restrictions on total water use, especially for water-scarce provinces. On the other hand, it might also be beneficial to consider reducing the water use cap for areas rich in water resources, as too strictly limiting water use in these areas could hamper local economic development,” says study author and IIASA Water Security Research Group Leader, Taher Kahil.

“The findings of our study facilitate a better understanding of the water-energy nexus in the context of meeting ambitious climate targets and show that the integrated management of water and industry is efficient and can promote sustainable development. It also accentuates the need to formulate more coordinated policies, including more stringent regulations and advanced technologies, that can maximize synergies in addressing climate and water challenges,” concludes IIASA Biodiversity and Natural Resources Program Director, Yoshihide Wada, who was also one of the study authors.



VELES WATER WEEKLY REPORT

Original Article: [Liu, X., Dai, H., Wada, Y., Kahil, T., Ni, J., Chen, B., Chen, Y., Guo, C., Pan, C., Liu, X., Liu, Y. \(2022\). Achieving carbon neutrality enables China to attain its industrial water-use target.](#)

Mozambique: India donates €8.8M to boost drinking water supply in Cabo Delgado

India will donate US\$10 million (€8.8 million) to Mozambique for the creation of drinking water supply networks in Cabo Delgado, a region in the north of the country affected by an armed insurgency, the authorities announced on Monday.

The amount is included in a memorandum of understanding signed today between Mozambique's Minister for Foreign Affairs and Cooperation, Verónica Macamo, and India's high commissioner to Mozambique, Ankan Banerjee.

"The memorandum we signed is an enormous contribution to the lives of the population of Cabo Delgado province, particularly in Mueda district, the project's area of focus, which will have an abundance of drinking water," Macamo said.

Macamo said India was a prominent partner of Mozambique.

Among the most recent support is the donation of vaccines against Covid-19, supply with concessional financing of locomotives and carriages for the railway lines and boats for the navy.

Cabo Delgado province is rich in natural gas but has been terrorised since 2017 by armed rebels, with some attacks claimed by the extremist group Islamic State.

The conflict has led to more than 3,100 deaths, according to the ACLED conflict registration project, and more than 817,000 displaced people, according to Mozambican authorities.

Since July, an offensive by government troops with support from Rwanda, later joined by the Southern African Development Community (SADC), allowed for an increase in security, recovering several areas where there was a rebel presence.

Original Article: [Macau Business New by Lusa](#)



VELES WATER WEEKLY REPORT

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