

Veles Water Weekly Report

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VelesWater



WATER FUTURES MARKET ANALYSIS

Welcome to ***WATERTALK***

by Joshua Bell

CLICK THE LINK BELOW

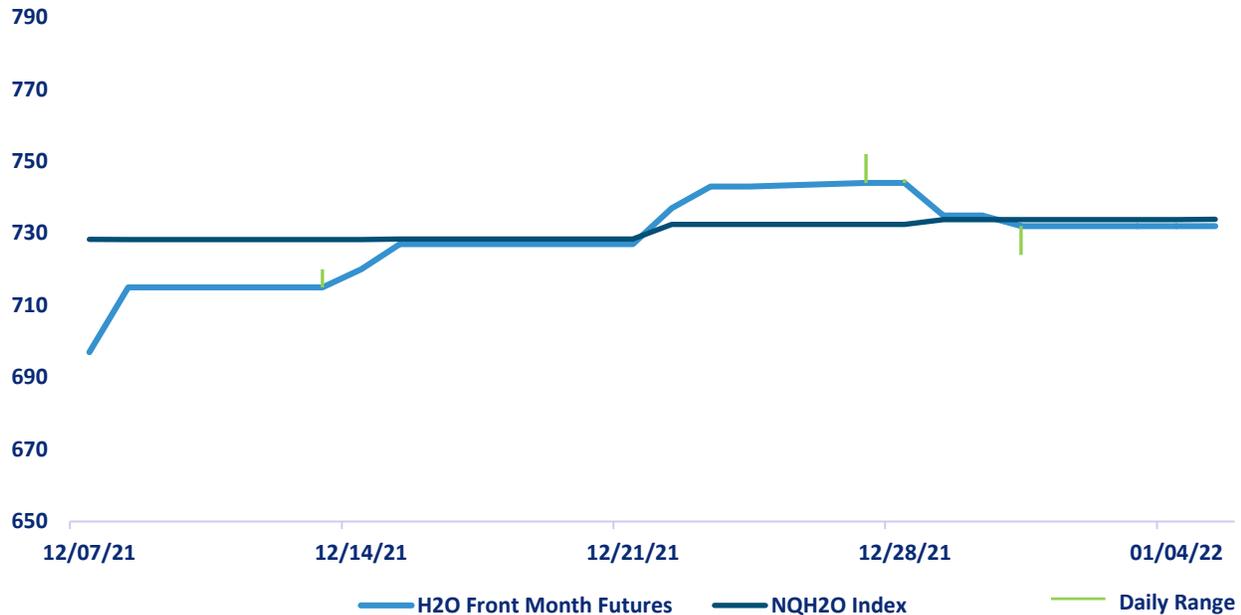
"A 2 minute technical analysis video of H2O futures"

<https://vimeo.com/662901667>



NQH2O INDEX PRICE vs H2O FUTURES PRICE

1 Month Price Performance NQH2O Index vs H2O Futures



Price Chart Based upon Daily Close

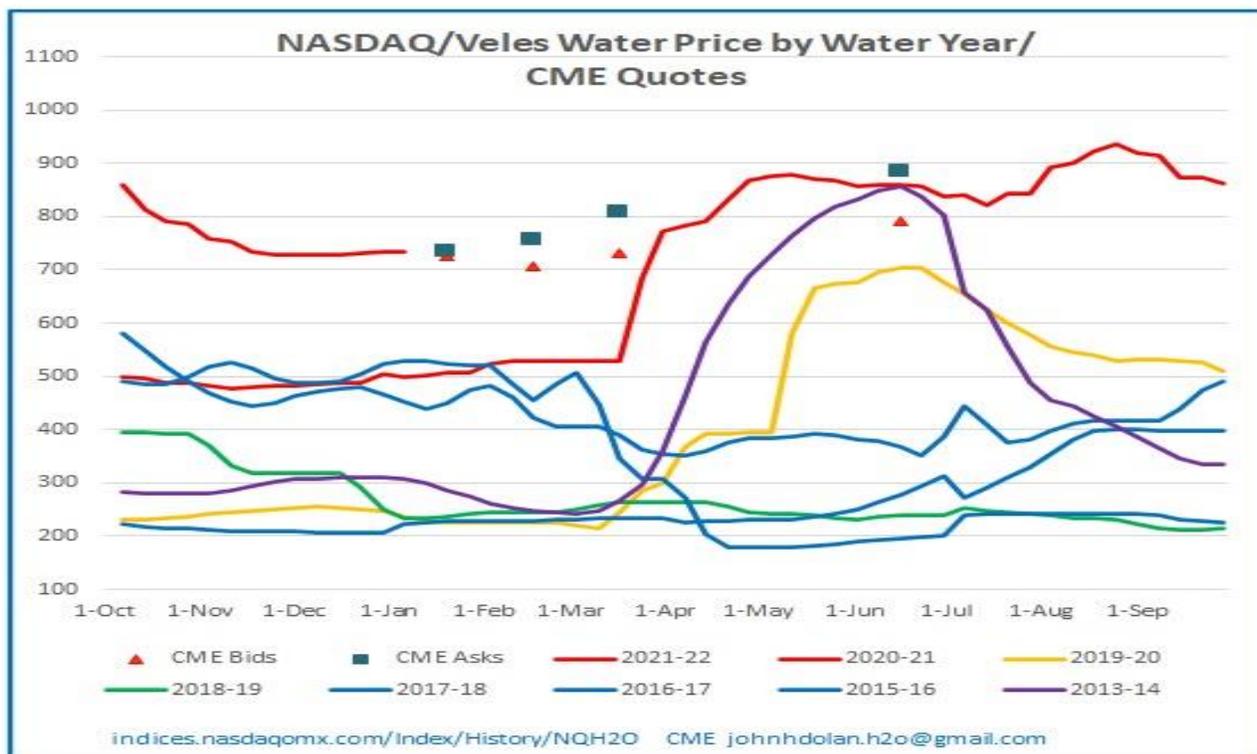
The new NQH2O index level of \$733.90 was published on the 5th of January, up \$0.07 or 0.01%. The Futures have traded at a discount to the index of \$1.90 to a premium of \$1.17.

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

January 22	727@735
February 22	707@756
March 22	730@807
June 22	790@885



NQH2O INDEX HISTORY



The graph above lays out the Nasdaq Veles water index by year, showing 2013- 2022. In very dry years, prices clearly rise through the spring, peaking in May to July (with the exception of 2015) as demand for water from farmers peaks. Prices then taper off heading into the winter on reduced demand, and the possibility of rain/snow. The restricted ability to “carry” water, much like one can do with financial contracts, gives this index the same type of seasonal pattern that one sees on some other commodities.

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



H2O FUTURES AND NQH2O INDEX VOLATILITY ANALYSIS

Daily H2O Futures Volatility vs Daily NQH2O Index Volatility



DAILY VOLATILITY

Over the last week the January future volatility high has been 0.86% on December 30th and a low of 0% on the 4th and 5th of January.

ASSET	1 YEAR (%)	2 MONTH (%)	1 MONTH (%)	1 WEEK (%)
NQH2O INDEX	34.56%	3.60%	0.50%	0.179%
H2O FUTURES	N/A	7.96%	2.37%	1.09%

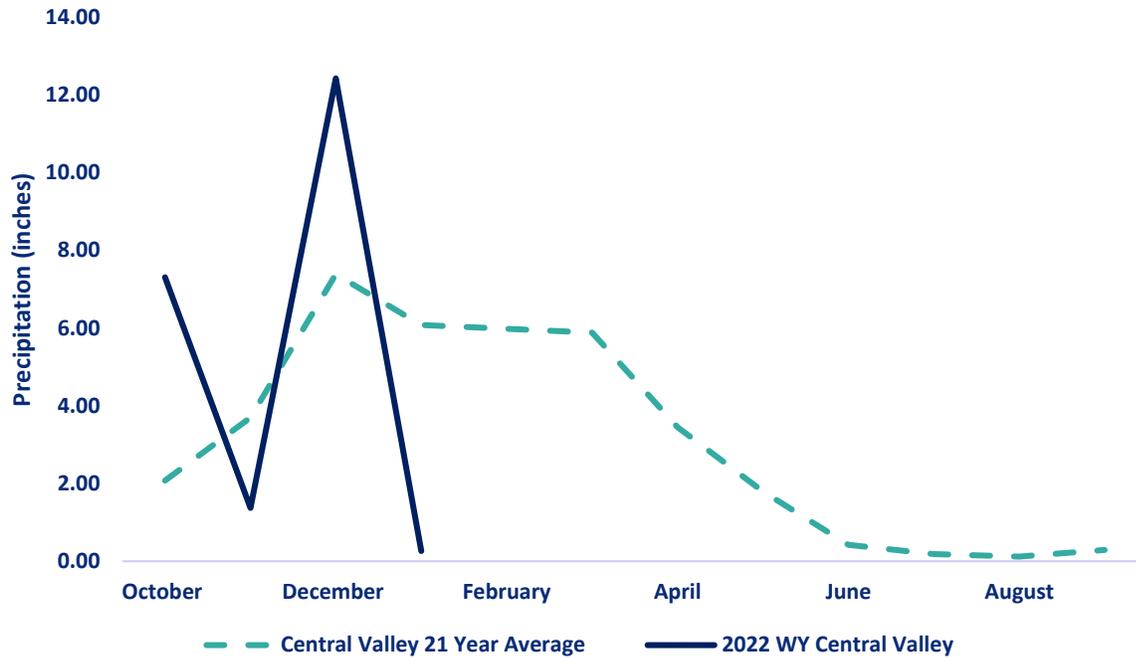
For the week ending on the January 5th the two-month futures volatility is at a premium of 4.36% to the index, down 0.22% from the previous week. The one-month futures volatility is at a premium of 1.87% to the index, down 0.98% from last week. The one-week futures volatility is at a premium of 0.91% to the index, down 0.68% from the previous week.

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



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 05/01/2022

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	186.45%	36	156
TULARE 6 STATION (6SI)	0	0.00	202.06%	29	145
NORTHERN SIERRA 8 STATION (8SI)	0.79	0.79	139.71%	38	158
CENTRAL VALLEY TOTAL	0.79	0.26	176.07%	34	153

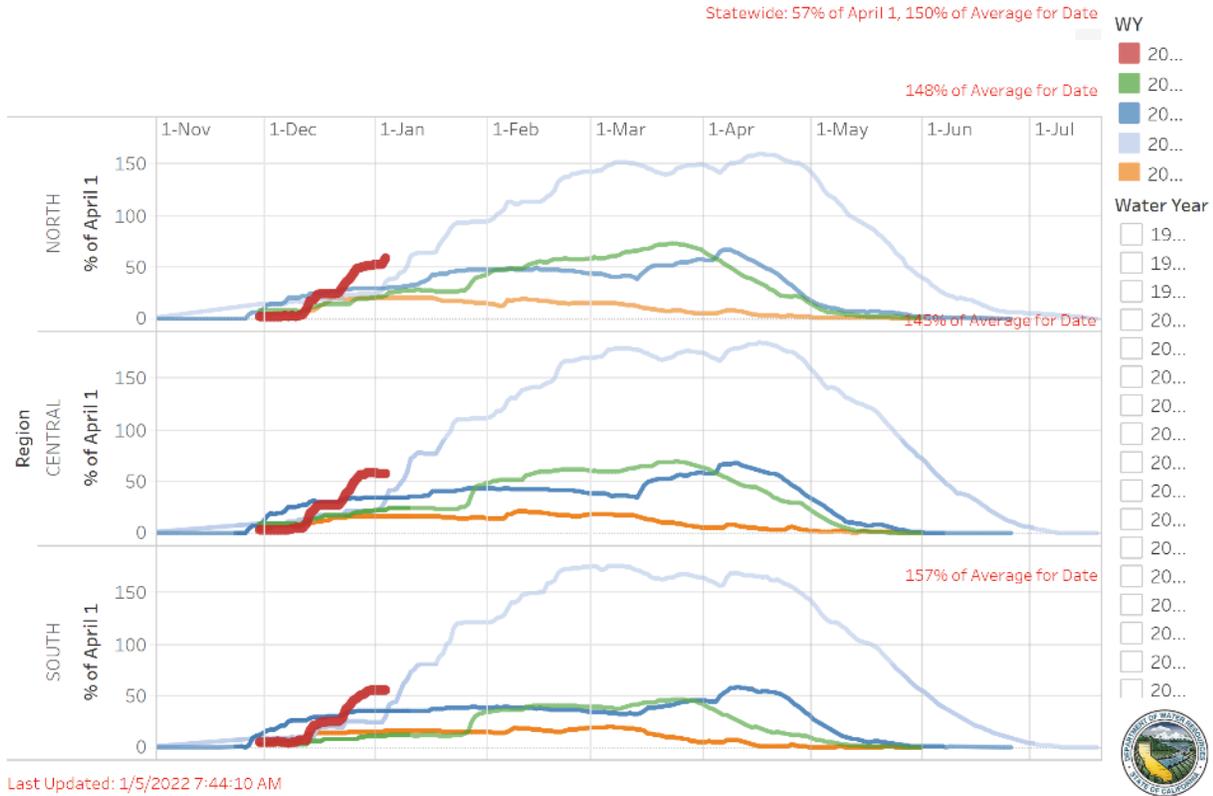
RESERVOIR STORAGE

RESERVOIR	STORAGE (AF)	% CAPACITY	LAST YEAR % CAPACITY	HISTORIC ANNUAL AVERAGE CAPACITY %
TRINITY LAKE	721,084	29	51	49
SHASTA LAKE	1,350,287	30	45	50
LAKE OROVILLE	1,383,768	39	35	74
SAN LUIS RES	639,157	31	47	49



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	16.5	2.40	56	148	58
CENTRAL SIERRA	16.6	0.20	56	145	57
SOUTHERN SIERRA	14.2	1.30	31	157	55
STATEWIDE	15.9	7.40	50	150	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.

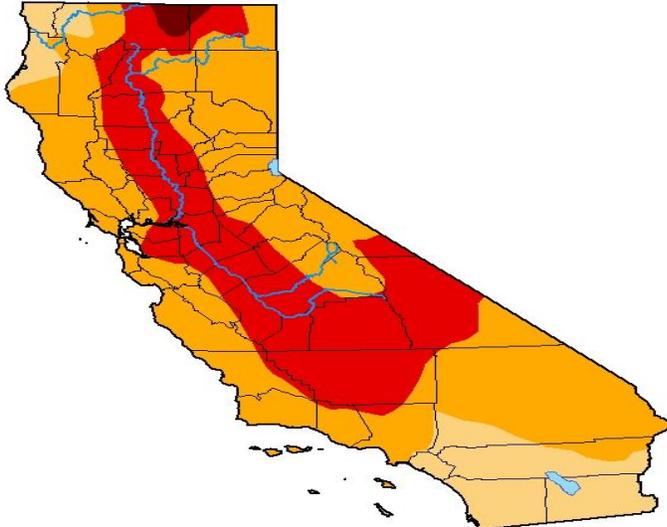
** April 1st is used as the benchmark as it when the snowpack in California is generally deepest. It has been used the benchmark date since 1941 by DWR and can be used to predict spring river flow.



DROUGHT MONITOR

U.S. Drought Monitor California

December 28, 2021
(Released Thursday, Dec. 30, 2021)
Valid 7 a.m. EST



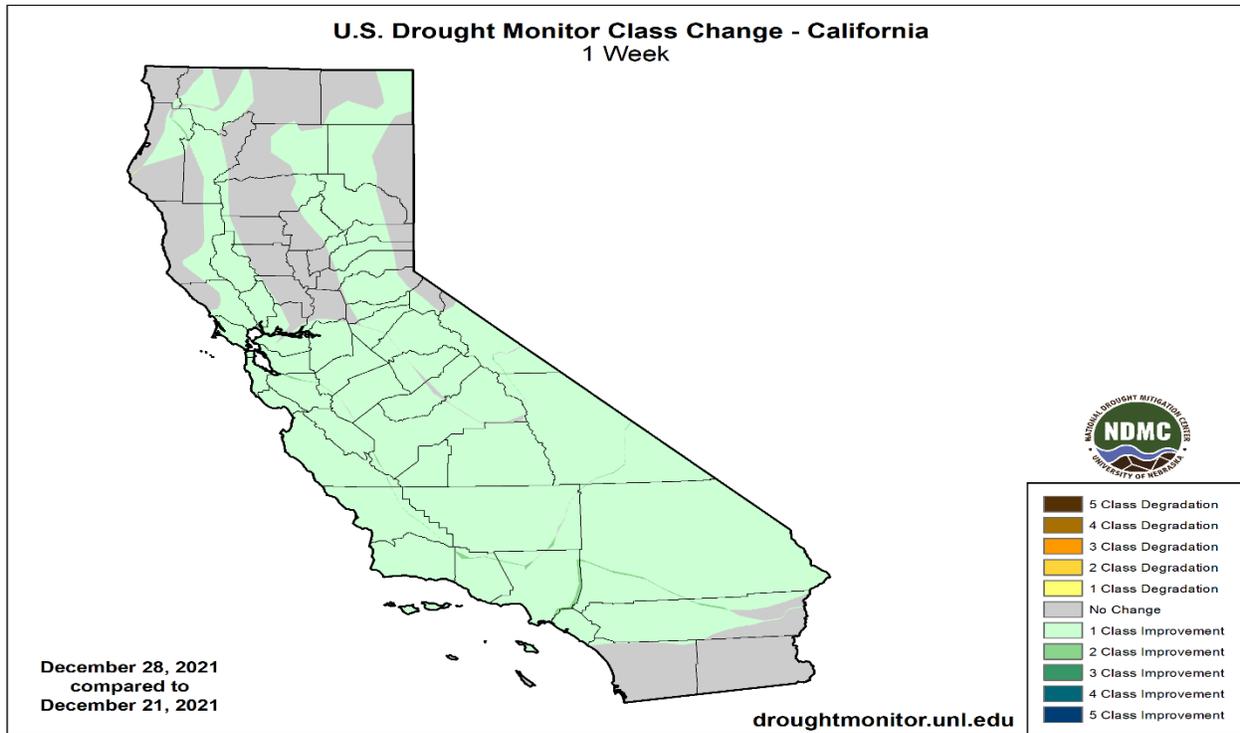
Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	100.00	86.28	32.93	0.84
Last Week 12-21-2021	0.00	100.00	100.00	92.44	79.44	23.11
3 Months Ago 09-28-2021	0.00	100.00	100.00	93.93	87.88	45.66
Start of Calendar Year 12-29-2020	0.00	100.00	95.17	74.34	33.75	1.19
Start of Water Year 09-28-2021	0.00	100.00	100.00	93.93	87.88	45.66
One Year Ago 12-29-2020	0.00	100.00	95.17	74.34	33.75	1.19

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:
Brad Pugh
CPC/NOAA

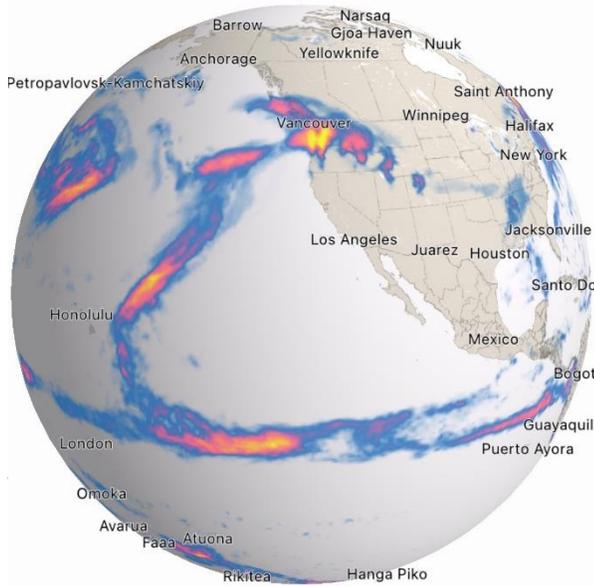
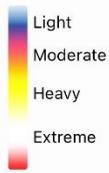


The US Drought Monitor release their statistics with a 1-week lag to this report. Over the past week there has been significant class 1 improvements in exceptional (D4) drought conditions 22.27% and extreme (D3) drought conditions 46.51%.

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



The current satellite picture shows a weather system over Southern Canadian border and moving over the Seattle region. This system may bring some precipitation to the Northern Californian region this week.

To the West of this is another frontal system which will bring further precipitation to these Northern regions at the end of next week.

The South Western US looks dry with a high pressure system in place which may give way to some frontal activity later in the week.

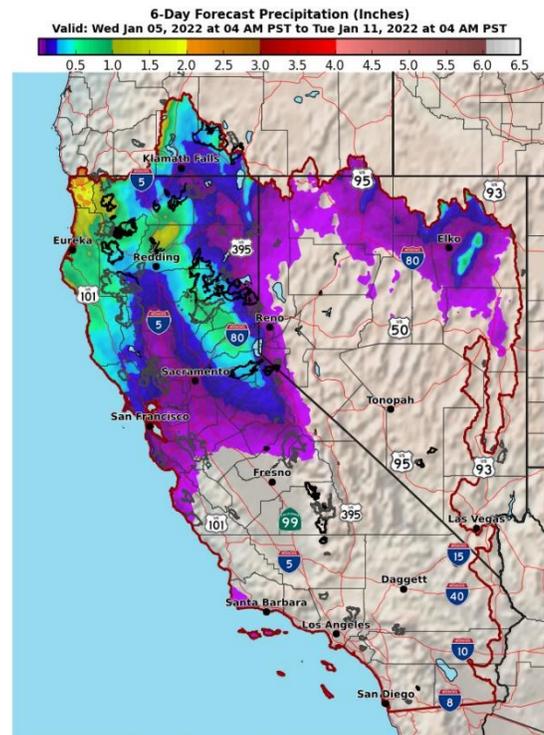
There is no Monsoonal effect at this time of the year as the current weather systems dominate. Our models are still showing that there will be more ongoing precipitation over the next few

months.

10 Day Outlook

Ridge of high pressure builds into the region from the Eastern Pacific on Saturday for a dry day except some lingering showers over NE Nevada in the morning. Ridge over the region on Sunday for a dry day then ridge shifts to the east Sunday night with a shortwave trough approaching the CA coast. The trough becomes a closed low off the Central CA coast Monday morning and dives south during the day. Model variability in the exact track of this low and how far offshore it will be so low confidence in the precipitation forecast. The forecast uses WPC (which is 0) with a mix of GFS/EC and a little NBM 90 with light precipitation possible along Norther and Central CA coast Monday morning and around Point Conception in the afternoon.

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



National Weather Service
 CNRFC - Sacramento, CA

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Heavy December precipitation, SWE numbers, and 12 to 24-month SPIs supported a large 1-category improvement to California along with parts of Nevada and Utah. The SWE is 150 to 250 percent of normal throughout the Sierras for this time of year. The Central Sierra snow lab has observed 193.7 inches of snowfall this month which is a December record. 179 inches, set in 1970, was the previous record for December. As of December 28, the California statewide average of snow water content is 159 percent of normal for that date. Given the favorable snowpack and heavy precipitation during December, additional improvements may be warranted for California during subsequent weeks. Widespread, heavy precipitation (1 to 3 inches, liquid equivalent) resulted in a 1-category improvement across parts of Arizona and Utah where the heaviest amounts occurred and also supported by 12-month SPI values. A 1-category improvement was also made to much of northern and central Idaho along with adjacent areas of northwest Montana based on near to above normal SWE and 24-month SPI. A sharp gradient in drought conditions exists from west to east along the Continental Divide. During the past 14 days, parts of southeast Washington and northeast Oregon have received more than 2 inches of precipitation, liquid equivalent. This recent heavy precipitation and favorable response from soil moisture and 28-day streamflow indicators prompted a slight improvement to those areas. The longer term SPEI, which includes the record heat earlier this summer, continues to support extreme (D3) to exceptional (D4) drought for central and eastern parts of Oregon and Washington. Along and to the west of the Cascades, additional improvements were made this week to western Oregon. A recent increase in snowfall prompted improving drought conditions across parts of northern New Mexico, while all of northeast New Mexico is now designated with severe (D2) to extreme (D3) drought. No precipitation has been observed at Clayton, New Mexico for 76 days which is the 5th longest streak on record.

Reference:

Brad Pugh, NOAA/CPC

Brad Rippey, U.S. Department of Agriculture



CALIFORNIA WATER NEWS

Water-Scarce Economies and Scarcity Values: Can Water Futures Trading Combat Water Scarcity?

Water futures trading can be an important tool for water-scarce economies. This paper argues that it can help reduce the scarcity value of water (defined here as the value that can be generated if the limit on water availability is relaxed by one unit), even without a physical market. ‘Scarcity value’ measures the degree of deprivation and creates the basis for disputes. The paper argues that water futures trading reduces the scarcity value by helping compensate water stakeholders, associated especially with the farm community, for losses incurred due to scarcity. It defines “scarcity value” and “loss functions” in water-scarce economies through a mathematical framework; studies the case of water futures trading in California; and shows how such trading can be useful in the Indian context.

Original Article: [Nilanjan Ghosh, “Water-Scarce Economies and Scarcity Values: Can Water Futures Trading Combat Water Scarcity?” ORF Occasional Paper No. 342, January 2022, Observer Research Foundation.](#)

The importance of California’s agricultural water supplies

Wendell Berry famously said that eating is an agricultural act. That makes all of us into farmers, and nowhere is that more true than in water terms.

Farming is irreducibly the process of mixing dirt, water and sunshine to bring forth from the ground what we need to eat. And no matter who you are, it’s true: somebody, somewhere, must devote a lot of water to the process of feeding you.

Some have been sidestepping this fact in the ongoing policy evolutions over the way we must capture, store and move water in California. Yet even the most ardent urban environmentalist finds herself at the local grocery store or the farmers’ market – filling her basket with California-grown nuts, fruits and vegetables.

Some of these crops can only be grown here, or in one of the few similar agricultural climates around the world, in an irrigation-based agricultural economy.

Bottom of Form

Take almonds, now and then the whipping-post of California water use: They cannot be grown in a place where it rains in the summer. Iowa, for example, is awfully cold in February – which is precisely when almonds need mild Mediterranean winter weather for their blossoms to be pollinated. Mediterranean crops need a Mediterranean climate, which usually means mild winters and hot, dry summers.

Beyond that, the case for California agriculture is made by our farming practices and their regulatory backdrop, whatever natural reticence California farmers may have about being regulated. We do it more efficiently here, and with more oversight, than in



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most alternative agricultural venues around the world. I would compare a California avocado favorably to an avocado anywhere else in the world, on those terms.

That's why I have always thought that a subtle strain of NIMBYism runs through the retrograde ideas that some have about "reforming" agricultural water rights here and constraining the water projects that ultimately deliver food to the world. With nearly 8 billion people on the planet, pinching off California's agricultural water supplies is a game of whack-a-mole which will cause the same water issues to arise elsewhere.

Without question, we must continue on our trajectory of making California farming more water-efficient. If you have been watching California agriculture for a generation, you already know that much of the landscape has transitioned from old-fashioned flood and sprinkler irrigation to more efficient drip and micro-sprinkler techniques – even in the case of row crops. We must continue this path; new technologies related to irrigation continue to be developed, including better monitoring of applied water and crop water use.

We must also recognize inherent conflicts between agricultural water use and the flora and fauna that are dependent upon our rivers and streams.

Gone are the days in California when a grizzly bear might paw a salmon out of the Suisun Marsh, but we can work together to find non-zero-sum water and habitat solutions that would take advantage of opportunities to protect and rehabilitate species of concern, where it can be done without disproportionate human impact. Again and again through public enactment, California has demonstrated its will to keep the environment in mind as we move forward.

Further, we must also carry forward processes to develop new water supplies for California's farms and growing cities, whether those are storage facilities above ground or below ground, or stormwater capture and aquifer recharge, or desalination or recycling. In the face of a changing hydrology and the expected loss of snowpack, we simply cannot accommodate serious discussion on the demand side of water questions without working on the supply side. Otherwise, we are chasing a receding goalpost – and we will not get there.

Finally, remember that farming is not a question of "if," but "where." We're going to eat – all of us around the world – and we're going to farm in order to do so. So we should protect California's agricultural water supplies, because the case for California water being used on California's farms is strong.

Original Article: [Cal Matters by Chris Scheuring, Special to CalMatters](#)

Protect the public's interest with Kern River water allocation decision

There's a water fight brewing on the Kern River. The State Water Resources Control Board's handling of the conflict will be telling for the future of California's streams and rivers.



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If the water board takes seriously its duty to protect the public interest, this conflict could lead to better water management statewide.

The Kern River starts on the slopes of Mount Whitney and (sometimes) flows through Bakersfield. It once supported a vast ecosystem of wetlands and lakes, teeming with wildlife and offering an escape from the heat of the San Joaquin Valley. As with several California rivers, every drop of water in the Kern River has been diverted since the mid-to-late 1800s, destroying the wetlands and draining the river.

California laws are supposed to protect rivers from this fate, and the California Supreme Court has ruled that all water allocations must consider the public trust doctrine, which protects the public's interest in healthy rivers and streams. However, Kern River water rights are so old that they have never been assessed against modern environmental laws.

Under the state Supreme Court precedent, the water board has both the power and the duty to adjust antiquated water rights to protect public trust interests, but it seldom does. Fortunately, the water board now has an opportunity to reassess these rights.

A 2007 California appellate court decision struck down some of the oldest water rights on the Kern because the right-holder failed to use the water. This unusual ruling means that new rights to Kern River water might be available for the first time in more than a century. Nearby cities and area water districts pounced, filing six applications for any unclaimed water. Public-interest organizations suggest the water should be used to restore portions of the Kern.

Before the water board can allocate the water, it must determine whether the forfeiture actually freed up any water. The water board's Administrative Hearings Office is currently trying to determine how much water is already claimed under existing rights and whether there is any water left for the new applicants. Making this decision requires evaluating the historic Kern River water rights.

The water board should take this opportunity to consider whether the existing rights adequately protect the public trust. If not, as the state Supreme Court has indicated, those rights should be adjusted to comply with modern law. But the water board seems poised to ignore the public trust in this phase of the proceedings. Instead, it plans to defer consideration of public trust until after it decides whether existing right holders can soak up all the available water.

This approach assumes the validity of the old water rights and puts the public's interests last, behind all the existing right holders. If the public only gets the leftovers, there will never be enough water for a healthy environment. That falls short of the Supreme Court's mandate to the water board – public trust protections extend to all waters, not just whatever is left after everyone else takes their cut.

Under California law, the water board must determine whether the historic water rights adequately protect public interests. Over the past century and a half, California has become a leader in environmental protection, but our leadership has lagged when public interests and water rights clash.



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This conflict offers the water board an opportunity to set a vital precedent: that whenever the board considers claims under existing water rights, it will assess whether those rights are still valid in light of the board's modern responsibilities to the public.

Setting this precedent would put the water board on a path toward improved water management across California by adjusting historic rights to reflect modern priorities. The board has the authority and the responsibility to make the right decision. We've come a long way since the 1800s, and it is high time for these old water rights to catch up.

Original Article: [CalMatters by Karrigan Bork, Special to CalMatters](#)

California's Water Rights Records Are a Long Way From Being Digital

This year saw the western United States experience an ominous abundance of drought conditions. It's another reason to be concerned about climate change — as well as a harbinger of the fact that water rights are going to be increasingly important in the coming years. (Cue a growing sense that Paolo Bacigalupi's novel *The Water Knife* is going to read like nonfiction before long.)

Both water rights and how that water is used will be playing a much larger role in local politics in the near future. But there's an alarming addendum to that — namely, the methods by which records of water rights are kept and maintained. As a new Los Angeles Times story reveals, California's system of keeping track of them hasn't been updated in a very long while.

The article opens with a description of the California State Water Resources Control Board, where one analyst is described as "a custodian of millions of pieces of paper" — some of them over a century old. Some water claims date back to the days of the gold rush, and the lack of a standardized system makes it especially hard to work out certain rights issues.

This system might end up modernized before long; the article notes that California's budget allocated \$33 million to modernize the system this year. But implementing that will still take plenty of time and labor, especially at a time when water rights are increasingly important. If it can be accomplished, this feat could offer a better picture of the state's environmental history — but that remains a big if.

Original Article: [Inside Hook by Tobias Carroll](#)



Critics say valley groundwater managers relying too much on recharge, not enough on pumping cuts

Groundwater recharge seems to be priority No. 1 in the San Joaquin Valley's scramble toward sustainability. With water restrictions on the horizon, groundwater managers can't build recharge sites fast enough. But will it be enough?

"That's something that's always on the forefront of my mind: Is this going to be enough?" said Kassy Chaugan, executive officer of the North Kings groundwater sustainability agency. "The answer really is, we don't know."

Farmers have always relied on pumping groundwater in the valley for their crops, especially in drought years when surface water is in short supply. But overpumping is causing groundwater levels to plummet, as well as land subsidence and water quality problems.

In 2014, the Sustainable Groundwater Management Act passed and created local groundwater agencies responsible for bringing groundwater back into balance, meaning more isn't pumped out than goes back in. The agencies will have until 2040 to reach that goal.

Recharge is the practice of putting excess water in wet years into ponding basins where it can percolate down and replenish the aquifer. It's a method that is being leaned on heavily by local agencies as a solution to the groundwater crisis.

Original Article: [Bakersfield by Jesse Vad/ SJV Water](#)

Feds release \$61.8M in drought relief to CVP

The United States Bureau of Reclamation (USBR) has announced they will be allocating \$61.8 million to the Central Valley Project (CVP) to address ongoing drought needs in California.

"Most of the West, and specifically California's Central Valley, the Klamath Basin in Oregon and California and the Colorado River Basin, were impacted by this past dry hydrologic year. Recent forecasts show minimal relief for water year 2022," said reclamation commissioner Camille Calimlim Touton. "This funding will help protect those communities and ecosystems in the short term as we leverage our resources in the bipartisan infrastructure law to build long-term water resilience in the backdrop of climate change across the entire West."

The Central Valley Project is a complex, multi-purpose network of dams, reservoirs, canals, hydroelectric power plants and other facilities extending 400 miles throughout central California. The CVP reduces flood risk and supplies domestic and industrial water for the Central Valley, as well as supplies water to major urban centers in the Greater Sacramento and San Francisco Bay areas.

Construction of major CVP facilities began in 1938 with the breaking of ground for Shasta Dam on the Sacramento River near Redding in Northern California. Over the next five



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decades, the CVP was expanded into a system of 20 dams and reservoirs that together can hold nearly 12 million acre-feet of water.

The investment in the CVP comes as a part of USBR's \$210 million spending plan in the Extending Government Funding and Delivery Emergency Assistance Act. The legislation provides Reclamation with \$200 million to address drought conditions throughout the West, as well as \$10 million for fire remediation and suppression emergency assistance related to wildfires.

Original Article: [The Sun Gazette by Ben Irwin](#)

Plentiful early-season Sierra snowpack signals 'remarkable turnaround' amid historic drought

A series of record-setting blizzards in recent weeks that buried roads, snarled holiday traffic and even temporarily shut down ski resorts has combined to offer California a window of hope after two years of historic and punishing drought.

Plunging a pole into the snow-covered landscape along U.S. 50 near Echo Summit, officials with the California Department of Water Resources on Thursday measured 78.5 inches of snow and about 20 inches of water within that snow — a total that's 202% of average for this time of year.

That's about 82% of the way to what water managers would expect for that location to receive by April 1. Snowpack elsewhere in the Sierra Nevada also appears far ahead of historical averages — an unexpected respite from two years of bone-dry conditions, leaving climatologists cautiously optimistic about the prospects for easing the state's water shortage.

"Obviously we are off to a great start," said Sean de Guzman, of the California Department of Water Resources. "Let's just keep it coming."

Weeks of snow and rain have helped push the state almost completely out of the "exceptional" drought category, according to the most recent U.S. Drought Monitor's report.

The portion of the state still in what is known as "extreme drought" also shrank from nearly 80% to 33%. Still, it will take sustained precipitation over the next few months for conditions to finally return to normal, experts said.

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

California ends year with heavy snow, but officials say the drought is far from over

After two of California's driest years on record, a spectacularly stormy December blanketed the Sierra Nevada with heavy snow, giving a major boost to the state's water supplies.

California's mountain snowpack now stands at 160% of average for this time of year, state officials said Thursday as they conducted their first snow survey of the season.



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“We are off to a great start,” said Sean de Guzman, manager of snow surveys for the Department of Water Resources. “We still have a long way to go for our wet season, and we need more and more of these storms to keep coming through.”

With the state’s depleted reservoirs still below average levels, he said, California is “definitely not out of the woods.”

“This drought is still far from over,” de Guzman said.

State officials measured the water content of the snowpack at Phillips Station snow course, as they do five times during the winter and spring each year. The measurements of snowpack at a network of about 260 sites across the Sierra Nevada are used to forecast how much snowmelt runoff will fill the state’s reservoirs in the coming months. The storms that rolled in this month brought record snowfall in parts of the Sierra Nevada. More than 17 feet of snow — 212 inches in all — accumulated at Donner Pass in December, according to the UC Berkeley Central Sierra Snow Lab.

California gets much of its rain and mountain snow between November and March.

“A wet start doesn’t always mean that this year will be wet once it’s all said and done,” de Guzman said.

In 2013, for example, the winter began with ample snow, “eerily similar to where we are today,” de Guzman said, but then the “spigot shut off” in January and was followed by an extraordinarily dry year.

Though California naturally goes through dramatic swings between dry spells and deluges, higher temperatures brought on by climate change are making droughts more intense.

In 2021, the Sierra Nevada snowpack peaked at 72% of average in April but then rapidly melted during the hottest spring on record.

Extreme heat last winter baked much of the West and left parched soils, which soaked up a portion of the runoff and left diminished flows in rivers, adding to California’s drought woes.

“Last year’s snowmelt runoff basically never arrived,” de Guzman said.

“And that’s really concerning considering California’s snowpack provides about a third of our water each year,” he said. “It really tells us that climate change is here and that it’s really impacting our watersheds, as well as our snowpack.”

Over the past two years, as the dry months persisted, water levels fell dramatically in reservoirs throughout the state. And while reservoirs have risen some after recent rains, they remain low. The level of Lake Shasta, the state’s largest reservoir, still sits at 50% of average for this time of year, while the second-largest, Lake Oroville, is at 73% of average.

The snow that falls in the Sierra Nevada over the next three months will determine how much more the reservoirs will rise before the dry season returns.

The state’s water management officials use April 1 as an annual finish line for measuring the Sierra snowpack, around the time when the snow typically peaks.



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Even after this snowy December, state water officials said the amount of snow to date represents only about 55% of the April 1 seasonal average.

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

California adopts water restrictions as drought drags on

For the second time in a decade, Californians will face mandatory restrictions governing their outdoor water use as the state endures another drought and voluntary conservation efforts have fallen short.

The rules adopted Tuesday by the State Water Resources Control Board are fairly mild — no watering lawns for 48 hours after a rainstorm or letting sprinklers run onto the sidewalk— and could take effect as soon as the end of the month. Scofflaws could face \$500 daily fines, though regulators say they expect such fines will be rare, as they were in the last drought.

The action comes as Californians have failed to meet Gov. Gavin Newsom’s call for a voluntary 15% reduction in water use compared to last year. Between July and November, the state’s water usage went down just 6%.

The new restrictions follow an extremely wet December that state officials warned may not continue during the winter months that normally are the state’s wettest. Weather patterns have become more unpredictable due to climate change and state climatologist Michael Anderson said forecasts show January, February and March could be drier than average.

Earlier forecasts didn’t predict such a wet December, which saw record amounts of rain and snow in many areas. In mid-December, about 80% of the state was in extreme or exceptional drought conditions. By the end of the month only about a third was experiencing those conditions, according to the U.S. Drought Monitor that tabulates conditions. Meanwhile, the state Department of Water Resources announced Tuesday that recent storms will allow the resumption of hydropower generation at the Oroville Dam, which was halted in early August due to historically low lake levels.

Despite the rain, significant parts of the state’s water system are still under stress from the extremely dry conditions earlier in 2021 that dropped many of California’s largest reservoirs to record and near-record lows.

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

Lake Oroville’s hydroelectric powerplant resumes operation after recent storms

After being taken offline for five months, the Hyatt Powerplant at Oroville Dam has resumed hydropower generation, according to the Department of Water Resources.

On August 5, the powerplant was taken offline ‘due to historic low lake levels driven by the state’s ongoing severe drought conditions.’

Following recent rainstorms, the lake levels have been boosted and colder water in the reservoir was provided which allowed operations to resume.



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“This is a significant milestone as California sees some relief from drought conditions,” said DWR Director Karla Nemeth. “Providing clean hydropower to the state energy grid allows DWR to assist in meeting the state’s clean energy goals.”

According to the DWR, the powerplant uses one generating unit to make electricity and supply to California’s electrical grid.

As rainfall continues and brings the lake levels higher, more units will also resume.

Original Article: [KRON 4 by Erica Pieschke](#)

Climate change will get worse in 2022. But it won’t be the end

What is there to say about 2021 that hasn’t already been said?

Heat-trapping carbon dioxide kept piling up in the atmosphere, peaking at 419 parts per million, up from 280 parts per million before the Industrial Revolution. Hundreds of people died from extreme heat in the Pacific Northwest as several states suffered their hottest summers on record; infernos burned 2.6 million acres in yet another unprecedented wildfire season for California; drought emptied reservoirs and prompted a first-ever shortage declaration on the Colorado River. An oil spill marred the Pacific coast.

And the pandemic continued to rage, despite the existence of highly effective vaccines that might have stopped COVID-19 in its tracks, or at least made the virus easier to manage. Misinformation and fear-mongering kept far too many people from protecting themselves and their loved ones, in much the same way that climate denial and delay slowed the transition to cleaner energy.

I wish I could tell you that 2022 will bring anything much different, but I doubt it. Even with record-breaking snowfall this month in parts of California — which may not bring the drought to an end but should at least alleviate it — I’m expecting next year’s top stories to look a lot like this year’s. Prepare for deadly heat waves, brutal wildfires and occasional COVID-19 surges, accompanied by a surge of lies that will make your blood boil with disbelief but will nonetheless be believed by a great many Americans.

Here’s the thing, though — about climate and coronavirus both.

In April 2020, when the L.A. Times launched this newsletter, stay-at-home orders were still in effect, and vaccines were a distant dream. The federal government vacillated between treating climate change as a minor inconvenience and as a hoax. Clean energy technologies such as solar panels and batteries were more expensive than they are now, and toilet paper was in short supply.

If I had my choice between living in April 2020 and January 2022, it wouldn’t be a difficult decision.

Yes, Congress hasn’t been able to pass President Biden’s climate bill — and there’s plenty to criticize in the Biden administration’s climate performance thus far. Meanwhile, vaccines appear to be less effective against Omicron than against earlier variants.



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But as easy as it is to live and die with each day's news — with every disappointing headline, frustrating tweet and panicked proclamation by the talking head on your TV screen — the story of climate change is long, as is the story of the pandemic. Both crises were decades in the making. Neither will be resolved anytime soon, certainly not by the end of 2022.

The best we can hope for is incremental progress — two steps forward, one step back, a string of little victories that slowly add up to something more. As the climate journalist David Roberts wrote recently, global warming “remains stubbornly uncathartic.”

“There will be no final moment of recognition and no clear line between success and failure,” he wrote. “The result will be an unsatisfying muddle at every stage, with more suffering than there should have been but less than there could have been.”

So yes, the world is in bad shape right now, and it will be in bad shape next year. But it was in bad shape before 2021, too. And here we are still forging ahead, celebrating good news when it comes and hopefully remembering to find joy in the people and experiences that make life worth living. Whatever happens next — scary as it may be in the moment — it won't be the end.

So good riddance to the unsatisfying muddle that was 2021, and a toast to the muddle that will be 2022.

Original Article: [The LA Times by Sammy Roth](#)

US WATER NEWS

As Western states pledge to take less water from Colorado River, tribes seek a bigger role

When officials from California, Arizona and Nevada signed a deal this month to take less water from the shrinking Colorado River, a large portion of the water savings came through agreements with two Native tribes.

Indigenous leaders have also been invited by the Biden administration to play a key role in future negotiations on coping with shortages.

The rising involvement of tribes in discussions about managing the West's scarce water supplies marks a dramatic turn in a century-long history of being left on the sidelines.

“We see ourselves as really a leader in this,” said Stephen Roe Lewis, governor of the Gila River Indian Community, whose reservation lies south of Phoenix. “This is part of our value system to conserve water when we can. And we see this even as a moral obligation.”

Lewis is part of a growing movement pushing for Native communities to have a bigger say in decisions about the river, which sustains cities and farms across the West but faces chronic overuse and diminishing snowpack in its headwaters in the Rocky Mountains.

He was one of 20 tribal leaders from across the Colorado River Basin who signed a joint letter to Interior Secretary Deb Haaland last month saying tribes have an “essential role”



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to play in upcoming negotiations for dealing with shortages after 2026, when the current rules expire.

They told Haaland, the country's first Indigenous cabinet secretary, that they must be at the table alongside the seven states that rely on the river.

"Basin Tribes hold water rights to approximately 3 million acre-feet of Colorado River water, which equates to about 25% of the river's current average annual flow," their letter explained. "This percentage will only increase as climate change continues to diminish overall runoff amounts and reduces the amount of water available to lower priority users."

There are 29 federally recognized tribes in the Colorado River Basin. Some have unsettled water rights claims and serious water infrastructure deficiencies. On the Navajo Nation, for example, an estimated 30% or more of people live in homes without running water.

Original Article: [The LA Times by Ian James and Jaweed Kaleem](#)

\$2.5B headed to tribes for long-standing water settlements

For over a decade, residents of the rural Fort Apache Reservation in eastern Arizona have been promised miles of pipeline that would bring clean drinking water to their communities.

Now, a one-time windfall to help carry out the agreement could be on its way.

The federal infrastructure bill signed last month includes \$2.5 billion for Native American water rights settlements, a tool tribes have used to define their rights to water from rivers and other sources and get federal funding to deliver it to residents.

The federal government has not disclosed how the money will be divvied up. But tribes involved in more than 30 settlements — many in the U.S. West, including the White Mountain Apache of the Fort Apache Reservation — are eligible and eagerly awaiting specifics.

"These are longstanding lapses in the building out of infrastructure ... to make sure that people in Indian Country are not left behind," said Heather Whiteman Runs Him, who is from the Crow Nation of Montana and directs the University of Arizona's Tribal Justice Clinic.

Access to reliable, clean water and basic sanitation facilities on tribal lands remains a challenge for hundreds of thousands of people. The funding for settlements is part of about \$11 billion from the infrastructure law headed to Indian Country to expand broadband coverage, fix roads and provide basic needs like running water.

The U.S. Supreme Court ruled in 1908 that tribes have rights to as much water as they need to establish a permanent homeland, and those rights stretch back at least as long as any given reservation has existed. As a result, tribal water rights often are more senior to others in the West, where competition over the scarce resource is often fierce.



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Litigation can be expensive and drawn-out, which is why many tribes have turned to settlements. The negotiations generally involve tribes, states, cities, private water users, local water districts and others and can take years if not decades to hash out.

“What makes them a complicated and often very slow-moving process is there are huge potential ramifications for how a tribal water right gets quantified and developed,” said Richard “Jim” Palmer, the White Mountain Apache Tribe’s attorney general from 2010 to 2018.

Original Article: [Az Capitol Times by Suman Naishadham and Felicia Fonseca/ associated Press](#)

Central Arizona farmer struggles to grow crops with less water

It’s harvest season for Caywood Farms east of Casa Grande, Arizona. The tractor is gassed up, the swather blades are sharp and Nancy Caywood is ready to farm.

Only one thing is missing.

“This all should be alfalfa,” Caywood said, standing in a dry field. “Every bit of this land should be in production.”

Caywood walks across a dry, nearly barren field. Each step she takes, alfalfa crunches beneath her boots. A few stalks poke out of the ground.

“Everything is dead out here,” Caywood said.

Working on a fifth-generation family farm with her son, Travis, Caywood knows about the challenges of growing alfalfa and cotton — two water-heavy crops — in south-central Arizona. Yet her farm faces a decades-long drought that could further threaten the already bleak picture of her fields.

Arizona relies on many sources of water. The Colorado River supplies 36% of all water in Arizona, according to the state Department of Water Resources. Most of that water is delivered through the Central Arizona Project, an aqueduct system that delivers water throughout the state. Caywood’s farm gets water from the Gila River watershed, which also is under pressure from drought and rising temperatures.

Because of city and state decisions, obtaining water has been a constant source of worry for farmers in Pinal County, said Chelsea McGuire, who directs government relations for the Arizona Farm Bureau.

“When you look at the decisions that led us to where we are today,” McGuire said, “it explains a lot of that foundation.”

Original Article: [NPR for Northern Colorado by Emma VandenEinde](#)

USDA Invests \$19.3 Million to Build and Improve Critical Rural Infrastructure in Arizona

USDA Rural Development Arizona State Director Charlene Fernandez today announced that USDA is investing \$19.3 million to build and improve critical infrastructure in rural



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Arizona. The investments will help expand access to clean water and high speed internet in people's homes and businesses in rural communities across the state.

"Rural infrastructure is so much more than constructing water treatment facilities, laying pipes, or building power lines," said Fernandez. "Infrastructure includes the essential parts and pieces of a community that make daily life possible. Our investments today highlight USDA's commitment to ensuring rural communities in Arizona have the modern, responsive water and broadband services they need to keep moving forward." This announcement follows the recent passage of President Biden's historic Bipartisan Infrastructure Law and reflects the many ways USDA Rural Development's programs are helping people, businesses and communities address critical infrastructure needs to help rural America build back better.

Original Article: [Signals AZ](#)

NY funds water quality improvement with \$272M

New York officials last week announced more than \$272 million awarded to 179 water quality projects across the state.

The \$272 million awarded through the state's Water Quality Improvement Project program aims to help improve water quality, combat contributors to harmful algal blooms, and update aging water infrastructure in communities across the State. The funding is part of the \$750 million announced as part of Round XI of the Regional Economic Development Council initiative.

"Our state's economic development goals cannot be achieved without clean water for drinking, recreation, and the overall quality of life New Yorkers expect and deserve," Governor Kathy Hochul said. "These sustained investments in water quality improve the health of our communities while creating economic opportunity through well-paying, long-lasting jobs."

Today's announcement is the largest-ever awarded through the Water Quality Improvement Project program. Earlier this year, state officials announced more than \$277 million in economic development funding was awarded to support 585 shovel-ready projects across New York State.

The Water Quality Improvement Project (WQIP) grant program is administered by the New York State Department of Environmental Conservation (DEC) and funds projects that directly address documented water quality impairments or protect a drinking water source.

Supported in part by the State's Environmental Protection Fund, WQIP projects include municipal wastewater treatment upgrades, non-agricultural nonpoint source abatement and control, land acquisition projects for source water protection, salt storage construction, aquatic connectivity restoration, and marine habitat restoration. DEC Commissioner Basil Seggos said, "Protecting New York's water quality is among Governor Hochul's top priorities. She recognizes that access to clean water is critical to sustaining the health of our communities, environment, and economy. The \$272 million



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in WQIP grants announced today will help communities across the state advance work and maximize investments to safeguard our drinking water supplies for generations to come."

Original Article: [Water World](#)

Water Board seeks new surface water right for Snake River Plain aquifer recharge

The cities of Hailey and Bellevue, and the Sun Valley Co., have withdrawn protests to the establishment of a new surface water right from the Big Wood River aimed at helping to recharge the Eastern Snake River Plain Aquifer below Magic Reservoir.

A final hearing in January or February is expected to yield an agreement among all concerned parties, which include the Idaho Conservation League, Idaho Department of Fish and Game, the Big Wood Canal Co., Idaho Power, the Galena Groundwater District and the Bureau of Land Management.

In 2018, the Idaho Water Resource Board requested the establishment of a new surface water right for 800 cubic feet per second from the Big Wood River. That initial amount, which would have been taken during spring flows of "excess water" from April through June, was reduced to 650 cfs as a result of the protest.

"Once the water leaves Magic Reservoir, it's in the Eastern Snake River Plain Aquifer," said Wesley Hipke, Water Projects Section supervisor for the Idaho Department of Water Resources, the agency that issues and enforces water rights in Idaho.

Hipke applied for the new water right in 2018 on behalf of the Idaho Water Resource Board as part of his job managing the board's Eastern Snake River Plain Managed Recharge Program. He said the recharge plan would allow previously unappropriated water below Magic Reservoir to seep through canals and basins into the 10,000-square-mile Eastern Snake River Plain Aquifer, a subterranean complex of naturally occurring reservoirs that stretch from Bliss to Rexburg, Idaho, a distance of 170 miles. Hipke said portions of the hidden but essential aquifer pour from cliffsides in the Hagerman area at Thousand Springs.

"One quarter to one third of the economy of Idaho is derived from this aquifer," Hipke said. "The reason for the recharge right is because the Eastern Snake River Plain has been in a steady decline since 1950. Groundwater levels have been dropping and there has also been a decrease in spring flows and in annual flows in the Snake River."

Hipke said the Idaho Water Resource Board, which oversees the state's water rights, came to an agreement with the protesters that they can also have various amounts of spring flow water during big flood years for their own purposes under their own new surface water rights.

Original Article: [Idaho Mountain Express by Tony Tekaroniaka Evans](#)

Franklin Electric acquires U.S. groundwater distribution company

Fort Wayne based-Franklin Electric Co., Inc. (NASDAQ: FELE) announced Jan. 4 that on Dec. 31 its wholly owned subsidiary Headwater Companies, LLC acquired Blake Group



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Holdings, Inc., a Connecticut corporation, for \$27.1 million in cash. Blake is a professional groundwater distributor operating 14 locations throughout the northeast United States. Blake has approximately \$74 million of consolidated annual sales.

DeLancey Davis, president of Headwater Companies, the wholly owned distribution segment of Franklin Electric, commented:

“We are pleased to add Blake to the Headwater family. Blake has served the pump industry and related water resource markets for over 40 years and has an outstanding reputation within the industry for quality service and technical depth. The acquisition of Blake adds to Headwater’s commitment to the critical groundwater channel, provides geographic expansion in the New York and New England markets and furthers our objective of being the leading source of distribution for water systems solutions in the U.S.”

Headwater Companies, LLC is a collection of leading groundwater distributors. Headwater is a focused groundwater distribution organization that delivers quality products and leading brands to the industry, providing contractors with the availability and service they demand to meet their application challenges.

Franklin Electric produces and markets systems and components for the movement of water and fuel.

Original Article: [Greater Fort Wayne Business Weekly by Lisa Long](#)

GLOBAL WATER NEWS

World Bank to help Karnataka take up drinking water project in three cities

The World Bank has approved additional financing of \$150 million to the ongoing Karnataka Urban Water Supply Modernisation Project (KUWSMP) in Hubballi-Dharwad, Belagavi and Kalaburagi cities. The project is aimed at providing piped drinking water supplies to households in these three cities.

The World Bank’s partnership with the Government of Karnataka for urban water reforms started in 2004. Support of about \$52 million was first extended to the state to bring continuous and reliable piped water supply to about 230,000 people in specific ‘demo-zones’ on the outskirts of three major cities: Hubballi-Dharwad, Belagavi and Kalaburagi. At this time only 34-60 per cent of residents in these cities were connected to piped water supply for about two hours every three days, and the water needed to be disinfected before being consumed said a statement from the World Bank.

Further support of \$100 million was extended under the KUWSMP to move towards a continuous (24x7) water supply for the entire population in these three cities. The additional finance will further help the state achieve its ambitious vision of becoming



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the first state in India with these cities having a city-wide reliable and continuous safe water supply, said the statement.

“In Belagavi, Hubballi-Dharwad and Kalaburagi, the establishment of modern water utilities is aimed at ensuring universal and continuous access to water supply, regardless of income level and housing status, ” said Junaid Ahmad, World Bank’s Country Director in India. The project aimed at benefiting more than 2.8 million people.

Original Article: [Deccan Herald by Ajith Athrady, DHNS](#)

Water Innovations Technology project saved around 23mcm of groundwater in Jordan

According to the United States Agency for International Development (USAID) Jordan, the Water Innovations Technology (WIT) project has saved around 23 million cubic metres (mcm) of groundwater in Jordan, which is enough drinking water to meet the annual needs of approximately 630,000 people.

USAID Jordan stated that the WIT project, which started in March 2017 and will end in March 2022, identified two methods to save water: Water-efficient irrigation material and technologies — including drippers, shade nets, scientific design of irrigation networks — and water-conscious practices and behaviour.

“USAID worked with farmers in northeastern Jordan [east of Mafraq and in Azraq] who rely on groundwater for irrigation. Their farms were already equipped with irrigation systems, which required updating for more efficient water use. USAID has made adjustments included matching the irrigation equipment specifications to the needs of the crop or designing the full irrigation system in a way that prevents leaks,” USAID Jordan told The Jordan Times.

USAID collaborated with irrigation equipment suppliers who serve many farmers in the Mafraq and Azraq areas to widen the reach and maximise impact.

USAID Jordan noted that WIT helped the equipment suppliers improve the pre-and post-market services they provided to farmers, teaching farmers how to adopt water efficient technologies.

“There was a 25 per cent increase in sales of the water-efficient technologies WIT promoted,” according to USAID Jordan.

“Agriculture is an important source of income for many rural Jordanians. By increasing water efficiency in agriculture, farmers can stretch the resources they have, saving time and money spent on the energy used to treat and pump their water. By conserving water, these farmers are protecting their livelihoods,” according to USAID Jordan.

USAID said it also works in communities to rehabilitate ponds and small water retention structures or small dams as a way to create a local supply of non-potable water, which provides the community with an additional source of water, and also helps relieve the pressure and demand on public water supply networks, saving Jordan’s important groundwater reserves for household use.



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Preserving groundwater increases Jordan's water security by helping Jordan maintain a supply of groundwater for the future, USAID Jordan noted.

USAID Jordan highlighted that the WIT project demonstrates that food can be grown with two to five times less water than what has been traditionally used on some farms in the northeast of Jordan. By using less water, the farmers are extending their existing water resources and strengthening the security of their agricultural investments into the future.

USAID said it supports many other water projects in the Kingdom, as water security in Jordan is a key focus for the US government.

"USAID currently has over \$500 million in active programming aimed at helping Jordan build new water infrastructure, update water networks, reduce water losses, and strengthen water conservation," the agency said, noting that Jordan is one of the most water scarce countries in the world.

Original Article: [Jordan Times by Batool Ghaith](#)

Ukraine's water wars

Anatoli Malyuk and his team of fifteen fitters are responsible for the maintenance of 300 kilometres of water pipeline.

It supplies three million people downstream from the Siverskyi Donets river.

The problem?

That pipeline criss-crosses the frontline of a seven-year struggle in the Donbas region of eastern Ukraine between government forces and Russian-backed separatists.

The 50-year-old foreman has been in his role for 25 years. But today he faces the threats of gunfire, landmines, and shelling in going about the daily work of ensuring people on both sides have clean drinking water.

Water is being used as a weapon of war on Europe's eastern edge. As tensions between Ukraine and Russia threaten to escalate to new levels, civilians are paying the price in and around the warzone.

Nine of Anatoli's colleagues at Voda Donbasu, the Ukrainian state water authority, have been killed and 26 injured in the last seven years in the course of duty – often repairing pipes with wooden stakes, due to a lack of equipment and resources.

The pipeline has been damaged by fighting 390 times in that time. Meanwhile the main water treatment plant in separatist-controlled Donetsk has come under repeated attack. If it should be destroyed, aid agencies say that they would not be able to supply the three million people who would be affected. That, in turn, would lead to a new refugee crisis.

Already, many people in the region are living without drinkable running water.

The town of Marinka is luckier than some. It can still be supplied with untreated, non-potable water directly from nearby reservoirs, while it depends on shipments by lorry for drinking water. Children at the local kindergarten quickly got used to telling the difference between the two types. The latter is strictly rationed.



Deadline looms for farms to secure cash for water projects

East Anglian farmers have been urged to seize the last chance to secure government grants of up to £500,000 to help improve their water supplies.

Rural agents said farmers and landowners have until January 12 to check their eligibility for the Water Management Grant, which is part of the wider Farming Transformation Fund.

The scheme can cover 40pc of capital costs to help pay for large projects such as building new reservoirs, improving irrigation equipment and installing new abstraction points, pumps, pipework and water meters.

Investments in equipment such as boom or trickle irrigators, and software and sensors to optimise water application, could also qualify.

Dan Murphy, from the food and farming team at Savills in Norfolk and Suffolk, said: "The deadline for the initial 'project checker' part of the application is fast approaching – but it's still not too late.

"As agriculture's role in tackling climate change continues to move into sharper focus it has never been a better time for farmers and landowners to take advantage of this new initiative – its main aim being to help increase productivity and profitability in an environmentally sustainable way.

"The minimum grant rural businesses can claim is £35,000 (40pc of £87,500), while the maximum is £500,000 (40pc of £1,250,000).

Original Article: [Eastern Daily press by Chris Hill](#)

China Is Running Out of Water and That's Scary for Asia

Nature and geopolitics can interact in nasty ways. The historian Geoffrey Parker has argued that changing weather patterns drove war, revolution and upheaval during a long global crisis in the 17th century. More recently, climate change has opened new trade routes, resources and rivalries in the Arctic. And now China, a great power that often appears bent on reordering the international system, is running out of water in ways that are likely to stoke conflict at home and abroad.

Natural resources have always been critical to economic and global power. In the 19th century, a small country — the U.K. — raced ahead of the pack because its abundant coal reserves allowed it to drive the Industrial Revolution. Britain was eventually surpassed by the U.S., which exploited its huge tracts of arable land, massive oil reserves and other resources to become an economic titan.

The same goes for China's rise. Capitalist reforms, a welcoming global trade system and good demographics all contributed to Beijing's world-beating economic growth from the late 1970s to the early 2000s. The fact that China was nearly self-sufficient in land, water and many raw materials — and that its cheap labor allowed it to exploit these resources aggressively — also helped it to become the workshop of the world.



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Yet China's natural abundance is a thing of the past. As Michael Beckley and I argue in our forthcoming book, "The Danger Zone," Beijing has blown through many of its resources. A decade ago, China became the world's largest importer of agricultural goods. Its arable land has been shrinking due to degradation and overuse. Breakneck development has also made China the world's largest energy importer: It buys three-quarters of its oil abroad at a time when America has become a net energy exporter.

China's water situation is particularly grim. As Gopal Reddy notes, China possesses 20% of the world's population but only 7% of its fresh water. Entire regions, especially in the north, suffer from water scarcity worse than that found in a parched Middle East.

Original Article: [Bloomberg by Hal Brands](#)

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