

Veles Water Weekly Report

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VelesWater



WATER FUTURES MARKET ANALYSIS

Welcome to ***WATERTALK***

by Joshua Bell

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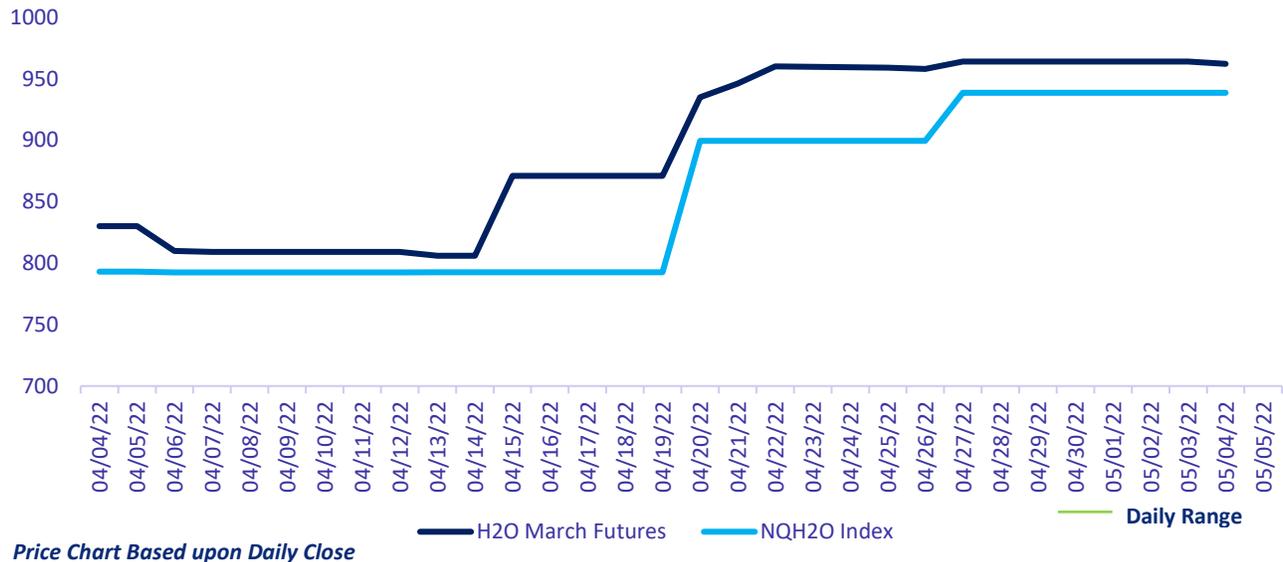
"A 2 minute technical analysis video of H2O futures"

<https://vimeo.com/706432382>



NQH2O INDEX PRICE vs H2O FUTURES PRICE

1 Month Price Performance NQH2O Index vs H2O Futures



The new NQH2O index level of \$935.58 was published on the 4th of May, down \$3.01 or 0.32%. The front month or May contract has been trading at premium of +\$25.41 - \$60.50 to the index over the past week.

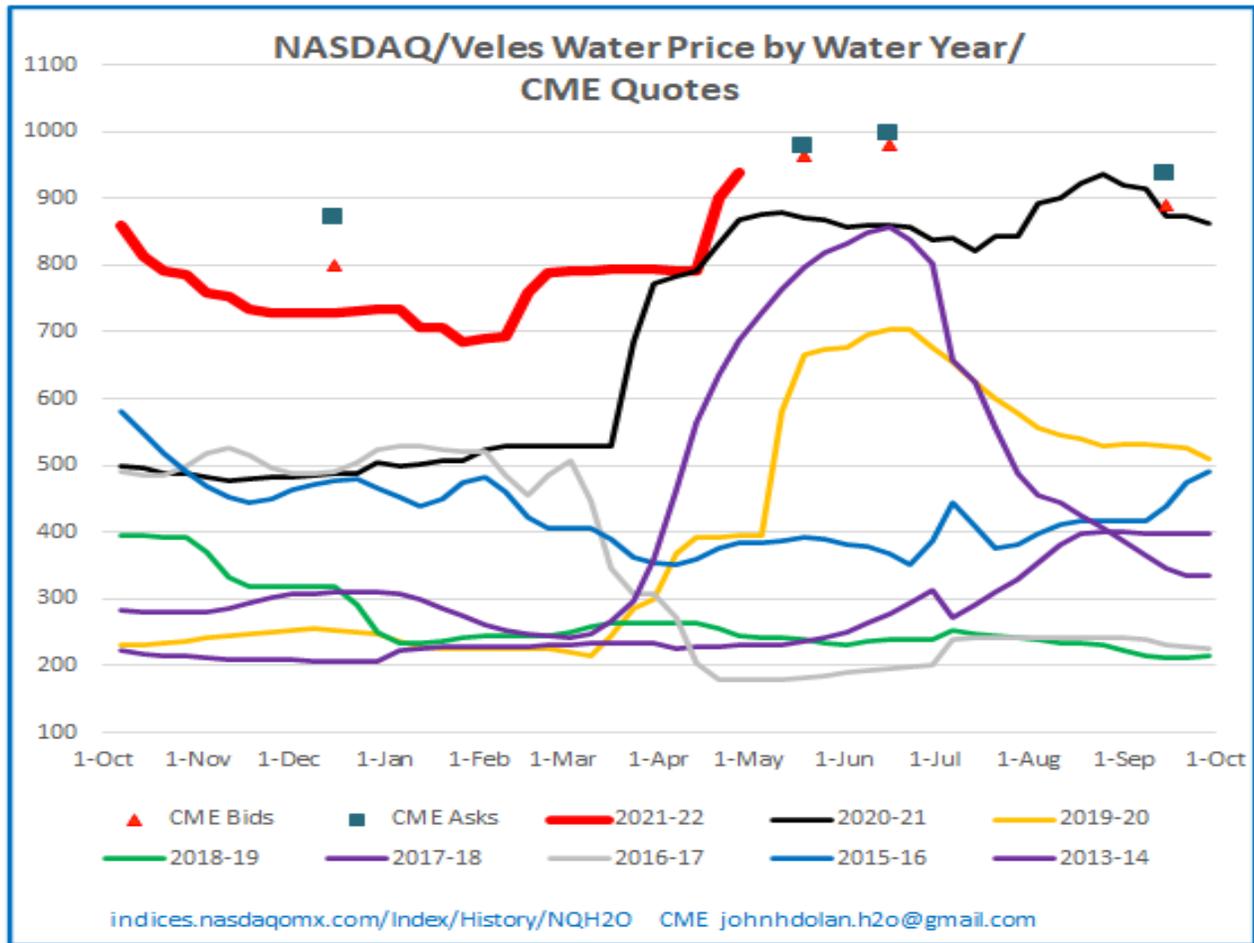
NQH2O is up 32.45% Year to Date.

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

May 22	952@964
June 22	970@985
Sept 22	880@924
Dec 22	790@865
Jun 23	960@1020



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.

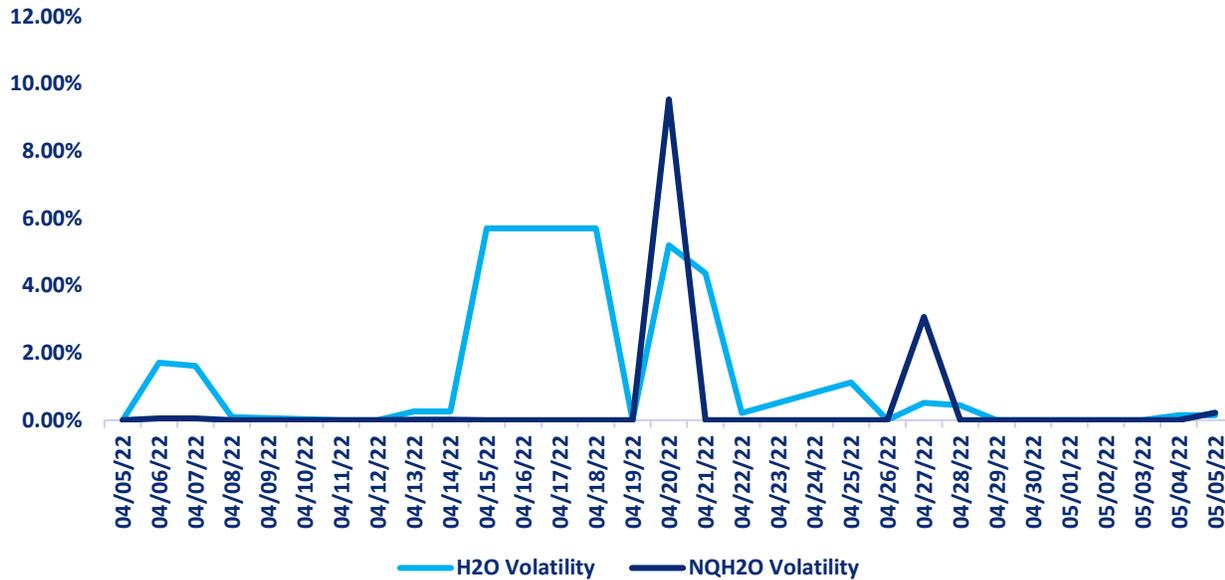
The graph for 2021 is highlighted in red. It shows the same seasonal climb, but at record-high values above each of the last eight years since February. Current bids and offers in the market are still higher than historic prices showing that expectations are that this is an exceptionally dry year and 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 April daily future volatility high has been 4.36% on April 28th and a low of 0% on May 3rd.

ASSET	1 YEAR (%)	2 MONTH (%)	1 MONTH (%)	1 WEEK (%)
NQH2O INDEX	21.63%	12.26%	12.86%	4.666%
H2O FUTURES	N/A	13.74%	10.63%	0.21%

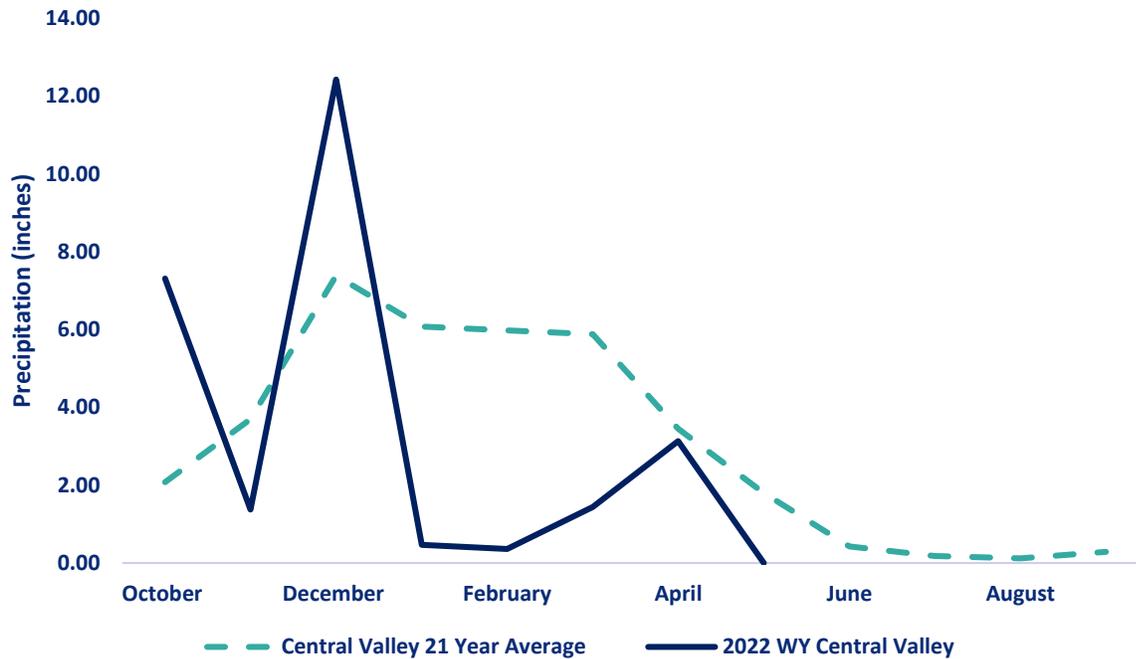
For the week ending on the May 4th the two-month futures volatility is at a premium of 1.49% to the index, up 0.28% from the previous week. The one-month futures volatility is at a discount of 2.23% to the index, up 0.47% from last week. The one-week futures volatility is at a discount of 4.46% to the index, this has decreased by a further 3.06 % from the previous week. The futures volatility continual discount in the one week and one month contract indicates the futures are predicting a slowdown in volatility in the index in the near term.

*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 27/04/2022

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%	50	66
TULARE 6 STATION (6SI)	0	0.00	0.00%	37	61
NORTHERN SIERRA 8 STATION (8SI)	0	0.00	0.00%	47	81
CENTRAL VALLEY AVERAGE	0.00	0.00	0.00%	45	69

RESERVOIR STORAGE

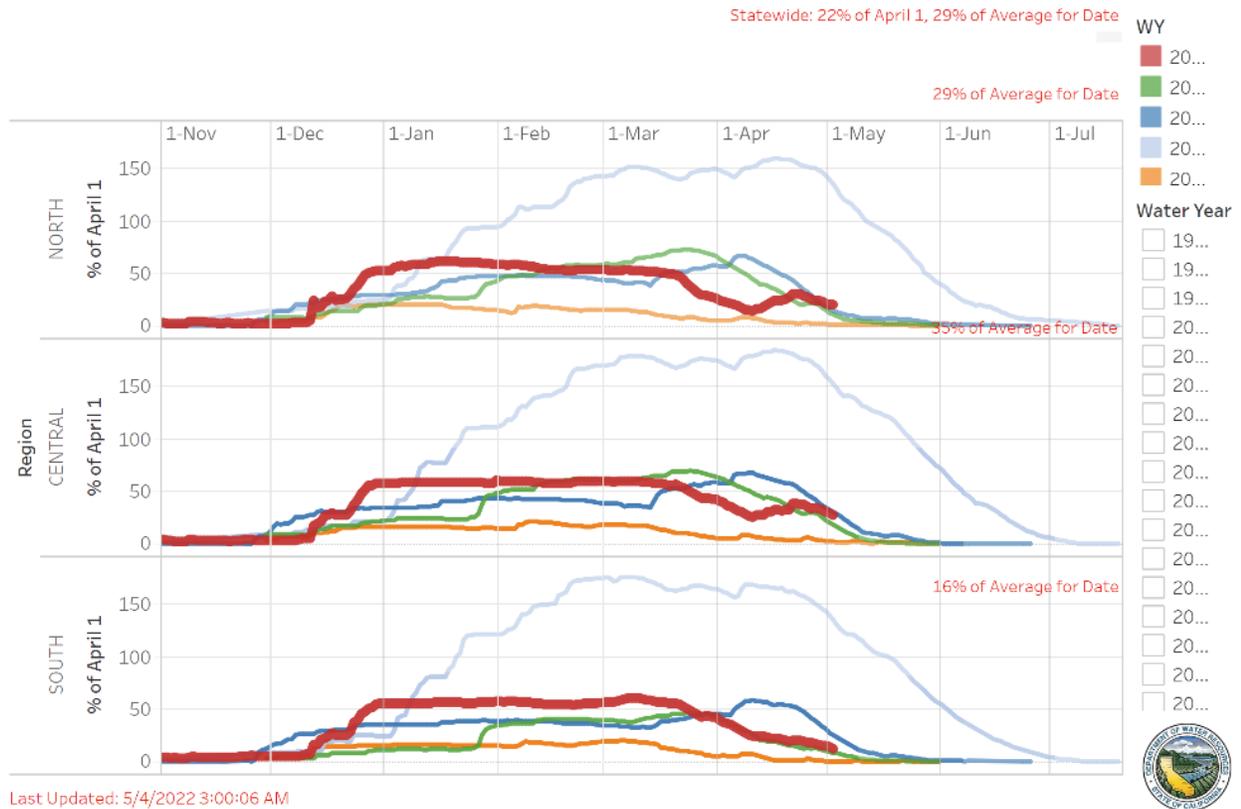
RESERVOIR	STORAGE (AF)	% CAPACITY	LAST YEAR % CAPACITY	HISTORIC ANNUAL AVERAGE CAPACITY %
TRINITY LAKE	764,123	31	53	40
SHASTA LAKE	1,809,502	40	50	47
LAKE OROVILLE	1,931,121	55	42	70
SAN LUIS RES	952,112	47	51	57

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	5.5	-2.10%	16	29	20
CENTRAL SIERRA	8.1	-2.30%	23	35	27
SOUTHERN SIERRA	3.1	-1.50%	10	16	12
STATEWIDE	6.1	-2.00%	17	29	22

*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.

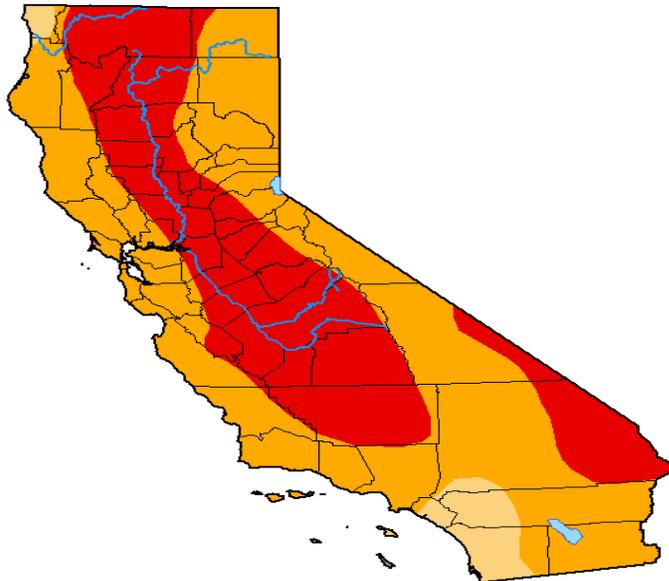
** April 1st is used as the benchmark as it when the snowpack in California is generally deepest. It has been used the benchmark date since 1941 by DWR and can be used to predict spring river flow.



DROUGHT MONITOR

U.S. Drought Monitor California

April 26, 2022
(Released Thursday, Apr. 28, 2022)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	100.00	95.18	40.56	0.00
Last Week 04-19-2022	0.00	100.00	100.00	95.18	40.81	0.00
3 Months Ago 01-25-2022	0.00	100.00	99.25	66.39	1.39	0.00
Start of Calendar Year 01-04-2022	0.00	100.00	99.30	67.62	16.60	0.84
Start of Water Year 09-28-2021	0.00	100.00	100.00	93.93	87.88	45.66
One Year Ago 04-27-2021	0.00	100.00	97.51	87.95	52.86	5.36

Intensity:

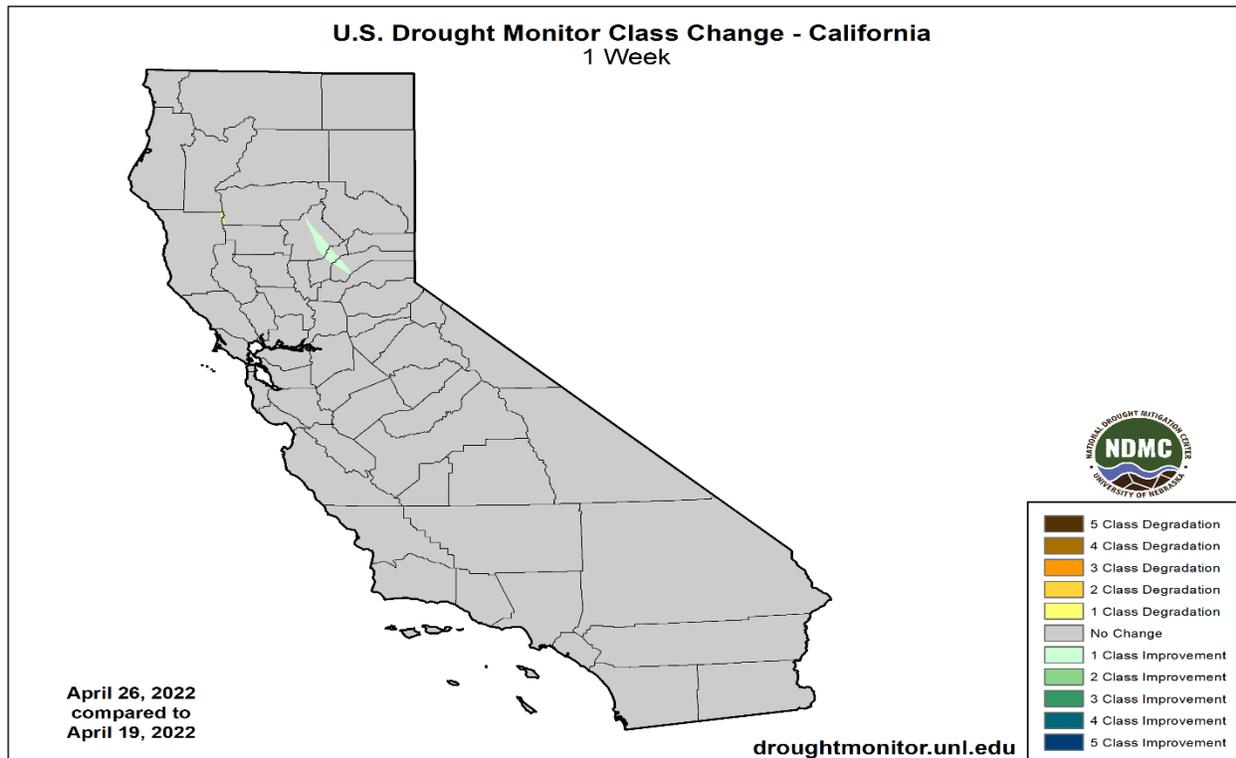
- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

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 Rippey
U.S. Department of Agriculture



droughtmonitor.unl.edu



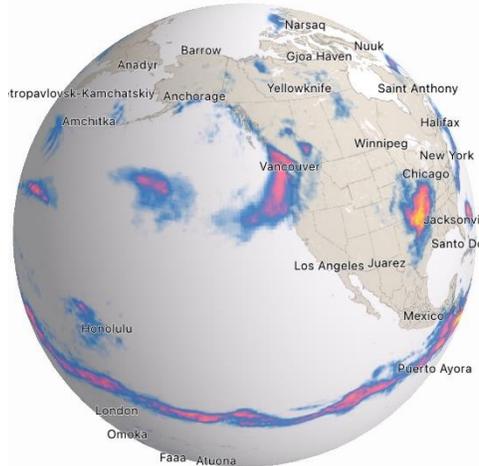
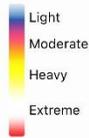
The US Drought Monitor release their statistics with a 1-week lag to this report. Over the past week the has been 0.25% Class 1 improvement in D3 Extreme Drought conditions.

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



VEES WATER WEEKLY REPORT

CURRENT SATELLITE IMAGERY



The satellite picture shows a frontal system hitting the coast of Western Canada and the Northwestern US with some precipitation occurring in Northern California. This is expected to move eastwards bringing precipitation to those regions which will likely only affect the most Northerly portions of the Central Valley regions.

There is a further frontal system brewing over the Northwestern Pacific which we expect to arrive early next week once again hitting the Northwesterly coastal regions.

There are some stormy conditions over the central US stretching from Northern Texas up to the Chicago area. Further east there are some dissipating cloud formations moving off the coastline into the Atlantic.

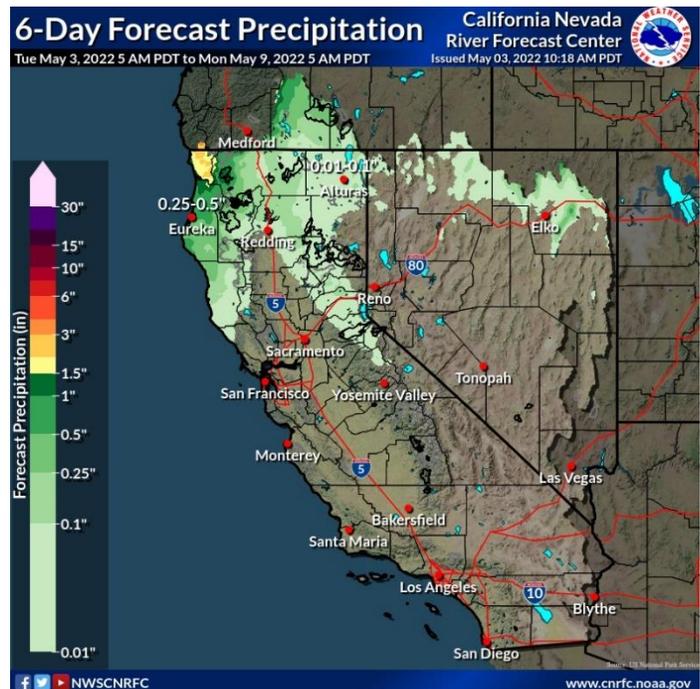
The LA area and the Southern Central Valley region will be relatively dry throughout.

There is no Monsoon activity prevalent and this weather system is not active at this time

Map Ref: Dark Sky

10 Day Outlook

A trough digs over the West Coast Friday into early next week bringing cooler temperatures and periods of precip to Srn Oregon, NRN CA (mainly over coast and mountains), and Nrn Nevada. Models still differ with the details in timing and strength leading to lower confidence in southern extent and amounts. Temperatures cooling to generally near to around 15 degrees below normal Sunday to 5 to 20 degrees below normal Monday and Tuesday. Precipitation amounts around 1-2 inches possible for the Smith Basin and near the crest of the Srn OR Cascades and 0.25-0.5 inches for the Eel and Shasta Basins and around a third of inch or less for the Northern Sierra Friday into Monday. Freezing levels generally above 7500 ft dropping to around 4500-6000 ft near ORCA border Friday night





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and around 7000-9000 ft for the Nrn Sierra and Nrn Nevada Sat morning then dropping to around 2000-4000 ft near ORCA border and around 4000-6000 ft along the Northern and Central Sierra on Sunday and around 2000-4500 ft near ORCA border and along the Sierra and 4000-6000 ft over Nrn NV Sunday night/Monday.

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

WESTERN WEATHER DISCUSSION

Conditions were nearly identical those observed the previous week, with beneficial precipitation falling across the northern tier of the region and windy, dry weather dominating the Southwest. Given the Southwest's low humidity levels, high winds, and drought-cured vegetation, two active wildfires—the Hermits Peak and Cooks Peak Fires—charred more than 50,000 acres of vegetation apiece in northeastern New Mexico. Northeast of Flagstaff, Arizona, the Tunnel Fire—ignited on April 17—scorched nearly 20,000 acres of vegetation and destroyed more than 50 structures. At times, impressively high winds raked the Southwest, raising dust and fanning flames. On April 22 in New Mexico, wind gusts in Gallup, Farmington, Las Vegas, and Raton were clocked to 70, 72, 73, and 80 mph, respectively. By April 24, according to the U.S. Department of Agriculture, New Mexico led the nation—tied with Texas—with topsoil moisture rated 86% very short to short. By the 26th, Tucson, Arizona, reported a daily-record high of 100°F—only the fourteenth observance of triple-digit heat on record during April in that location. Tucson's only earlier readings of 100°F or higher occurred on April 19-21, 1989, and April 22-23, 2012. Deterioration was common across the Southwest, with extreme to exceptional drought (D3 to D4) broadly expanding in New Mexico and moderate to severe drought (D1 to D2) increasing in coverage across parts of Arizona and Colorado. Farther north, however, periods of precipitation continued from northern California and the Pacific Northwest to the northern Rockies. Changes in the Northwestern drought depiction, although fewer than those noted the previous week, were driven by factors such as improving water-supply prospects and increasing topsoil moisture. In Oregon, topsoil moisture rated very short to short improved from 47 to 36% during the week ending April 24.

Reference:

Brad Rippey, U.S. Department of Agriculture

Richard Heim, NOAA/NCEI



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WATER NEWS

CALIFORNIA WATER NEWS

Valley could see a “mass migration” of farmworkers as land is fallowed under state groundwater law

Advocates are sounding the alarm for what they think could be the collapse of the San Joaquin Valley’s agriculture workforce. As drought continues to hammer the state and groundwater pumping restrictions take effect, farmland will need to be retired en masse.

While there have been many conversations, including legislation, on how to support farmers during intermittent droughts, advocates say there has been little to no planning for what will happen to the nearly 167,000 farmworkers in the San Joaquin Valley when swaths of farmland are permanently fallowed. Estimates of how many farmworkers are in the valley aren’t exact and the number is likely much higher during peak harvest season.

“We just don’t think you can plan to transition land without also planning to transition the workers that will be impacted when the land gets fallowed,” said Nataly Escobedo Garcia, water policy coordinator at nonprofit Leadership Counsel for Justice and Accountability. “We need to get on it now. We can’t keep leaving farmworkers out of these conversations.”

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

Can we do it? Unprecedented water cuts will require sacrifices for Southern California

In less than a month, residents in large portions of Southern California will be under unprecedented water restrictions due to a worsening drought that has severely limited water supplies.

The biggest change is the requirement from the Metropolitan Water District that local water suppliers in those areas, from Ventura County to northwestern L.A. County to parts of the Inland Empire, limit outdoor watering to once a week.

But behind that is a big cut in water use needed to avoid even more serious measures.

Can we do it? Here’s what we know:

How much water do we now use?

Currently, the average potable water use across the MWD’s service area — including residential, commercial and industrial water use — amounts to 125 gallons per person per day.



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But those numbers vary by water agency. Ellen Cheng, a spokesperson for the Los Angeles Department of Water and Power, said customers average about 111 gallons per person per day.

How much water will those in targeted areas need to use to hit savings numbers? 80 gallons per day — or a 35% drop.

How do officials expect us to get there?

The focus right now is on outdoor water use.

Under the new rules, MWD will require suppliers to limit watering times on the one day when outdoor watering is allowed for each customer. The details will be left to each supplier, but some water agencies have already said sprinklers should run no more than eight minutes. That alone should achieve significant savings, since outdoor watering accounts for as much as 70% of residential use in the region, according to the MWD.

What will the impact of that be on the landscape?

Officials expect yellow and brown lawns due to less water.

“We cannot afford green lawns,” said Adel Hagekhalil, the MWD’s general manager, last week.

There are exceptions to the new rules, however. Those exceptions are meant to protect the region’s trees, which provide valuable shade and help stave off dangerous heat health effects.

“The fact is, we don’t want to see our beautiful and ecologically important tree canopy suffer because of these restrictions,” said Deven Upadhyay, the MWD’s chief operating officer. “People should be able to continue to hand-water their trees.”

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

Hesperia Council to discuss purchasing water rights, traffic signal agreement

The Hesperia City Council on Tuesday will discuss several agenda items, including the consideration to purchase nearly \$2.3 million worth of water rights.

As the Hesperia Water District Board of Directors, the council will consider authorizing the purchase of 360 acre-feet (AF) of permanent Bass Annual Production water rights in the Alto Subarea from Vanhoops Holdings, LP.

The Alto Subarea encompasses most of the populous Victor Valley and its waters serve Summit Valley, Hesperia, Victorville, Adelanto, Apple Valley, Oak Hills, Phelan, and Helendale, according to the Mojave Water Agency.

The price would be at \$6,060 per AF for just more than \$2.1 million. Additionally, 234 AF of carryover rights at \$500 per AF totaling \$117,000.

Also, 198 AF of Free Production Allowance at \$500 per AF totaling \$99,000, for a total transaction amount of just over \$2.3 million for the permanent and temporary assignment of water rights.



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The FPA is the maximum amount of water a producer may pump in one year without incurring a replacement or make-up obligation.

When multiple parties or agencies withdraw water from the same aquifer, groundwater pumpers can request the court to adjudicate or hear arguments for and against, to better define the rights that various entities have to use groundwater resources. This is known as groundwater adjudication.

The adjudication (City of Barstow et al, v. City of Adelanto et al) is intended to remediate overdraft in the Mojave Basin Area by limiting the amount of water produced in specific subareas.

As a result of the judgment, the Hesperia Water District incurs replacement water obligations in the Alto Subarea when verified production amounts exceed the FPA for the water year.

Original Article: [Daily Press by Rene Ray De La Cruz](#)

‘The lack of frozen water is alarming’: California left with little snow as drought continues

The latest snow survey on one California mountain peak recorded zero snow, as drought conditions wreak havoc on the state’s drinking water.

“The lack of frozen water is alarming,” the state’s Department of Water Resources (DWR) tweeted.

The survey was done at Phillips Station, south of Lake Tahoe in the Sierra Nevada mountains. California relies on runoff from melting snow for around a third of its drinking water.

Photos show a muddy field with green grass, and mere patches of snow under some trees.

At the beginning of April, snowpack at Phillips Station measured 2.5 inches, according to DWR — 4 per cent of the average for that day.

That’s a significant drop from the end of December, when the site recorded 202 per cent of normal snow levels, DWR says. The agency notes that extremely dry conditions throughout the start of the year have decimated the state’s snowpack.

Snow throughout the Sierra Nevada mountains is at just 29 per cent of normal levels.

Currently, 95 per cent of California is under “severe drought” conditions, according to the US government’s drought monitor. The state’s current drought has lasted almost three years, though the entire western United States has been in an extended “megadrought” for two decades.

In response to these dwindling resources, the water providers — especially in the Los Angeles area, which relies heavily on water from the Sierras — have taken drastic measures to conserve water.

Early last month, the Los Angeles Department of Water and Power urged residents to conserve water in response to dropping snowpack levels. And just last week, the



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Metropolitan Water District of Southern California, a regional water management agency, restricted all outdoor watering to one day per week in an effort to drastically reduce water consumption in the region.

Original Article: [The Independent by Ethan Freedman](#)

California's grim drought situation is visible from the International Space Station

Despite the late-season snow that blanketed Northern California last month, almost all of the state remains under significant drought conditions.

California's snowpack, which helps fill up much of the state's reservoirs, is below average and far from where it needs to be.

The dwindling snowpack was captured in a video taken Friday from the International Space Station.

"Just how much snow is in Northern California and The Sierra Mountains? Not all that much," ISS officials tweeted last week while sharing video of the mountains.

U.S. Drought Monitor data released April 26 showed that more than 95% of California was classified under severe or extreme drought. That's an increase from about 66% recorded in February.

The April 1 snow survey showed the statewide snowpack was just 38% of average for the time of year, according to the Department of Water Resources.

Dry conditions were impacting every region of the state, with the snowpack plummeting since the beginning of the year.

Original Article: Kron4 by [Nouran Salahieh](#)

As Drought Shrinks The Colorado River, A Socal Giant Seeks Help From River Partners To Fortify Its Local Supply

Momentum is building for a unique interstate deal that aims to transform wastewater from Southern California homes and business into relief for the stressed Colorado River. The collaborative effort to add resiliency to a river suffering from overuse, drought and climate change is being shaped across state lines by some of the West's largest water agencies.

Southern California's giant wholesaler, Metropolitan Water District, claims a multi-billion-dollar water recycling proposal will not only create a new local source for its 19 million customers, but allow it to share part of its Colorado River supply with other parched river partners already facing their own cutbacks. To advance what would become the nation's largest wastewater recycling facility, Metropolitan is securing financial aid from other major Colorado River users in Nevada and Arizona in return for giving them portions of its river supply. Amid critically low reservoir levels and the first-ever shortage declaration on the Colorado River, water managers and experts are



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touting the interstate deal as a prime example of the team effort required to safeguard the future of this iconic Southwestern river and the people who rely on it.

“It’s a really interesting and innovative approach around partnerships,” said Heather Cooley, research director with the Pacific Institute, an Oakland-based water policy center. “Something we haven’t yet seen.”

Thus far the project appears long on support, but there are some potential impediments, such as whether the next set of river operating guidelines due in place by 2026 will allow the partners’ proposed long-term interstate water exchanges. Additionally, California regulators must clear the way for Metropolitan and others in the state to put the recycled supply directly into the drinking water system.

Aid for the Struggling Colorado

Metropolitan pitched the ambitious wastewater recycling proposal more than a decade ago, but the project gained steam recently amid increasingly dry conditions across two of its key water sources in California’s Sierra Nevada and Colorado River Basin. Water interests along the lower Colorado River Basin have for several years discussed how they might augment the river’s shrinking flows. As it turned out, the Lower Basin’s next potential augmentation project is being hatched more than 200 miles away near the coast of California.

Southern Nevada Water Authority, the Central Arizona Project and the Arizona Department of Water Resources have agreed to spend up to a combined \$12 million to assist Metropolitan with environmental review, almost half of the total planning cost. If the project isn’t built, or if operating agreements aren’t finalized, Metropolitan would refund the agencies’ contributions. However, if the Nevada and Arizona agencies stay on to help build the final project, they will gain to-be-determined slices of Metropolitan’s annual share of Colorado River water.

The partnering agencies are currently grappling with major cuts to their own Colorado River supply, and more are on the horizon.

Last summer, the Bureau of Reclamation declared a first-ever shortage in the Lower Colorado Basin, requiring Arizona to slash its annual take of the river by 18 percent and Nevada by 7 percent in 2022. But the mandated cuts have done little to protect water levels at the river’s two main reservoirs, Lake Mead and Lake Powell, and now federal officials are on the verge of implementing a fresh round of unprecedented reductions that stand to affect supply for the Lower Basin states.

Metropolitan’s assistant general manager calls the deal a win-win for Southern California and the Southwest.

“The idea of the program is that in return for their co-investment to make this facility a reality, we would back off some of our Colorado supply,” Deven Upadhyay said. “It becomes one component of potential augmentation on the river to help others out.”

Boosting Water Security



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At full capacity, Metropolitan’s wastewater recycling plant could produce up to 168,000 acre-feet a year. However, Upadhyay said Metropolitan doesn’t plan to make a corresponding amount of its river share available to the out-of-state investors. But gaining even a sliver of Metropolitan’s Colorado River supply could boost water security for arid Arizona and Nevada.

“We’re at a point in this Basin where we can’t afford to not look at reasonable ideas,” said Colby Pellegrino, deputy general manager of resources for the Southern Nevada Water Authority.

Contract details haven’t been finalized but Pellegrino estimates SNWA could secure between 25,000-35,000 additional acre-feet annually, or around 10 percent of its yearly river apportionment. In Las Vegas, one acre-foot of water is enough to serve two households for more than a year, though officials are continually striving to reduce per capita water use.

Original Article: [Water Education by Nick Cahill](#)

DWR releases new grants for drought relief

The Department of Water Resources released a seventh round of grants to help with drought relief after the driest three month stretch in state history.

The \$22 million in funding will go toward 17 projects.

The Artois Community Services District in Glenn County will receive \$675,000 to rehabilitate it's well and extend the water system to 25 homes with private wells that are going dry.

Feather Ridge Estates in Butte County will receive \$1.2 million for water system improvements.

The Johnsville Public Utility District in Plumas County will receive \$1.4 million to replace its aging water storage tanks.

Original Article: [Actions News Now by Will Anderson](#)

Water district will continue investment in potential Delta Conveyance Project

It’s a long way from Tehachapi to the California Delta — the network of waterways, canals and sloughs that connects the Sierra Nevada watershed with the San Francisco Bay. But water the local water district brings to the Tehachapi, Brite and Cummings basins must travel through the delta before it reaches the pumping station near Arvin and is eventually pumped up the hill to Brite Lake.

A potential \$16 billion project could improve reliability of the State Water Project for contractors including the Tehachapi-Cummings Water District and its customers. Betting on that option, directors voted 4-1 on April 20 to continue an investment in planning and environmental review for what is known as the Delta Conveyance Project. The investment will be funded through property tax.



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Citing objections to the project's expense, Director James Pack voted against the investment, as he did in November 2020 when the district was first asked by the Kern County Water Agency to contribute financially to the planning. And representatives of the city of Tehachapi and Golden Hills Community Services District questioned the funding mechanism, continuing to push for greater involvement in decisions about the district's water priorities.

Project purpose

The local water district is reliant on imported water from SWP, but the project has become less reliable over the years. This year, because of the drought, the district at best is expected to receive only 5 percent of what is called its Table A allocation. And even without drought, a number of factors — including aging infrastructure and environmental concerns — caused water agencies throughout the state to begin looking at long-term solutions a number of years ago.

The district's access to imported water is through its relationship with the Kern County Water Agency. KCWA General Manager Tom McCarthy provided an update on the delta project at the April 20 meeting of the local water district board.

In November 2020 the district agreed to join with other SWP contractors to help fund the first two of four years of preliminary planning and design costs for a potential project to address varied issues.

McCarthy told directors that the project is on schedule and on budget.

Although there are no guarantees for improvement of water deliveries, he said the preliminary estimate of potential SWP water supply change with the proposed project, under current trends, is on average a 60 percent increase of Table A water allocations with the most benefit in wetter years.

"There hasn't been a change in cost, there hasn't been a change in yield," he said. "I think everyone's decision in the future is based on how much do I get for how much money, and so I just want to reiterate, it's really about the same (as anticipated in 2020)."

The local district's share of the planning cost expense is expected to be a total of \$1,621,355 — of which \$594,252 was contributed in 2021 and 2022. The remaining \$1,027,103 will be paid in two payments — \$489,097 in 2023 and \$538,006 in 2024. The total cost of the planning project is estimated at nearly \$351 million over four years. In February 2021, the Department of Water Resources estimated construction cost of the project at about \$16 billion.

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

Calif. awards \$150M for groundwater management

In an effort to boost water supply reliability for millions of Californians, the California Department of Water Resources (DWR) has announced its first round of funding to 20



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agencies responsible for managing critically overdrafted groundwater basins throughout the state.

A total of \$150 million in funding is being awarded to regional groundwater agencies through the Sustainable Groundwater Management (SGM) Grant Program. The funding will go toward projects focused on water efficiency, groundwater recharge, feasibility studies for alternative water supplies, and the installation of monitoring wells.

The grant funding is made possible by a \$171 million investment from the Budget Act of 2021 and will support other benefits such as improving drinking water quality and restoring habitat.

“Groundwater is a critical lifeline for millions of Californians and that is especially true during severe droughts like the one we’re experiencing right now,” said DWR Director Karla Nemeth in a press release. “We are dealing with the real-time impacts of a warming climate, and we know that less snowpack, precipitation, and surface water supply will lead to an increased reliance on groundwater. This first round of grant funding will help strengthen groundwater management, improve the reliability of those supplies statewide, and ensure access to safe and clean water for all Californians.”

This funding will support 119 individual projects across 20 groundwater basins, with 102 of those projects benefitting underrepresented or severely disadvantaged communities including Tribes. The awards include \$40 million dedicated to projects within the San Joaquin Valley basin, a critically overdrafted region that is home to millions of Californians.

Original Article: [Water World](#)

“Unprecedented” Water Restrictions Coming To Southern California

The Metropolitan Water District (MWD) of Southern California declared a water shortage emergency on Tuesday and approved “unprecedented” water use restrictions that will impact six million residents across Los Angeles, Ventura, and San Bernardino counties. Cities that get their water from MWD must begin restricting outdoor water use to once a week or find other ways to significantly reduce water usage by June 1.

“We are seeing conditions unlike anything we have seen before,” said Adel Hagekhalil, the district’s general manager. “We need serious demand reductions.”

MWD’s actions come a month after state water officials announced they were cutting State Water Project allocations from 15% to 5%. The State Water Project is a system of reservoirs, canals and dams that supply 29 water agencies serving 27 million residents – including MWD.

The areas MWD serves “rely on extremely limited supplies from Northern California, and there is not enough supply available to meet the normal demands in these areas for the remainder of the year,” Hagekhalil warned. Last winter was the driest on record in California and the summer is expected to be much worse.

Original Article: [California City News](#)



US WATER NEWS

Beyond “paper” water: The complexities of fully leveraging tribal water rights

In July 2020, in the case of *McGirt v. Oklahoma*, the U.S. Supreme Court re-recognized the reservation of the Muscogee (Creek) Nation’s sovereignty over roughly 3 million acres of land in Oklahoma that were taken from the tribe in the late nineteenth century. The ruling garnered national attention, in part because it left unanswered many practical questions about how tribal jurisdiction over an area populated by non-tribal members will work in practice.

McGirt v. Oklahoma underscored the practical challenges associated with leveraging tribal rights to natural resources. Farther west, a different and much older Supreme Court ruling, which concerned tribal water rights on the Fort Belknap Reservation in Montana, has led many tribes to grapple with similar issues related to their control of water resources. The 1908 *Winters v. United States* ruling affirmed that tribes on reservations owned property rights to water, although the water itself was, in many cases, already fully allocated without regard for tribal water needs.

Like *McGirt v. Oklahoma*, *Winters v. United States* left many practicalities unanswered. It took nearly 50 years before the Supreme Court’s 1963 ruling in *Arizona v. California* even established a potential metric for quantifying tribes’ water rights—what was termed practicably irrigable acreage. To this day, barriers exist for tribes as they work to define and fully exercise their “Winters rights” and gain access to water.

Water rights in the West

Surface water rights in the West are controlled by state governments under a legal doctrine known as prior appropriation, where water is allocated based on the timing of formal filings that individuals and public and private entities (including businesses, municipal water purveyors, and irrigation districts) make with state governments. The earliest filers received “senior” rights, giving them priority access to water during drought. The first appropriative water rights were assigned to irrigated agriculture beginning in the 1850s, around the same time that many tribes were forced onto reservations.

In Winters v. United States, the Supreme Court held that when the federal government confined tribes to reservations, it implicitly reserved the amount of water necessary to maintain a reservation as a “homeland.”

In *Winters v. United States*, the Supreme Court held that when the federal government confined tribes to reservations, it implicitly reserved the amount of water necessary to maintain a reservation as a “homeland.” These rights would have a legal priority date of a reservation’s formation, meaning they would often be senior to even the earliest-



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established appropriative water rights in each state. But at the time there were few formal legal filings for water rights for existing or future tribal use.

Over the ensuing decades, most available surface water was fully appropriated for off-reservation use. In *Arizona v. California*, the Supreme Court ruled that tribes had rights to enough water to cultivate every irrigable acre on a reservation. By establishing practicably irrigable acreage as a quantification metric, the ruling provided a modicum of assurance that Winters rights would be upheld in court, even if their adjudication displaced existing water use.

Winters rights adjudications

Together, the rulings created a pathway for tribes to assert claims to senior water rights through state courts, where tribes must engage in an adjudication process. As part of this process, conflicting water right claims are resolved via a legally binding court ruling or through a negotiated settlement agreement. While both pathways result in legally enforceable water rights, the adjudication process itself is complex and potentially expensive. Adjudications can involve many different parties, but nearly always include: The federal government, which is the trustee for tribal resources (including water) and must initiate a Winters claim on behalf of a tribe.

State courts, agencies, and engineers' offices, which oversee the adjudication process—given that each state has authority over its water resources.

Non-tribal water users (e.g., irrigation districts and urban and environmental interests seeking reliable water access) that may have to reduce or alter their current water uses to accommodate Winters rights.

The Winters process officially begins when a tribe, or the federal government on a tribe's behalf, files legal claims to water rights in a state court. When major water users in a basin agree that fully adjudicating rights is too costly (potentially after decades of litigation), parties can request that the Secretary of the Interior's Indian Water Rights Office assign a settlement-negotiation team. Parties negotiate to reach mutually beneficial settlements that meet tribal water needs, stipulate how future shortages will be shared, and resolve broader water disagreements. Settlements are then enacted by Congress and typically include federal funding for their implementation.

Now, 114 years after the initial Winters v. United States decision, 46 tribes have concluded adjudications and successfully reclaimed rights to 10.7 million acre-feet of water.

Now, 114 years after the initial *Winters v. United States* decision, 46 tribes have concluded adjudications and successfully reclaimed rights to 10.7 million acre-feet (AF) of water. The adjudication process spans 22 years on average, with parties spending half of that time in court before switching to negotiation. The magnitude of water entitlements tends to reflect the size of a reservation's land base, with larger



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reservations receiving more water. Yet, more recent settlements involve less water but more funding for tribes. In addition, 23 tribes have initiated the adjudication process but not completed it. A 2020 study estimated that in the coming decades, the total water entitlement for tribes actively undergoing adjudication will be between 1.2 and 1.6 million AF (Sanchez, Edwards, and Leonard 2020).

In arid Western states that use appropriative water rights, 145 remaining Winters-eligible reservations have not yet initiated a claim. One potential reason is that the costs of undertaking the adjudication process remain too high. Legal fees and technical assessments can cost tribes millions of dollars, while uncertainty about adjudication outcomes and long-term benefits from securing water rights has deterred many smaller tribes.

Original Article: [The Federal Reserve Bank of Minneapolis by Leslie Sanchez, Eric Edwards and Bryan Leonard](#)

Idaho water officials issue emergency drought declaration for majority of state

The Idaho Department of Water Resources on Friday issued an emergency drought declaration for all but 10 of the state's 44 counties.

Gary Spackman, the department's director, issued the declaration for all 34 counties south of the Salmon River, according to a news release. Gov. Brad Little approved it, meaning it will go into effect immediately for Ada and Canyon counties, and the 32 others.

Drought declarations allow for temporary changes in water rights. Water users can apply for changes to where water can be diverted, where it can be used and the purpose of use. Officials said such declarations can also pave the way for federal aid in drought-stricken areas.

According to the U.S. Drought Monitor, all of Idaho south of the Salmon River is in moderate to severe drought, with some small areas experiencing extreme drought. In the Panhandle, much of the state is considered abnormally dry with the exception of a small swath along the Idaho-Montana state line.

Department of Water Resources officials said snowpack in the affected counties was between 50% and 78% of normal at the start of April, and reservoirs in the southern part of the state were between 20% and 65% of capacity. The news release Friday said it's likely many reservoirs in the southern half of Idaho will not fill.

It's the second year of widespread drought in Idaho, exacerbated by an exceptionally hot summer in 2021 and consecutive springs with below-average precipitation. Some irrigation districts began warning earlier this month that water users must reduce water usage in order to avoid early irrigation shutoffs.

Original Article: [Phys.org by Nicole Blanchard](#)



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Lobbying heats up ahead of water rule rewrite

Environmental advocates and the nation's largest pipeline and electricity associations are lobbying the White House, hoping to shape a controversial Clean Water Act rule that could determine just how much say — and time — states and tribes have over a broad range of projects, including pipelines and other infrastructure.

The Edison Electric Institute, Interstate Natural Gas Association of America, Southern Environmental Law Center, Appalachian Trail Conservancy and Environmental Law & Policy Center are the latest groups to meet or schedule meetings with the Office of Information and Regulatory Affairs, or OIRA, over EPA's Clean Water Act Section 401 certification rule.

The rule gives states the right to “certify” that projects that require permits comply with federal law and state water quality standards. Much of the controversy in past years has stemmed from states like New York and Washington denying permits for pipelines and coal terminals for issues tied to air pollution and climate change, as well as water quality concerns (Greenwire, Aug. 9, 2019).

The Trump administration made changes to the 401 rule that limited reviews to water quality, a move that was followed up with the Army Corps of Engineers releasing guidance limiting how much time states and tribes have to make such decisions (Greenwire, Feb. 6, 2019).

The recent spat of meetings arrives on the heels of a Supreme Court decision to reinstate the Trump-era version of the rule, which has fueled ongoing concerns about states' and tribes' hands being tied in how they review — and possibly deny — water permits (Greenwire, April 6). The nation's highest bench, without explanation and over the objections of four justices, put the Trump-era rule back in place pending the outcome of litigation in the 9th U.S. Circuit Court of Appeals. The Supreme Court at the time said the parties could bring back the matter for fuller Supreme Court review if necessary.

The Trump administration issued a new rule in a bid to help the oil and gas sector and other industries by removing obstacles to building pipelines and other infrastructure. A federal district court judge last year struck down the regulation. But by that point, EPA had already begun a process to change the 2020 rule, which EPA head Michael Regan said “weakened the authority of states and Tribes to protect their waters” (E&E News PM, May 27, 2021).

Exactly what changes EPA will make and when the agency will issue a new proposal is unclear.

Meetings on the horizon include the Environmental Law & Policy Center's appointment on May 5. Groups that have already met with the agency include the Appalachian Trail Conservancy, which met with EPA on April 29, and the Southern Environmental Law Center and INGAA. EEI, according to OIRA's website, held a teleconference with nine EPA and White House officials on April 12.



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Environmental groups are pushing EPA to scrap many of the Trump-era provisions and revive state and tribal rights to impose restrictions on permits, while industry groups have largely defended the Trump administration's interpretation of Section 401 of the Clean Water Act.

SELC, for example, joined dozens of environmental groups last summer in demanding EPA quickly repeal — not just revise — the regulation and put back in place strict protections. SELC in its comments laid out recommendations for how EPA can pivot from the Trump-era rule to ensure states and tribes have sufficient information before conducting permitting reviews, be able to impose restrictions they see fit to protect wetlands and water quality, and have the flexibility to take the time they need to make such decisions.

Original Article: [E&E News / Greenwire by Hannah Northey and Timothy Cama](#)

Drought Imperils Arizona Hydropower Plant Operations

Ongoing dry weather in the western U.S. conducive to wildfires burning in New Mexico and Arizona has also helped drop the waters of Lake Powell to a level approaching the minimum needed to operate the Glen Canyon Dam hydroelectric power plant.

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

Palumbo appeared before the U.S. House Appropriations Committee April 27 to make his case for the bureau's 2023 budget proposal, which includes plans for spending on projects beyond the \$1.6 billion per year through 2026 appropriated by the Infrastructure Investment and Jobs Act for water and related resources.

With no apparent sign of an end to droughts in the West, he said the bureau is looking to address water issues with multiple solutions, including conservation, increased storage, water reuse and desalination.

“Many water users, power contractors, tribes and related communities have had to make significant sacrifices,” Palumbo said. “These situations highlight the need for immediate actions as well as thoughtful planning for on-the-ground work to make both our infrastructure and operational decisions more resilient to withstand future water resource scarcity and variability.”

Lake Powell is part of the Colorado River system and the country's second-largest reservoir, capable of storing more than 25-million acre-ft of water at the Utah-Arizona border. As of May 1, it held less than 5.5 million acre-ft of water, and its elevation was only about 32 ft above the minimum level needed to operate the 1,320-MW power plant.



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Bureau of Reclamation officials aim to keep the water level at least 35 ft above the minimum operating level, but the water level has been below the targeted buffer level since March.

To prevent the water level from dropping below operational levels for the power plant, the bureau released an additional 161,000 acre-ft of water from the Blue Mesa and Flaming Gorge reservoirs to Lake Powell last year, and temporarily reduced monthly releases from Lake Powell to hold back 350,000 acre-ft of water from January through April.

Spring Runoff to Help

Wayne Pullan, the bureau's Upper Colorado River Basin regional director, says he expects the spring runoff to help resolve the Lake Powell deficit in the short term, so the agency is not planning any further action to address the "temporary dip." However, lake water elevation is projected to fall below the 35-ft buffer again later this year and officials may take additional action then, he adds.

Those 350,000 acre-ft of water will be released from Lake Powell to Lake Mead between June and September. But there are impacts in the meantime. As of April 25, the Southern Nevada Water Authority said the water level in Lake Mead had dropped below one of its intake valves for the first time since it began operations. As a result, the authority is using its Low Lake Level Pumping Station, which completed construction in 2020.

The authority instituted summer watering restrictions as of May 1. If water levels in Lake Mead fall too low, it warned that the Hoover Dam could no longer release water further downstream to California, Arizona and Mexico. The Metropolitan Water District of Southern California, which imports water from the Colorado River and elsewhere to an area that includes Los Angeles, also is imposing water restrictions more severe than any in history, according to Adel Hagekhalil, district general manager.

The bureau updated its five-year projections for Lake Powell and Lake Mead in February. The projections anticipate a 23% chance of Lake Powell's level dropping below the minimum for the power plant in 2023, which is down from the 34% odds projected for 2023 as of last fall. At Lake Mead, the bureau does not anticipate any chance of the water level falling below the minimum needed to operate the Hoover Dam power plant.

Original Article: [ENR Southwest by James Leggate](#)

Lake Powell officials face an impossible choice in the West's megadrought: Water or electricity

Lake Powell, the country's second-largest reservoir, is drying up.

The situation is critical: if water levels at the lake were to drop another 32 feet, all hydroelectricity production would be halted at the reservoir's Glen Canyon Dam.

The West's climate change-induced water crisis is now triggering a potential energy crisis for millions of people in the Southwest who rely on the dam as a power source.



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Over the past several years, the Glen Canyon Dam has lost about 16 percent of its capacity to generate power. The water levels at Lake Powell have dropped around 100 feet in the last three years.

Bob Martin, deputy power manager for the Glen Canyon Dam, pointed toward what's called the "bathtub ring" on the canyon walls. The miles of white rock represent this region's problem.

"That's where the water has bleached out the rock -- and that's how high the water was at one point," Martin told CNN.

As water levels decline, so does hydropower production. The dam harnesses the gravitational force of the Colorado River's water to generate power for as many as 5.8 million homes and businesses in seven states, including Nevada and New Mexico.

Bryan Hill runs the public power utility in Page, Arizona, where the federal dam is located, and likens the situation to judgment day.

"We're knocking on the door of judgment day -- judgment day being when we don't have any water to give anybody."

Forty percent of Page's power comes from the Glen Canyon Dam. Without it, they'll be forced to make up that electricity with fossil fuels like natural gas, which emits planet-warming gases and will exacerbate the West's water crisis.

Loss of power at the dam would also mean higher energy costs for customers as the price of fossil fuels skyrockets.

"If nothing changes, in other words, if we don't start getting some moisture for Page, in particular, we are looking at an additional 25 to 30% in power costs," Hill told CNN.

Arash Moalemi, the Navajo Tribal Utility Authority's deputy general manager, told CNN a loss of power at the Glen Canyon Dam would be devastating for the Navajo community.

"We have 40% unemployment, and our per capita income is a little over 10 thousand dollars," Moalemi said. "Higher energy prices could mean some people aren't able to heat or cool their homes."

The federal government -- which technically owns the hydropower flowing through federally managed dams -- sells the electricity to states for what is often far less than the commercial market price. In a worst-case scenario, the Interior Department projects the dam could stop producing power by January.

The agency is now weighing an emergency action that would buy the dam more time.

In a letter to seven Western states this month, the Interior Department recommended releasing less water from Lake Powell to downstream states this year. The proposal calls for holding back the equivalent of 42.6 billion gallons of water in Lake Powell, which will mean deeper cuts to the amount of water people can use in Arizona, California, Colorado, Nevada, New Mexico, Utah and Wyoming.

More than 110 billion gallons of water have already been held back so far this year.

Original Article: [CNN by Rene Marsh](#)



GLOBAL WATER NEWS

A reckoning is coming for the Murray-Darling Basin and its \$13 billion management plan. Very few people believe water will be found in time

The lakes and dams are full, the crops bountiful, and birds and fish are returning, but a reckoning is coming for Australia's largest river system.

Delivery of the \$13 billion Murray-Darling Basin Plan, arguably one of the country's largest and most ambitious environmental reforms, hangs in the balance with just two years to go before major water-saving deadlines must be met.

Very few people who have been paying attention believe the water will be found in time. What happens then has all sides of politics divided.

Where did this all start? A little history

For too long, too much water was taken out of the rivers and the environment suffered. In 2012 a new way of doing business was legislated – with bipartisan support — and a plan was set about how much water could be withdrawn from the Murray-Darling Basin. The plan says 2,750 gigalitres, more than five Sydney Harbours worth of water, must be given back to the rivers.

Plus, an additional 450GL should be recovered through what is called efficiency projects. South Australia, at the bottom of the system, said it would only sign on to the plan if the 450GL was included.

The deadline for both targets is set for June 2024.

What's with the target to recover the 450GL?

In 2018, the federal and state water ministers agreed to set a strict criteria about how the 450GL could be recovered.

They'd essentially decided that too many regional communities were suffering because there was less water, less money and fewer people in the towns where the water use had changed.

The ministers agreed no water could be put toward the 450GL target unless it could be done in a way that met their criteria to ensure no socio-economic harm to communities. It's unclear how legally-binding that criteria is.

So far just 2GL has been recovered toward the target.

Now federal Labor says it would ensure delivery of the 450GL for the environment if it is elected later this month.

And it hasn't ruled out buying the water back from farmers — a prospect that outrages the Victorian Labor Water Minister Lisa Neville.

Political lines begin to blur

Ms Neville was one of those who led the charge to have the water ministers agree to the criteria by which the 450GL could be recovered.

She vehemently opposes buybacks.



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The Nationals agree.

Last year, backbench Nationals used debate in the federal parliament to break from cabinet and attempt to legislate to axe the 450GL, outlaw any more Commonwealth buybacks and extend the deadline for water-saving projects beyond 2024.

Catch up on all the news about the 2022 Australian federal election from May 4 in our blog.

It failed and spectacularly embarrassed Coalition partners the Liberals, whose South Australian senators promptly issued a statement re-instating their support to deliver the legislated Murray-Darling Basin Plan in full, and on time.

Original Article: [ABC News by Kath Sullivan](#)

Hydroponic native plants to detox PFAS-contaminated water

They're the non-stick on Teflon cookware, the stain resistance in Scotchgard, and the suppression factor in firefighting foam, but while the staying power of PFAS chemicals was once revered, it's now infamous as PFAS substances continue to infiltrate the environment and affect human health.

Now, new research from the University of South Australia is helping to remediate the "indestructible" PFASs as scientists show that Australian native plants can significantly remediate PFAS pollutants through floating wetlands to create healthier environments for all.

Conducted in partnership with CSIRO and the University of Western Australia, the research found that PFAS chemicals (per- and poly-fluoroalkyl substances) can be removed from contaminated water via Australian native rushes—*Phragmites australis*, *Baumea articulata*, and *Juncus kraussii*.

Phragmites australis, otherwise known as the common reed, removed legacy PFAS contaminants by 42–53% from contaminated surface water (level: 10 µg/L).

According to the U.S. Environmental Protection Agency, exposure to PFAS may lead to a range of health issues including a decline in fertility, developmental delays in children, increased risk of some cancers, a reduced immune system, higher cholesterol, and risk of obesity.

UniSA and CSIRO researcher Dr. John Awad says that this research could alleviate many of these environmental and health risks by providing a clean, green, and cost-effective method to remove PFAS from the environment.

"PFASs are often referred to as 'forever chemicals' because they don't break down, instead accumulating in the environment and in our bodies where they can cause adverse health effects," Dr. Awad says.

"In Australia, PFAS concerns often relate to the use of firefighting foam—especially legacy firefighting foam—which accumulates in the surface water of our waterways. Our research tested the effectiveness of Australian rushes to remove PFAS chemicals from



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stormwater, finding that *Phragmites australis* was the most effective at absorbing chemicals through its roots and shoots."

The study used constructed floating wetlands as a mechanism for plants to grow hydroponically. Dr. Awad says floating wetlands present a novel and flexible way for natural remediation systems.

Original Article: [Phys.org by University of Australia](#)

Wetlands protection law delays building of new homes in England

A legal requirement that new houses do not pollute nearby wetlands, rivers and nature reserves has halted development across a swath of England.

Forty-two local authorities in England were last month told they must ensure that new homes are "nutrient neutral" and do not add damaging nitrates or phosphates to river catchments and protected areas including the Eden Valley in Cumbria, the River Camel in Cornwall and the Norfolk Broads.

In these areas – close to protected sites such as special areas of conservation (SACs) – planning authorities are unable to permit new applications for any kind of home until developers prove they are not adding to nutrient pollution.

Advertisement

Natural England, the government's conservation watchdog, has already required developers in 32 local authorities to demonstrate they are causing no additional pollution of protected sites after a 2018 court of justice ruling to protect conservation areas designated by the EU.

Nutrient pollution causes algal blooms that deplete oxygen in the water, killing fish and damaging other aquatic life. Farming is the main cause of excess nutrients washing into rivers and wetlands alongside discharges from overloaded sewage works but rainwater running off roads and new developments can also add to the pollution.

Original Article: [The Gaudian by Patrick Barkham](#)

Preventing Water Conflict Through Dialogue

When considering the potential effects of "backdraft" on climate change responses, the question of the world's water future may be the most salient of all—especially as we examine water supplies and freshwater ecosystem health.

Large changes are coming to how we store, use, and price water, as well as in how we mitigate environmental harm and adapt to water-related stresses such as drought and flooding. What will those changes look like over the next thirty or forty years?

First, there will be efforts to manage supply more effectively. The ability to harvest and store large quantities of water will be increasingly valuable, as a way to smooth out climate-driven uncertainties. And more water will be recycled, closing the loop on wasteful 'once through' systems of water use.



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Those efforts will be important because access to predictable water supplies will become an important part of global economic competitiveness. Efforts to tap new sources will intensify. And managing extremes, particularly around flooding, will become a central principle of planning, in urban settings and for coastal land management.

There is much that is positive in these trends. Water use is growing more efficient and more intentional. It is hard to justify systems that expend vast quantities of energy to purify water and pump it to end users, only to expend several liters to carry away a small quantity of human waste and then either discharge the treated wastewater or fail to treat it entirely.

Yet things don't happen simply because we need them to; witness our sluggish response to the imperative of climate mitigation and adaptation. Still, the incentive to make these adjustments is too strong to ignore. Indeed, each of these shifts is already well underway.

If done properly, sensible adjustments around storing water, pricing water, recycling water, and designing landscapes for flood risk could make communities more climate- and water-resilient. They could also help to forestall the numerous conflict risks around water—the dangers of which, though sometimes simplified and overstated, are real enough.

Managing Transitions

The realization that the way nations must manage changes in water supply and usage—as well as protect environments from water-driven climate effects—is already upon us. In the Netherlands, floating office space is being deployed, ready to be moved in the face of flood risk. In Israel, economically competitive desalination plants line the Mediterranean coast. In China, vast engineering works are underway to move water from the more abundant south to the parched north. The Colorado River basin has finally admitted that it allocates more water rights than there is water available, triggering cutbacks for downstream farmers and, looming ahead, for cities.

Yet, given the sheer size of the adjustments ahead and their high stakes for human health, livelihoods, and environmental integrity, there is also great potential for conflict in how these adaptations are carried out.

First, the vast sums of money involved in these transformations, as well as their dramatic implications for land use, livelihoods, and human settlements, create enormous distributive consequences.

Consider the need to enhance water storage. Doing so is an essential tool to smooth out the inconsistencies of climate-driven water extremes of flooding and drought. Yet, as the history of large dams has taught us all too well, storing water upstream can trigger a devastating human and environmental toll downstream—displacing people, changing the physical and chemical properties of the water, devastating ecosystem-based livelihoods such as fishing, and increasing disease risks.



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Also, if storing water in large quantities locks in the ability of, say, increasingly thirsty cities or globally mobile industries to outbid rural areas for the water, it could do more to reinforce existing water inequalities than to create the resilience for which the storage was allegedly designed.

The same is true of water recycling. As noted above, our once-through, open-ended systems of water use make little sense; provided it is done properly, the economic logic of water recycling is unimpeachable. Yet, it is often the case that someone downstream was relying on that water for their own uses (even when doing so means relying on water of degraded quality). Without attention to the wider patterns of access, the decision to recycle large amounts of water is also a choice to redistribute it, often to the detriment of the poorest and most marginalized users.

As with the uses and reuses of water, so with the threats of harm it brings. Planning for flood resilience is urgently needed in the context of climate change. But distributional controversies abound in how we do so. Coastal flood barriers may protect one community while simultaneously exiling another from the coast.

Flood-sensitive planning attentive to protecting and expanding green spaces is a powerful tool for resilience. But ‘making room for the river’ can mean less room, or even forced displacement, for existing communities, again with the already vulnerable most likely to feel the pressures.

Disputes and Dealmaking

One key to addressing these challenges is to build out more effective mechanisms for dispute resolution. The high stakes make water ripe for social conflict, but conflict management remains the weak link in water governance. Even where arrangements have been formalized, they may be designed to resolve the problems of an earlier era. Most existing international river-basin commissions, for example, were created in a historical period when allocation of water supplies and (perhaps) pollution control were the primary considerations. These bodies function on principles closer to contractual arrangements, with largely fixed terms and conditions, than joint schemes for active management. They may create predictability, but they often lack the flexibility to adjust to changing circumstances.

Another challenge is the ability to engage with the full array of stakeholders. Many of the world’s largest cities lie in international river basins, and many are beginning to experience the urban-versus-rural water tensions alluded to above. Treaty-based arrangements typically lack the capacity to engage those subnational and transnational actors in their deliberations.

For instance, when the US agreed with Canada to create the International Joint Commission and with Mexico on the International Boundary and Water Commission, these were seen as innovative, forward-looking mechanisms. Today, both agreements struggle to address tasks for which they were not designed, and to manage tensions



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their makers did not envision. And perhaps just as important, they struggle to engage stakeholders their formal processes do not acknowledge.

Finally, and most centrally, there is the need for greater attention to questions of justice in water planning. Navigating water conflicts effectively means more than just containing or suppressing them, and thus maintaining in place a status quo that is both inequitable and unsustainable. The principal analytic methods, such as environmental impact assessment, risk assessment, and cost-benefit analysis, typically fail to engage questions of distributive justice. Even when they do nod to these questions, they at best, tag on procedurally thin 'stakeholder dialogues' that fail to grapple with unequal power dynamics or the historical roots of inequality that leave some much more vulnerable than others to change.

Attention to such concerns is sometimes framed as a complication that the climate emergency cannot afford. This is short-sighted, both in terms of managing grievances that fuel conflict and in terms of effectively engaging communities and actors who must 'buy in' if solutions are to be meaningful.

Original Article: [News Security Beat by Ken Conca](#)

How water tanks are a solution to the water crisis in South Africa

Water is a scarce commodity on the African continent as a whole. The severity of the situation has been brought to the forefront by the recent Coronavirus pandemic.

South Africa has reached a crisis point when it comes to water supply. It is already a semi-arid country that has faced the impact of drought and climate change will make drought even more frequent in the future.

Apart from the amount of water for supply, South Africa also faces challenges like a failing water infrastructure due to lack of maintenance, and the unequal distribution of water amongst the population.

So with the WHO and most experts saying that the frequent washing of hands prevents healthcare associated infections what happens when a large percentage of the population doesn't have access to adequate water supply?

How can South Africa combat the problem of a lack in water supply?

Thankfully Abeco saw the severity of the problem 40 years ago and came up with a solution in the form of water tanks. Abeco Tanks was started in 1983 and is today a leading supplier of tanks into Africa.

Mannie Ramos Junior, the COO of Abeco Tanks explains that water tanks are a solution to relieving the water supply problem in South Africa.

They can be both a temporary and a permanent solution in assisting communities with water supply.

Abeco Tanks has been supplying water tanks to countries in the Middle East, Africa and Central America for 40 years.



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“As we are a proudly South African company we have been supplying our steel tanks throughout South Africa. Our tanks assist with water supply to many communities rural and urban and can hold as much as 50 million litres of water or as little as 1,800 litres of water at any given time. Our tanks can also have multiple taps to reduce the amount of time spent waiting for water,” says Ramos

Abeco Tanks is the first water tank supplier to call their tanks water banks i.e. they act as a savings account storing water for a time of crisis.

“Covid-19 was a time of crisis for all communities and these water tanks acted as more than banks to communities. They were a critical resource for the prevention of infection and the spread of Covid-19,” he further explains.

Original Article: [Cape Business News](#)

Water Resources Department to take up emergency flood mitigation projects in Chennai's south

The Water Resources Department (WRD) will take up projects worth ₹184.22 crore in southern parts of the city around Pallikaranai marshland to construct new channels and also bridge gaps between waterbodies and the marshland.

These projects would be implemented as emergency works to provide the much-needed respite to areas such as Semmencheri and Pallikaranai that face the threat of flooding every monsoon. Officials of the WRD said several areas remained under sheets of water during the Northeast monsoon.

The department has been directed to call for tenders for the projects announced in the Assembly recently as three months of work period is usually lost between government order and administrative sanction. This often led to break in works after the onset of the monsoon and spilt over to the next fiscal and issues related to escalation of project cost. This time, the tenders would be called for during the waiting period for the government order. However, bids would be opened only after receiving the order, they said.

Officials noted surplus water from several groups of waterbodies drained into the Pallikaranai marshland. However, areas, including Perumbakkam and Semmencheri were flooded as there was no defined route for the surplus water to join the marshland after DLF, due to rapid urbanisation.

The department plans to provide a network of water channels to bridge the missing links between Ottiyambakkam channel and Madurapakkam drain and up to Pallikaranai swamp in Semmencheri and Perumbakkam.

For instance, a channel would be constructed from Madurapakkam Odai to the existing channel on the northern side of DLF and also build a retaining wall along the channel in Sholinganallur at a cost of ₹24 crore. Similarly, the missing links from Madurapakkam Odai to the marshland would be bridged with a network of macro drains from the Odai in DLF Campus road for a distance of 500 metres. There are also plans to improve



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Okkiyam Maduvu till Buckingham canal in Sholinganallur and link channel between Adambakkam tank and Veerangal Odai.

It took five or six days for the waterlogging to be reduced last year. The department plans to construct concrete channels for quicker draining of surplus water into the marshland. A two-km-long channel would be built from Arasankazhani Velanthal tank to the marsh.

More channels are proposed to be constructed to cover the missing link between tanks in Ottiyambakkam and Arasankazhani and the marsh. The department plans to improve the flood mitigation infrastructure within a year, the officials said.

Original Article: [The Hindu Times by K. Lakshmi](#)

Risk of lower groundwater levels in northern Sweden with a warmer climate

When the winters get warmer in northern Sweden, there is a risk for groundwater level decline, despite heavy precipitation. The villain in this story is lingering ground frost that prevents snow meltwater and rain from filling underground reservoirs. This is the finding of a new thesis from the University of Gothenburg.

Precipitation in most of Sweden is sufficient to keep groundwater storage levels in a state of balance. However, the effects of climate change in recent decades, with dry summers and mild weather in the midwinter risks adversely affecting groundwater, especially in northern Sweden.

"When winter months are warmer, much snow melting takes place while the ground is still frozen. This means that groundwater reservoirs are not refilled as much as they used to be. The water flows on top of the frozen ground into lakes and streams instead of infiltrating underground," says Michelle Nygren, Ph.D. student in geology at the University of Gothenburg.

More mild weather days

Michelle Nygren has analyzed groundwater levels, precipitation and temperature in Sweden and Finland, among other countries, over the last few decades, and she sees a clear increase in the number of mild weather days during the winter months of December–February. This trend is particularly evident in southern Finland. Winters were on average colder during the 1980s, which resulted in a greater proportion of precipitation in the form of snow, followed by more snow meltwater later in spring. When the ground frost thawed, more of the meltwater could infiltrate into the ground, replenishing groundwater levels. The growth season also started later, which contributed to a smaller amount of meltwater being absorbed by vegetation.

"A slow melt of the snow is best for groundwater replenishment. The climate-driven change is most evident north of Stockholm and in Finland, which increases the risk of lower groundwater reservoirs. As summers become warmer, rain in the summer



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months is not sufficient to fill the groundwater reservoirs. The water evaporates or is absorbed more by plants."

Higher risk of wildfire

She points out that this leads to an increased risk of wildfire, because moisture levels in the soil decrease due to lower groundwater levels. There is an increased need to irrigate dry arable land, which costs a great deal of money. In southern Sweden, the effects of warming climate on groundwater vary. Because there is ground frost, precipitation during the winter months may seep through the soil and fill the groundwater reservoirs. This is insufficient in the eastern parts of southern Sweden and Gotland, which receive too little rainfall in general. There, increasingly hot summers can lead to problems with drought and wells drying up.

"We risk overuse when we pump groundwater. This is particularly true for smaller groundwater reservoirs, which respond quickly to weather. Larger reservoirs are more robust and can withstand a year of drought now and then but, in contrast, take longer to recover after many years of drought."

The IPCC reports point to the climate becoming ever warmer, and Michelle argues that in 100 years, the amount of ground frost will probably have decreased so much in northern Sweden that groundwater problems will also decrease. But what will do until then?

"We have enough water in Scandinavia, but it can be very expensive for society as costs for water purification increase. Agriculture may need to switch to other crops. Like the Swedish Board of Agriculture, I believe that we need to retain more water in reservoirs or reuse wastewater. Groundwater is important for our water supply, and we need more studies of the impacts from climate change."

Original Article: [Phys.org by University of Gothenburg](#)

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