Veles Water Weekly Report

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June 1st 2023

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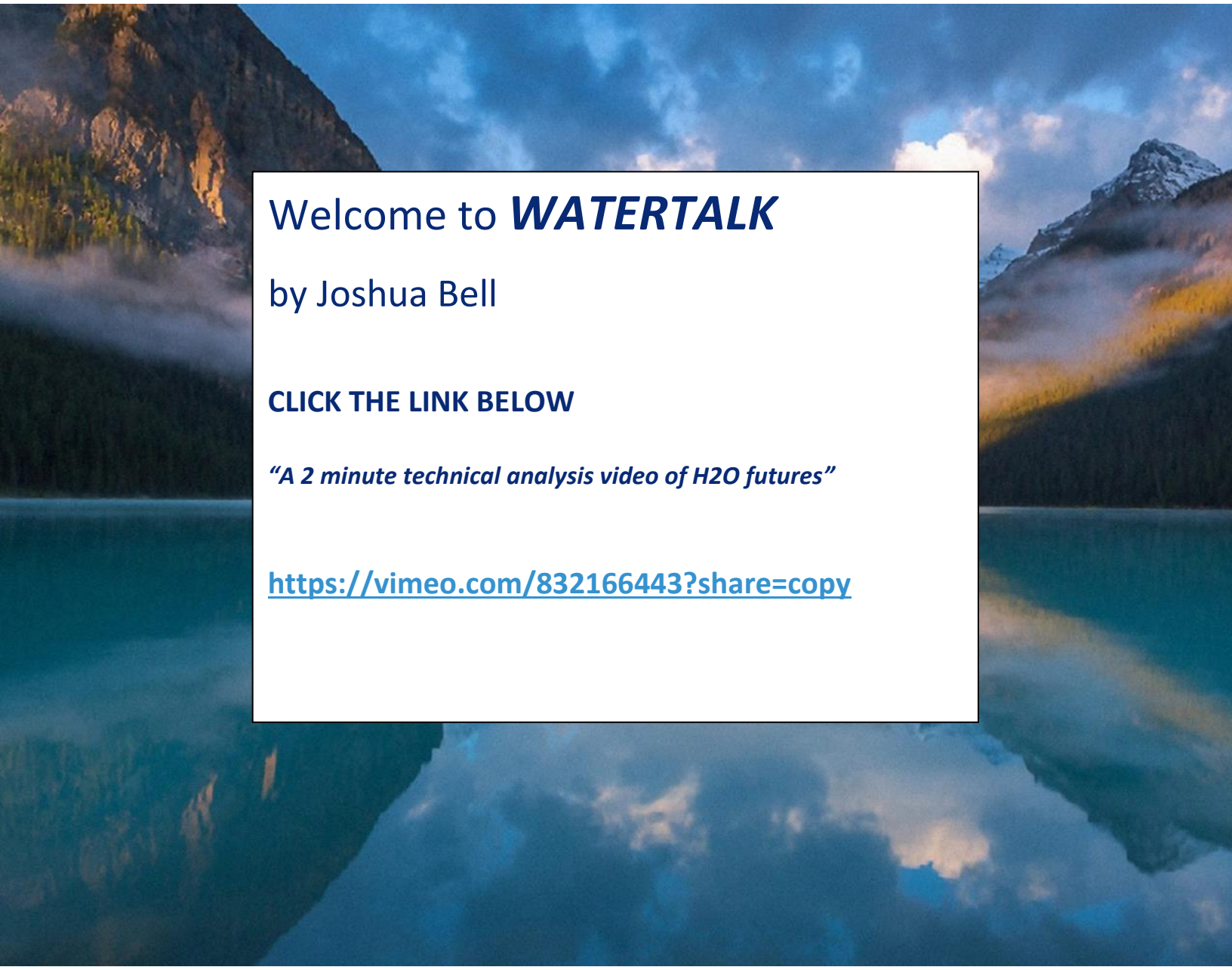
Veles Water

WATER FUTURES MARKET ANALYSIS



Welcome to ***WATERTALK***

by Joshua Bell

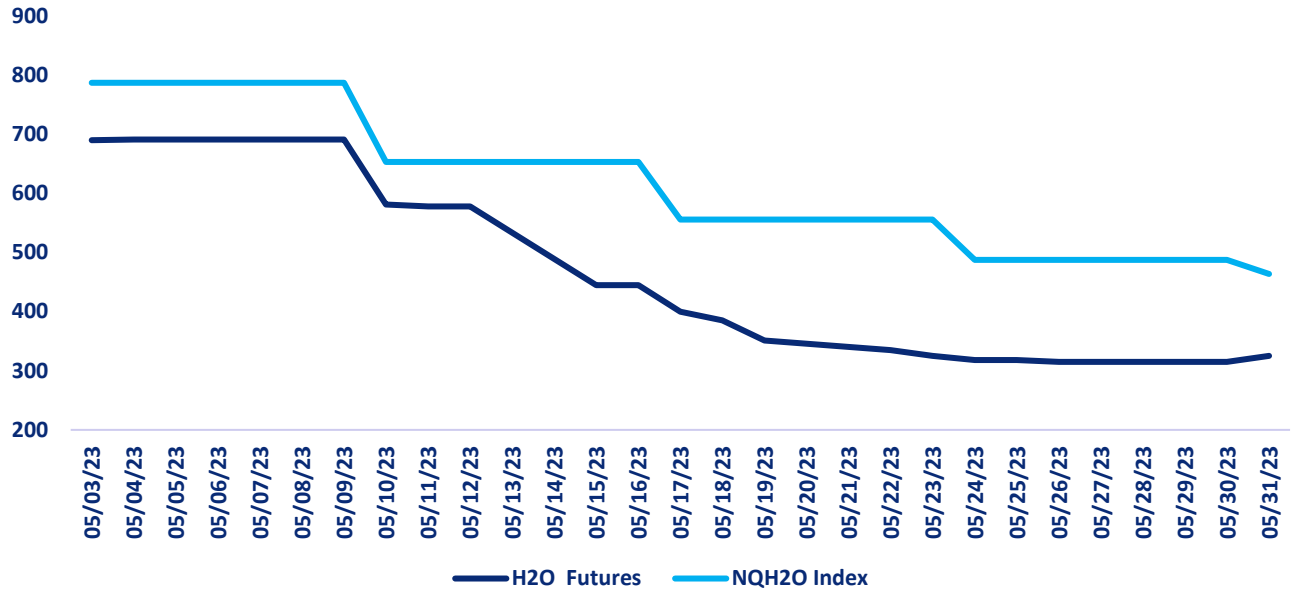
CLICK THE LINK BELOW

"A 2 minute technical analysis video of H2O futures"

https://vimeo.com/832166443?share=copy

NQH2O INDEX PRICE vs H2O FUTURES PRICE

1 Month Price Performance NQH2O Index vs H2O Futures



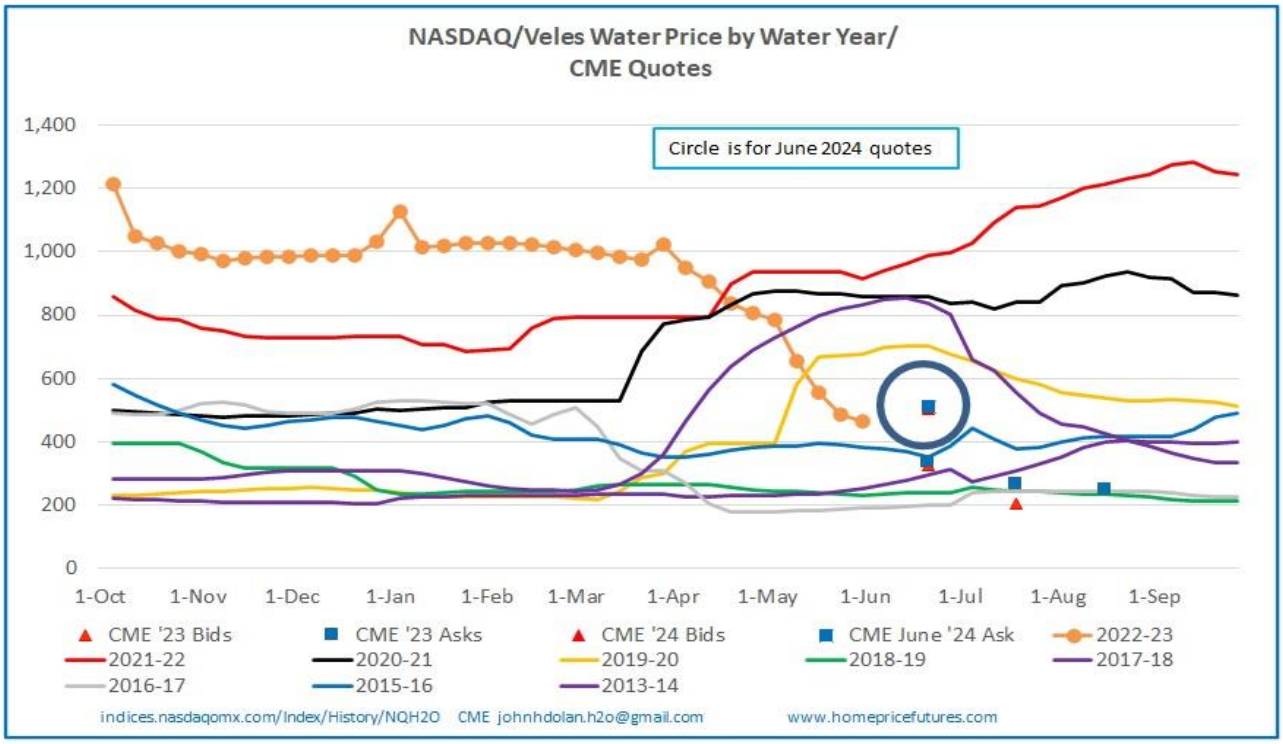
Price Chart Based upon Daily Close

The new NQH2O index level of $463.66 was published on the 31st May, down $23.65 or 4.85%. The May contract is now considered the front month. The futures have been closing at a discount of $138.66 to $172.31the index over the past week.

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

June 23	325@333
July 23	205@263
Aug 23	150@248
Jun 24	502@510

NQH2O INDEX HISTORY

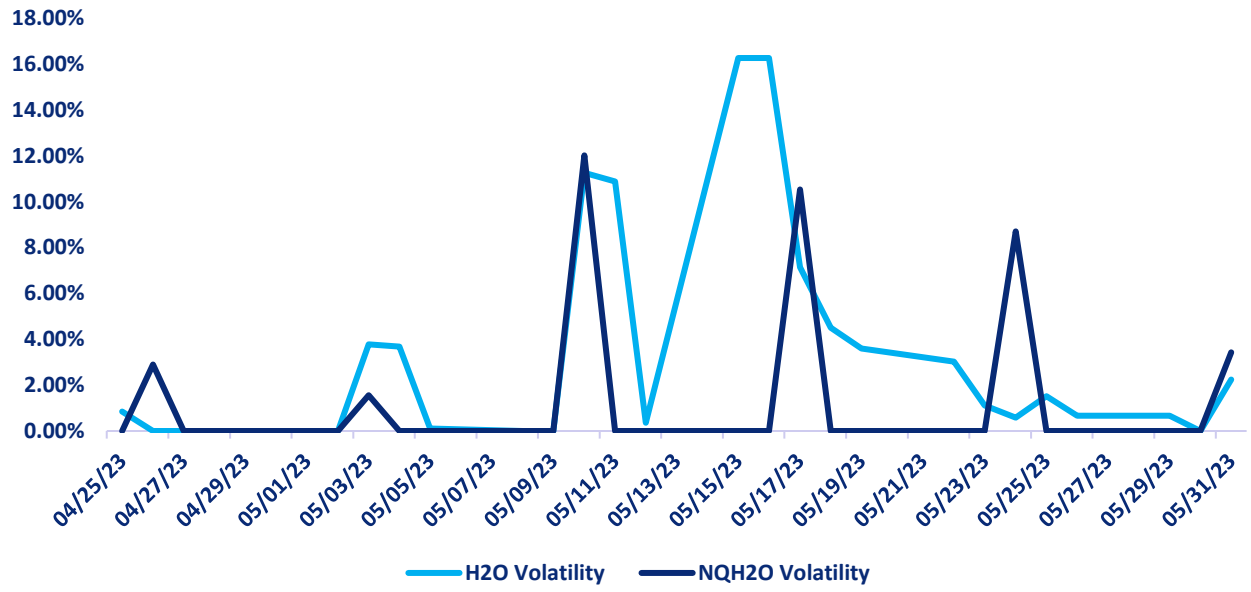


The graph above lays out the Nasdaq Veles water index by year, showing 2013- 2023. In very dry years, prices clearly rise through the spring, peaking in May to July (with the exception of 2015) as demand for water from farmers peaks. Prices then taper off heading into the winter on reduced demand, and 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.

(John H Dolan, CME Market Maker)

H2O FUTURES AND NQH2O INDEX VOLATILITY ANALYSIS

Daily H2O Futures Volatility vs Daily NQH2O Index Volatility



DAILY VOLATILITY

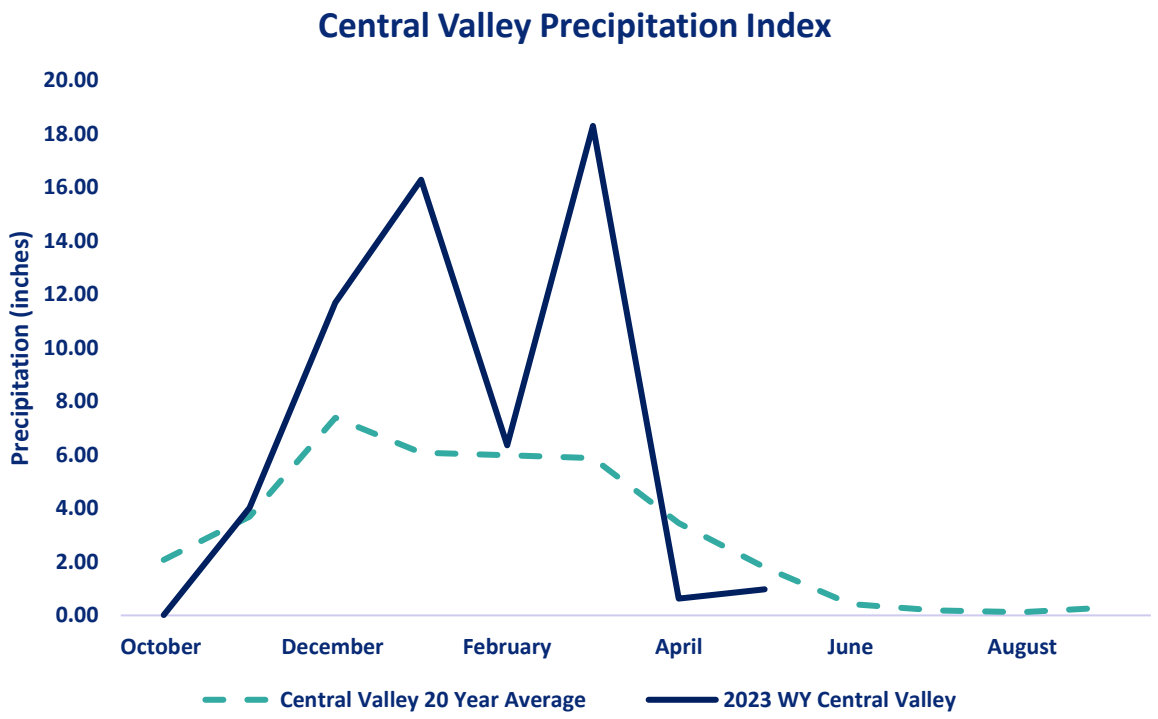
Over the last week the June contract daily future volatility high has been 2.24% on the 31st and the volatility low of 0% on the 30th.

ASSET	1 YEAR (%)	2 MONTH (%)	1 MONTH (%)	1 WEEK (%)
NQH2O INDEX	36.31%	18.08%	10.44%	7.47%
H2O FUTURES	N/A	37.92%	28.68%	3.53%

For the week ending on May 31st, the two-month futures volatility is at a premium of 19.48% to the index, up 3.28% from the previous week. The one-month futures volatility is at a premium of 18.24% to the index, up 8.17% from last week. The one-week futures volatility is at a discount of 5.09% to the index, a reversal of 3.94% 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 average is calculated using data from 19 weather stations in the Central Valley, California.
Data as of 31/05/2023

STATION	MTD (INCHES)	WEEK ON WEEK CHANGE (INCHES)	% OF 20 YEAR AVERAGE MTD	2023 WYTD VS 2022 WYTD %	2023 WY VS 20 YEAR AVERAGE TO DATE %
SAN JOAQUIN 5 STATION (5SI)	0.92	0	50.01%	65	165
TULARE 6 STATION (6SI)	0.4	0.	34.97%	60	193
NORTHERN SIERRA 8 STATION (8SI)	1.7	0	70.26%	80	126
CENTRAL VALLEY AVERAGE	1.01	0	55.90%	68	161

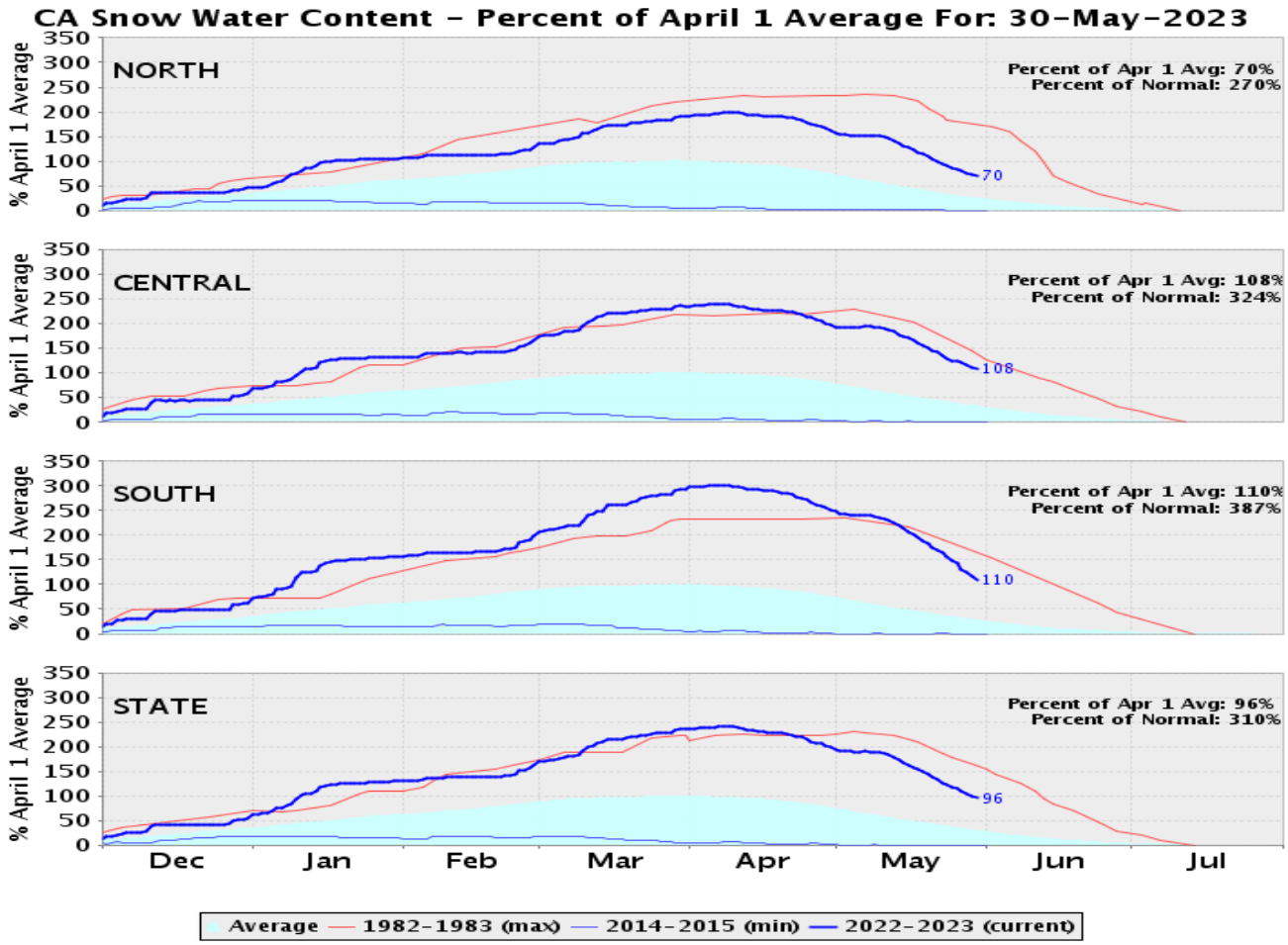
RESERVOIR STORAGE

RESERVOIR	STORAGE (AF)	% CAPACITY	LAST YEAR % CAPACITY	*% HISTORICAL AVERAGE
TRINITY LAKE	1,247,601	51	30	65
SHASTA LAKE	4,455,056	98	40	117
LAKE OROVILLE	3,439,156	97	54	122
SAN LUIS RES	2,012,987	99	45	141

*% Historical Average is based on a daily average that is interpolated from historical monthly averages. The monthly averages are computed using monthly data from water year 1991 to 2020. The monthly averages are updated every 5 years using a sliding 30 year period.

Reference: California Water Data Exchange

SNOWPACK WATER CONTENT



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	20.7	-6.4	20	270	70
CENTRAL SIERRA	26.4	-8.7	6	324	108
SOUTHERN SIERRA	21.8	-8.5	0	387	110
STATEWIDE	23.6	-8	6	310	96

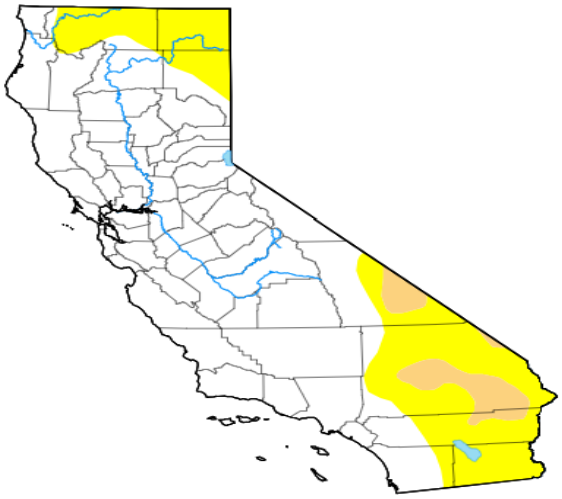
Snow Water Equivalent*, **or SWE**, is a commonly used measurement used by hydrologists and water managers to guage the amount of liquid water contained within the snowpack. In other words, it is the amount of water that will be released from the snowpack when it melts. SWE has regional variance.**

**** 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

California

Home / California



Map released: Thurs. May 25, 2023

Data valid: May 23, 2023 at 8 a.m. EDT

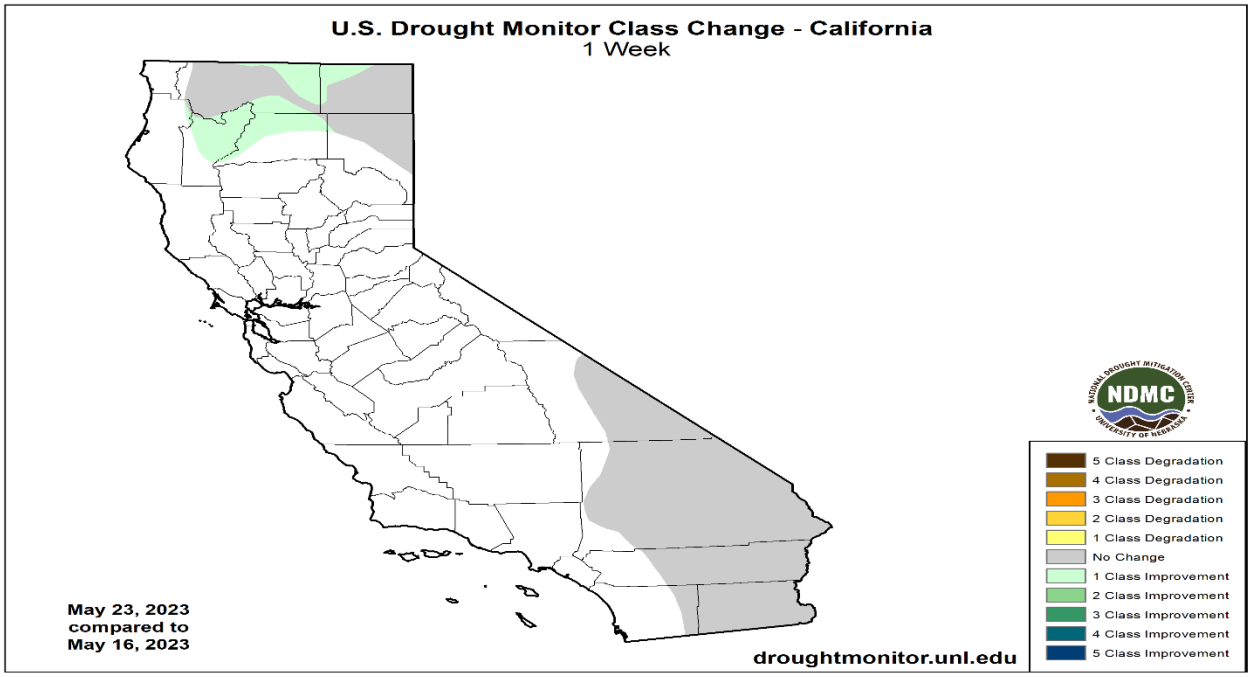
Intensity

- None
- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)
- No Data

Authors

United States and Puerto Rico Author(s):
Brad Rippey, U.S. Department of Agriculture

Pacific Islands and Virgin Islands Author(s):
Rocky Bilotta, NOAA/NCEI



Week	Date	None	D0-D4	D1-D4	D2-D4	D3-D4	D4	DSCI
Current	2023-05-23	70.86	29.14	4.63	0.00	0.00	0.00	34
Last Week to Current	2023-05-16	68.02	31.98	5.95	0.00	0.00	0.00	38
3 Months Ago to Current	2023-02-21	0.61	99.39	84.60	32.62	0.00	0.00	217
Start of Calendar Year to Current	2022-12-27	0.00	100.00	97.94	80.56	35.50	7.16	321
Start of Water Year to Current	2022-09-27	0.00	100.00	99.76	94.01	40.91	16.57	351
One Year Ago to Current	2022-05-24	0.00	100.00	99.86	97.56	59.81	11.59	369

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.

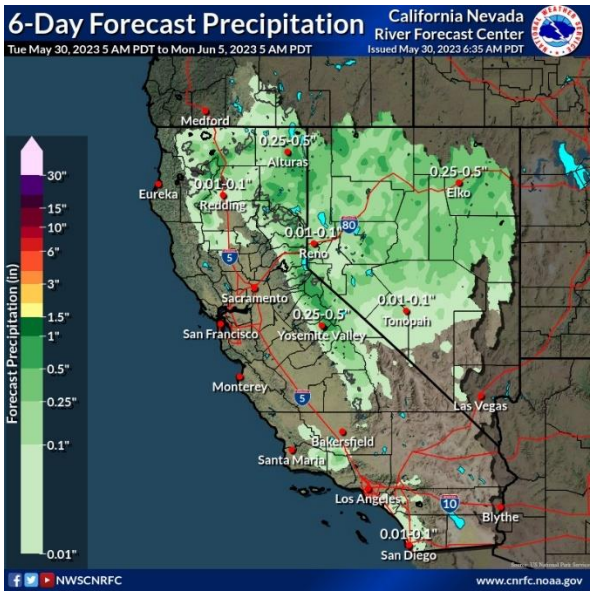
CURRENT SATELLITE IMAGERY

The current satellite picture shows a relatively dry western US with some light frontal activity in the Northwest Pacific which is moving towards the Vancouver region. This may affect Northern California but not expecting showers in Southern California.
There is some cloud cover over the Mid-West moving eastwards.
The hurricane season has not started and there are no current threatening systems.
There are no Monsoonal effects at present and these may only appear again at the middle to late summer this year.



Map Ref: Zoom Earth

10 Day Outlook



For Friday, the shortwave is forecast to gradually move through northern NV as high pressure builds in behind it over CA. Some scattered showers and thunderstorms are still expected across the Sierra and for parts of NV. There is some disagreement between the GFS and ECMWF on the fate of that shortwave over the weekend. The GFS keeps the system over northern/northeast NV pretty much through Sunday while the ECMWF moves it southeastward through the state Saturday and into the Four Corners by Sunday morning. Most of the region should remain dry due to high pressure over CA, but some showers and isolated thunderstorms over NV will be possible.

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

WESTERN WEATHER DISCUSSION

Some further improvements were introduced across roughly the southern two-thirds of the West, a combination of precipitation—especially in the central and southern Rockies—and further analysis and assessment of snow that fell during the impressively wet winter of 2022-23. In fact, recent warmth has caused some rapid melting of high-elevation snowpack, leading to some flooding. In south-central Idaho, for example, the Big Wood River at Hailey recently rose more than 2 feet above flood stage to reach its highest level since May 2017. The northern tier of the western U.S. received less winter precipitation, and in combination with the recent early-season heat wave, has experienced the return of patchy dryness (D0). During the week ending May 21, topsoil moisture rated very short to short by the U.S. Department of Agriculture increased from 32 to 47% in Oregon and 23 to 40% in Washington.

Reference:

David Simeral, Western Regional Climate Center
Tsegaye Tadesse, National Drought Mitigation Center

WATER NEWS

CALIFORNIA WATER NEWS

Supreme Court scales back clean water protections. What does it mean for California?

The Supreme Court's landmark decision scaling back federal protections for many wetlands and streams has drawn criticism from scientists and environmental advocates, who say the gutting of safeguards will jeopardize water quality throughout the arid West.

California's water regulators say the ruling will be harmful for protections nationwide, but the more stringent state protections of wetlands won't be affected.

To examine the implications of the ruling, The Times spoke with Joaquin Esquivel, chair of the State Water Resources Control Board, about the potential effects of limiting federal protections under the Clean Water Act and how the board will continue to regulate wetlands and streams under the state's Porter-Cologne Water Quality Control Act.

Esquivel stressed that because more than 90% of California's wetlands have already been drained and destroyed, strong protections for those that remain are vital. He said California's stringent protections will continue to safeguard wetlands and streams, even as the court's decision narrows the authority of the federal Environmental Protection Agency and the U.S. Army Corps of Engineers.

One of the biggest areas of concern is the Colorado River, he said. The ruling will put at risk water quality in intermittent streams and wetlands that feed the river. That could affect quality — and treatment costs — for one of Southern California's major water sources.

This interview has been edited for length and clarity.

What does this decision change in terms of protections for streams and wetlands?

It's pretty devastating nationally. You look at the reality of what we know to be the science and the facts of the way our watersheds work, and the real importance of the Clean Water Act. When it comes to the streams and wetlands that are no longer protected, there's no longer a permit or requirement to abide by rules and standards that ensure that you protect the water and the quality of water downstream from those wetlands and streams. And so, we're not going to wake up and see this damage, but as additional development is undertaken, as activities happen, there won't be protections or won't be permits for activities that pull up wetlands, that degrade the quality of downstream waters.

Aren't there protections overseen by the State Water Resources Control Board that accomplish the same thing or better?

Yes, that is correct. Porter-Cologne is a little over 50 years old. It was the model for the Clean Water Act. And so here in the state, we're fortunate because the board did update its wetlands definition in 2019 to ensure that, because if you really think of it as a circle, the protections in the state waters and the protections that Porter-Cologne affords are larger than what the federal Clean Water Act and purview are. The caveat, and an important one there, is that it will impact interstate waters — so, most important, the Colorado River and the protections that really Southern California depends on.

Does the Supreme Court decision affect areas like the Sacramento-San Joaquin River Delta and San Francisco Bay?

No. When it comes to the legal protections within the law, within the state here, they are maintained. The difference is the reliance on federal resources and or permits, or state resources and permits to accomplish the protections. But the legal protections, the fundamental protections, are there.

Does it mean that the federal EPA will be doing less oversight of surface water bodies in California, and the state water board will basically be doing the same work it's already doing?

Yes, that is the case. And the Army Corps of Engineers is another permitting entity within the Clean Water Act. It does a lot of important work within the state. Those wetland delineations and work the feds would cover would be shifting to the state. So it's both the EPA and Army Corps that are probably most impacted on what their purview and work would then be covering.

Are there negatives to losing that federal oversight and regulation in California, even though the state has relatively stringent regulations?

Yes. There are resources the federal government would otherwise contribute to the state and [to] interstate waters like the Colorado River. There is real material impact to us there. It's also just regrettable loss of protections across the nation that the Clean Water Act was providing us. It is unfortunate to see a discontinuity of those federal protections continue to emerge. We're seeing this kind of reversion to [where] you either have a state that's being more protective or not, because of a rollback of fundamental federal protections.

How many streams or wetlands in California no longer fall under federal protections as "waters of the United States" with this decision?

I think we may have some sense of that. The problem is, we've never had a real good, federal tool that delineates all this. It's often a permit-by-permit, case-by-case delineation by the Army Corps. The work by the permitting agencies is what actually determines oftentimes if it is a wetland that's covered and protected, either from the federal or state purview. So it's hard to easily come up with ... what percentage of wetlands or what percentage of our features might lose that sort of protection.

(The State Water Board staff said the agency is unable to provide an estimate of the acreage of wetlands in California that have lost federal protection under the ruling.)

One of the criticisms of the ruling is that it ignores the connection of groundwater to surface water. What do you think about that?

By saying that a wetland needs to have a significant surface connection to streams, and or a connection to the federal bodies for the purposes of the Clean Water Act, it ignores what we know is subsurface flow, oftentimes from either wetlands or creeks. And just because you don't see a significant surface flow between the features doesn't mean that they aren't actually connected. The federal Clean Water Act isn't supposed to apply to groundwater. But we know there is connectivity oftentimes. So it's problematic that we see the court has taken this idea that the wetland must have a significant surface flow. Really problematic. It doesn't conform with the way we know our watersheds work.

What's the best way to summarize what California's Porter-Cologne Water Quality Control Act does independently of what the federal government is doing?

Ultimately, the federal Clean Water Act was modeled off Porter-Cologne. Here in the state of California, we have the irrigated lands regulatory program. It regulates nitrates. And we do so under Porter-Cologne, not under the Clean Water Act, because the Clean Water Act is limited. So it's always been the case that Porter-Cologne, the state's water quality laws, are more encompassing than the federal law, although there is significant overlap, certainly. And because we adopted definitions around what a wetland is already, we better conformed and standardized that regulatory program so that it can be ready to absorb any contraction from the federal government around their definition and their work.

Original Article: The LA Times by Ian James

State asked to stop diverting iconic Mono Lake's water to Los Angeles

As trickling snowmelt in the Sierra Nevada slowly raises Mono Lake — famed for its bird life and outlandish shoreline mineral spires — advocates are pressuring state water officials to halt diversions from the lake's tributaries to Los Angeles, which has used this clean mountain water source for decades.

Environmentalists and tribal representatives say such action is years overdue and would help the iconic lake's ecosystem, long plagued by low levels, high salinity and dust that wafts off the exposed lakebed. The city of Los Angeles, they argue, should simply use less water, and expand investments in more sustainable sources – especially recycled wastewater and uncaptured stormwater. This, they say, could help wean the city off Mono basin's water for good.

In December, the Mono Lake Committee, the basin's leading advocacy group, sent a letter to the State Water Resources Control Board requesting an emergency pause on water diversions from the lake. The water board hosted an online workshop to discuss

the matter in February, and it is now considering further actions to restore the naturally saline lake.

Geoff McQuilkin, the Mono Lake Committee's executive director, said the lake will probably rise another four feet in 2023 — reason, as he sees it, to double down and halt exports.

"This is a year to take advantage of," he said. "We'd like to lock in these gains."

But the Los Angeles Department of Water and Power is pushing back. The agency began diverting the Mono basin's water in 1941, and officials say this supply, though a minute fraction of its overall demands, is a vital part of its portfolio, which includes water imported from the Sacramento-San Joaquin Delta and the Colorado River. The agency also has brushed away claims that the basin's wildlife — especially nesting birds — are threatened by the city's diversions. "The Mono Basin ecosystem remains healthy," the department recently stated. Moreover, the city has already cut exports from the lake's tributaries by 85%, starting in the early 1990s, when landmark hearings triggered tighter rules on sending the basin's water to Los Angeles.

"That's approximately 70,000 acre-feet per year," said Anselmo Collins, the city water department's assistant general manager of the water system, during the February workshop.

Historic diversions to Los Angeles amounted to between 80,000 and 100,000 acre-feet, and more, of the basin's water annually. Beginning in 1995, that was cut to between 4,500 and 16,000 acre-feet annually. Mono advocates say that's still too much.

The state water board has remained tight-lipped about how it may respond to the demands from Mono Lake's advocates. Samuel Boland-Brien, a supervising engineer with the board, said the agency plans to hold a hearing, though he couldn't say when, to discuss options for recovering Mono Lake.

Its surface elevation is currently around 6,380 feet, and in the past 30 years it has never risen much past 6,385 — still seven feet below a target recovery level of 6,392 feet, established in 1994.

"The need to reach that level isn't optional," Boland-Brien said.

While existing rules on Mono Lake diversions are designed to manage the basin's ecosystem – broadly categorized as public trust resources – they don't take into account the needs of the basin's indigenous residents, namely the Kutzadika'a tribe.

Dean Tonenna, a Kutzadika'a botanist, said his people were left out of the 1990s negotiations that led to the existing diversion rules. "The tribe has not been meaningfully engaged in any of the discussions or workshops that led to the decision," Tonenna said.

He said "a racist legacy" led to the lowering of the lake and still compromises his people's connection to the ecosystem. Now, he and other local tribal members want their interests considered.

“That’s the funny thing — it’s such a drop in the bucket. I think the department recognizes they don’t need the water, but they just keep it because they have a right to it.”

BRUZE REZNIK, EXECUTIVE DIRECTOR OF THE ENVIRONMENTAL GROUP LOS ANGELES WATERKEEPER

Brian Gray, a senior fellow and water law expert with the nonprofit Public Policy Institute of California, said the dilemma over how to restore Mono Lake could prompt a review of the historical decisions that gave Los Angeles ownership of a share of the basin’s water. If state officials conclude that the basin would benefit from having more water, he said, the water board “would have an obligation to reconsider its water rights decision, and specifically address the question of whether Los Angeles should be cut back, partially or completely.”

The lake’s defenders insist this would have almost no impact on the city’s water supply. The city’s 2023 Mono Lake diversions will amount to about 1% of the district’s annual water use.

Sean Bothwell, executive director of the California Coastkeeper Alliance, said opportunities for water recycling and stormwater capture, as well as simply using less water in the first place, could more than make up for the relatively small amount of water the city draws from the Mono Lake basin.

“The Department of Water and Power really does not rely on this lake … so why continue to destroy Mono Lake when they have these other options available?” he said.

Boland-Brien noted that the 1994 decision called for “a hearing” if the target lake level wasn’t reached by 2014. When that time came, the lake was 12 feet below the intended level, and dropping, for a severe drought had begun. Lake advocates agreed to give it more time.

Now, nine years later, the lake level is about the same as it was then, but there is still no firm date — or even an approximate one – for when that overdue hearing will occur.

“That’s where a lot of the focus is now – when will that hearing be scheduled, and what will be determined in terms of whether additional actions are necessary?” Boland-Brien said.

The legacy of Mono Lake

For decades, essentially the sky was the limit on exporting Mono basin water to Los Angeles. The legal cap, written into the city’s water rights, was 167,800 acre-feet per year, with no considerations for the environment or local users. Exports ranged as high as 156,000 acre-feet — a peak recorded in 1978 — and in the 1970s and 1980s, exports averaged more than 80,000 acre-feet annually.

This rate of diversion put the lake on pace to eventually disappear — a fate met long ago by Owens Lake, 125 miles to the south of Mono and sucked dry by the same aqueduct system. By the 1980s, Mono Lake’s surface had plunged 45 feet. Half the lake’s volume

was sacrificed for Los Angeles taps, toilets, lawns and pools, and its salinity level doubled, according to the Mono Lake Committee.

Bottom of Form

A landmark lawsuit challenged the city's diversions in 1979, and a court injunction halted exports in 1990. After weeks of hearings in 1993 and 1994, the state water board ordered the city's water department to reduce its diversions to a maximum of 16,000 acre-feet — deemed a sustainable level. The goal was to draw the lake over 20 years back to the target of 6,392 feet. Officials determined that this would protect native shrimp, flies, birds and geologic features, while preventing lakebed dust from endangering local communities.

The new rules included some key triggers: at a lake level below 6,380 feet, diversions are cut by 72%, and below 6,377 feet, diversions are banned.

But in the past 29 years, the lake level has only partially recovered.

"We've given it almost 30 years with the rules they established in 1994, and it hasn't worked," said Martha Davis, a board member of the Mono Lake Committee.

At the L.A. water department, Adam Perez, the Los Angeles Aqueduct manager, said "the lake level at Mono Lake continues to trend upwards."

Long-term lake level records, however, don't reflect this. The surface elevation has surged several times in the past three decades, usually in the year or so following wet periods. Each time, however, its surface level has dropped again — apparently a consequence of ramping diversions up to 16,000 acre-feet when the lake swells past 6,380 feet. Climate change is not helping either, causing decreased precipitation in the region and increased evaporation from streams and the lake itself.

McQuilkin said this rise-then-fall pattern will continue unless the water board steps in.

"Are we going to watch levels go up and then watch the lake drop again like it did in 2017?" McQuilkin said.

To L.A. water managers, the lake elevation is secondary. What matters, Collins explained at the February hearing, is that the basin's resources are sufficiently protected. Salinity levels, though variable with the lake's volume, have remained for decades within the acceptable range for the lake's invertebrate life, Collins said. He also pointed out that the land bridge that can form during low water periods, making nesting birds especially vulnerable to coyotes, has not fully emerged for many years.

"There is no emergency condition at Mono Lake," Collins said.

He added that the four main creeks that enter the lake "have been restored and are being protected," fish populations in these creeks are thriving and waterfowl habitat has been enhanced.

But Boland-Brien, at the water board, said achieving the 6,392-foot level is a clear mandate.

Tonenna, with the Kutzadika'a tribe, said proposed solutions to protect gulls nesting on the lake's islands from coyotes and prevent dust from lifting off the exposed lakebed — respectively, electric fences and sprinkler systems — are expensive and unworkable.

"All of this can be solved by putting water back into the lake," Tonenna said. "That's the most cost-effective way."

Why L.A. clings to this trickler

L.A.'s Department of Water and Power serves more than 4 million people. Its water comes from a variety of sources: As of 2020-21, about 41% was water purchased from Metropolitan Water District, which draws most of its water from the Sacramento-San Joaquin Delta and the Colorado River; 48% came from the Eastern Sierra, mostly the Owens Valley; 9% was pumped from local aquifers; and 2% was recycled water. In recent years, the Department of Water and Power's surface water diversions from the Mono Basin have amounted to between 1 and 3.5% of its total supplies.

There is momentum to restructure the city's water sources, with plans to greatly expand water recycling and stormwater capture programs, while continuing to improve on water conservation – already an area of deserved bragging rights for Los Angeles: In spite of a 25% increase in population since the 1980s, the city now uses almost 30% less water.

In 2019 former Los Angeles mayor Eric Garcetti set a goal of recycling 100% of the city's wastewater by 2035 — part of a broader plan to acquire 50% of the city's water from local sources by the same year. His vision aligns with that of Gov. Gavin Newsom, whose water strategy plan, released last summer, endorsed more water recycling, capturing stormwater and using less.

The progress prompts many to question why Los Angeles clings so tightly to the trickle it receives from the Mono basin.

"That's the funny thing — it's such a drop in the bucket," said Bruze Reznik, executive director of the environmental group Los Angeles Waterkeeper. "I think the department recognizes they don't need the water, but they just keep it because they have a right to it."

Gray suggested a practical reason Los Angeles isn't letting go: An appropriative water right holder who fails to put its water to beneficial use for five consecutive years can lose its water right permanently.

"By diverting this small amount now, they're protecting their entire water rights," he said.

The Natural Resources Defense Council's Mark Gold, who has been involved in the Mono Lake dispute since the 1990s, pointed out that Mono basin's water "is the cleanest water in the city by far" and said "it's also carbon-free, because it's 100 percent gravity fed once it's in the aqueduct."

Perez at the city's water department said by email that purchasing the water currently diverted from the Mono basin from elsewhere would cost $44 million per year. And increasing reliance on other sources, he added, would just transfer impacts to other watersheds, "resulting in increased environmental pressure on those already-strained systems" of the Delta and the Colorado River.

"Imported supplies remain a vital source of the City's water resources," he wrote, "especially in consideration of the unpredictability and the unprecedented climate variability we continue to see in the desert southwest."

But environmentalists say there are better options. Andy Lipkis, the founder of the urban greening organization Tree People, told the water board at the February workshop that Los Angeles has a wealth of untapped opportunities to capture local rainwater and runoff, far beyond what Mono Lake provides.

"It's entirely possible for Los Angeles to conserve and capture well over the 4,500 acre-feet of water that the (water department) states it needs," he said.

Wastewater treatment facilities could create a torrent of recirculated water. Reznik said Los Angeles could be treating and pumping back into its supply system more than 300,000 acre-feet per year within two decades.

"Imported supplies remain a vital source of the City's water resources, especially in consideration of the unpredictability and the unprecedented climate variability we continue to see in the desert southwest."

ADAM PEREZ, LOS ANGELES AQUEDUCT MANAGER

Planned projects include Operation Next, sometimes referred to as Hyperion 2035, and a collaboration between the Metropolitan Water District of Southern California and the Los Angeles County Sanitation Districts, each of which aims to treat and reuse more than 150,000 acre-feet of water annually that is currently discharged into the ocean.

A window of opportunity for further developing California's water recycling programs will open wide later this year, when a new law takes effect requiring the state water board to adopt statewide rules on implementing direct potable reuse systems — considered the gold standard in water recycling.

Conservation is certainly the cheapest approach to reducing exports from impacted watersheds. Each resident of Los Angeles uses, on average, 70 to 80 gallons of water daily in and around the home.

"If every Angeleno could just drop one gallon, we'd get that 4 million gallons" diverted daily on average from Mono Lake, Reznik said, adding that even a 10-gallon per person reduction in daily use "is not a crazy number. There are places in the world doing 40, 50 gallons per day."

But to detach itself from its Mono basin water prematurely could be a risky gamble for Los Angeles, said Charley Wilson, executive director and CEO of the Southern California Water Coalition. He said that in water supply management, unlike the energy sector, there is little room for error or failure.

"You can't make a mistake — you can't go through rotating outages with water," he said. "You have to have the alternatives fully in place before you start eliminating or closing out these historic, embedded infrastructure projects."

Water rights and righting wrongs

The city of Los Angeles defends its diversions from the Mono basin as though it has a right to take the water — which legally it does.

But water rights are not permanent fixtures of California law. They can be modified and, in extreme cases, revoked, if the water board determines such action is needed "to prevent waste, to ensure the reasonable and beneficial use of the available water, and to protect the public trust," Gray explained.

Already, the Los Angeles water department's capacity to exercise its water rights has been greatly diminished, with diversions limited to about 10% of historical levels. The question now is whether, and to what extent, the water board will further cut the city's privileges.

Perez said reduced diversions would compromise "the basic human right to water for the residents of Los Angeles."

But such equity considerations were not made of people living in the Mono basin in the 1940s.

"Since the day that settlers first came to our areas, we've been pushed off our lands, we've been robbed of our water," Tonenna said.

The state water board is now developing its Racial Equity Action Plan, which among other things considers "tribal beneficial uses and cultural resources, and related ecosystems when developing, implementing, and enforcing instream flow requirements."

"The board has committed itself to evaluate the water rights system because of the effects of historical and systemic racism that effectively precluded a number of groups from ever obtaining water rights, or that actually stripped certain groups of their ancestral aboriginal water rights," Gray said.

Jeffrey Mount, a water supply expert at the Public Policy Institute of California, is among the many who think Los Angeles could painlessly give up Mono Lake's water. He envisions an arrangement by which Los Angeles sells its water rights to a non-governmental organization better situated to steward the ecosystem. The lake could be managed back to something resembling its natural state. Equity and ecological issues associated with diversions would evaporate, while in times of plenty water could be offered to Los Angeles at market rates.

"You operate the facility with the environment as the priority objective, selling surplus water when you have it to fund improving the environment," Mount said.

Davis, with the Mono Lake Committee, would like to see a similar priority swap, with the lake basin's needs coming before those of Los Angeles. She said Mono Lake's plight reflects a statewide problem that ecosystems are often maintained at barely viable

levels, which makes them especially vulnerable to drought and other climate change impacts.

“Imagine if Mono Lake had been at 6,392 at the beginning of this drought,” she said. “If the lake is higher, then there is more flexibility for the lake to drop and not have all the ecological problems that we’re seeing. But we’re managing our ecosystems at the bottom.”

Original Article: CalMatters by Alastair Bland

How California’s record snowpack plays a part in wildfire season

A wet winter brought record snowpack to California, alleviating drought conditions in many parts of the state. But even that blessing for parched landscapes comes with its costs. Officials throughout the state have prepared for what comes in a wet season’s aftermath, like excess snowmelt flooding rivers.

Another hazard that still lies ahead is peak wildfire season. CapRadio’s Manola Secaira spoke to Zack Steel, a research scientist who has studied changing wildfire patterns in California. While last winter’s heavy rains and snowfall boosted the state’s water resources, Steel said it could also play a part in how and where wildfires manifest this year.

This interview has been edited for length and clarity.

Interview highlights

What did fire historically look like in California forests? And what’s changing now?

The first thing to understand with a lot of the ecosystems in California, in the West overall, is that these are ecosystems that are really built to burn. There was a lot of fire in these areas historically.

If we look back, prior to European colonization, there was a lot of Indigenous fire management on the landscape. There's a lot of lightning ignitions. And so the way that the vegetation and the ecological communities more broadly were structured is really around frequent, but low-intensity, fires.

What we're seeing now is … highlighted by a couple of big changes in the last couple hundred years. One is how we've been managing these forests — putting out those small, low-intensity fires [via fire suppression] and then we're also layering, on top of this, climate change. That leads to some of the big, severe fires that we're seeing now, which were historically uncommon and really not what these ecosystems are adapted to.

So, it’s the intensity of wildfires that’s changing and not an increase in the number of them?

On any given year over the last few decades, we've actually had a lot less fire [in recent decades] than we thought we used to on an average year, you know, 200 years ago.

2020, I think, was the first year that we actually kind of reached that historic average, and we had a lot of fire that year. But the problem is the type of fire that we're seeing

now tends to be more severe. You have larger patches of complete or nearly complete mortality of the vegetation and this is occurring near human communities.

The cycling between multiple drought years and an occasional wet winter, like the one we just saw, isn't out of the ordinary. But many researchers I've spoken to have told me the extremes are becoming more extreme. Can you tell me how this relates to wildfires?

There is a lot of interannual variation from one year to the next of drought and wet years, like we've seen in the last few years. That's intensifying because of climate change. But climate change also influences how the ecosystems respond to these disturbances, both drought and wildfire.

So if you have a couple of really dry years like we've recently experienced, then your forests are going to be stressed. You're going to start to see conifer mortality or other trees dying on the landscape due to a combination of drought and beetle attack. So when the fire does come through, you have a lot of dead material, fuels, which tend to dry out faster and burn hotter. That can contribute to the next fire.

And so there is an interaction of these different disturbances. That kind of goes back to this dual problem of global warming events that's amplifying the underlying problem, but also the overly dense forests that we have in a lot of places where we have excluded fire and so when you have a dense forest, it's more susceptible to both drought and to wildfire and eventually, the combination.

It's easy to understand how drought conditions feed a fire. But what does a wet winter mean for peak wildfire season?

All the rain and the snow certainly helps a lot. But the way that's going to play out will likely vary a lot by the ecosystem type that we're focused on. In that higher elevation Conifer forest, which is where I do most of my work, you're going to have snow in those systems for a while. It's going to remain wet and not susceptible to fire for a longer part of the season, so the fire season is going to be shorter.

But lower elevations where you don't have the snowpack, it's going to dry out sooner. There's less of that truncation of the fire season.

The other part is that when you have these wet winters, you get this pulse of vegetation growth. Think of the weeds in your yard — they really took off this year. Once those dry out and kind of get cured as the summer goes on, that's a lot of fuel that's ready to burn. So, we are still going to have a fire risk later in the season. It's just going to be, probably, delayed and come in a different form. Where we're likely to see these fires might be a little different than we have in past years.

It sounds like there are some predictions we can make based on this past winter, but it's not set in stone.

It's difficult to predict where and how much fire we're going to see — other than the fact that California's going to burn again. It's part of the system.

US WATER NEWS

Judge says fire retardant drops are polluting streams but allows use to continue

The U.S. government can keep using chemical retardant dropped from aircraft to fight wildfires, despite finding that the practice pollutes streams in western states in violation of federal law, a judge ruled Friday.

Halting the use of the red slurry material could have resulted in greater environmental damage from wildfires, said U.S. District Judge Dana Christensen in Missoula, Montana.

The judge agreed with U.S. Forest Service officials who said dropping retardant into areas with waterways was sometimes necessary to protect lives and property.

The ruling came after came after environmentalists sued following revelations that the Forest Service dropped retardant into waterways hundreds of times over the past decade.

Government officials say chemical fire retardant can be crucial to slowing the advance of dangerous blazes. Wildfires across North America have grown bigger and more destructive over the past two decades as climate change warms the planet.

More than 200 loads of retardant got into waterways over the past decade. Federal officials say those situations usually occurred by mistake and in less than 1% of the thousands of loads annually.

A coalition that includes Paradise, California - where a 2018 blaze killed 85 people and destroyed the town - had said a court ruling that stopped the use of retardant would have put lives, homes and forests at risk.

"This case was very personal for us," Paradise Mayor Greg Bolin said. "Our brave firefighters need every tool in the toolbox to protect human lives and property against wildfires, and today's ruling ensures we have a fighting chance this fire season."

State and local agencies lean heavily on the U.S. Forest Service to help fight fires, many of which originate or include federal land.

Fire retardant is a specialized mixture of water and chemicals including inorganic fertilizers or salts. It's designed to alter the way fire burns, making blazes less intense and slowing their advance.

That can give firefighters time to steer flames away from inhabited areas and in extreme situations to evacuate people from danger.

"Retardant lasts and even works if it's dry," said Scott Upton, a former region chief and air attack group supervisor for California's state fire agency. "Water is only so good because it dries out. It does very well to suppress fires, but it won't last."

The Oregon-based group Forest Service Employees for Environmental Ethics argued in its lawsuit filed last year that the Forest Service was disregarding the Act by continuing to use retardant without taking adequate precautions to protect streams and rivers.

Christensen said stopping the use of fire retardant would "conceivably result in greater harm from wildfires - including to human life and property and to the environment." The judge said his ruling was limited to 10 western states where members of the plaintiff's group alleged harm from pollution into waterways that they use.

After the lawsuit was filed the Forest Service applied to the Environmental Protection Agency for a permit that would allow it to continue using retardant without breaking the law. The process could take several years.

Such a permit could require tighter restrictions on when retardant could be used or for officials to use less-toxic chemicals, said Andy Stahl with Forest Service Employees for Environmental Ethics.

"It's certainly a good first step," Stahl said.

Christensen ordered federal officials to report every six months on their progress.

Forest Service spokesperson Wade Muehlhof said the agency believes retardant can be used "without compromising public health and the environment."

"The Forest Service is working diligently with the Environmental Protection Agency on a general permit for aerially delivered retardant that will allow us to continue using wildfire retardant to protect homes and communities," Muehlhof said.

Climate change, people moving into fire-prone areas, and overgrown forests are creating more catastrophic megafires that are harder to fight.

Almost 150 million gallons (567 million liters) of fire retardant were dropped on National Forest lands between 2013 and 2022, according to the Department of Agriculture. Retardant drops onto forests in California accounted for 49% of the total volume.

Health risks to firefighters or other people who come into contact with fire retardant are considered low, according to a 2021 risk assessment.

But the chemicals can be harmful to some fish, frogs, crustaceans and other aquatic species. A government study found misapplied retardant could adversely affect dozens of imperiled species, including crawfish, spotted owls and fish such as shiners and suckers.

Forest Service officials said they are trying to come into compliance with the law by getting a pollution permit but that could take years.

To keep streams from getting polluted, officials in recent years have avoided drops inside buffer zones within 300 feet (92 meters) of waterways. Retardant may only be

applied inside those zones when human life or public safety is threatened. Of 213 instances of fire retardant landing in water between 2012 and 2019, 190 were accidents and the remainder were necessary to save lives or property, officials said.
Many areas of the Western U.S. experienced heavy snowfalls this past winter, and as a result fire dangers are lower than in recent years across much of the region.
Original Article: abc 7/ AP

As Water Levels Drop, the Risk of Arsenic Rises

When John Mestas' ancestors moved to Colorado over 100 years ago to raise sheep in the San Luis Valley, they "hit paradise," he said.
"There was so much water, they thought it would never end," Mestas said of the agricultural region at the headwaters of the Rio Grande.
Now decades of climate change-driven drought, combined with the overpumping of aquifers, is making the valley desperately dry — and appears to be intensifying the levels of heavy metals in drinking water.
Like a third of people who live in this high alpine desert, Mestas relies on a private well that draws from an aquifer for drinking water. And, like many farmers there, he taps an aquifer to water the alfalfa that feeds his 550 cows.
"Water is everything here," he said.
Mestas, 71, is now one of the hundreds of well owners participating in a study that tackles the question: How does drought affect not just the quantity, but the quality, of water?
The study, led by Kathy James, an associate professor at the Colorado School of Public Health, focuses on arsenic in private drinking wells. Arsenic, a carcinogen that occurs naturally in soil, has been appearing in rising levels in drinking water in the valley, she said. In California, Mexico, and Vietnam, research has linked rising arsenic levels in groundwater to drought and the overpumping of aquifers.
Top of Form
Bottom of Form
As the West grapples with a megadrought that has lasted more than two decades, and states risk cutbacks in water from the shrinking Colorado River, the San Luis Valley offers clues to what the future may hold.
Nationwide, about 40 million people rely on domestic wells, estimated Melissa Lombard, a research hydrologist for the U.S. Geological Survey. Nevada, Arizona, and Maine have the highest percentage of domestic well users — ranging from about a quarter to a fifth of well users — using water with elevated arsenic levels, she found in a separate study.

During drought, the number of people in the contiguous U.S. exposed to elevated arsenic from domestic wells may rise from about 2.7 million to 4.1 million, Lombard estimated, using statistical models.

Arsenic has been shown to affect health across the human life span, beginning with sperm and eggs, James said. Even a small exposure, added up over the course of a person's life, is enough to cause health problems, she said.

In a previous study in the valley, James found that lifetime exposure to low levels of inorganic arsenic in drinking water, between 10 and 100 micrograms per liter, or µg/L, was linked to a higher risk of coronary heart disease. Other research has tied chronic exposure to low-level arsenic to hypertension, diabetes, and cancer. Pregnant women and children are at greater risk for harm.

The World Health Organization sets the recommended limit on arsenic in drinking water at 10 µg/L, which is also the U.S. standard for public water supplies. But research has shown that, even at 5 µg/L, arsenic is linked to higher rates of skin lesions.

"I think it's a problem that a lot of people are not aware of," Lombard said. "Climate change is probably going to impact water quality," she said, but more research is needed to understand how and why.

A Hotbed of Hope

The San Luis Valley, which has hosted a wealth of research and innovation, is the ideal place to explore those questions — and potential solutions.

Known for its stunning mountain views and the nearby Great Sand Dunes National Park and Preserve, the valley spans a region roughly the size of Massachusetts, making it North America's largest alpine valley. Rich in Indigenous, Mexican, and Spanish heritage, the valley contains 500,000 acres of irrigated land producing potatoes, alfalfa for hay, and beer barley for Coors. It's home to nearly 50,000 people, many of them farmworkers and about half of them Hispanic. It's also a challenging place to live: Counties here rank among the poorest in the state, and rates of diabetes, kidney disease, and depression run high.

Since it rains very little, about 7 inches a year on average, farmers rely on two large aquifers and the headwaters of the Rio Grande, which continues on to Mexico. Snowmelt from the looming Sangre de Cristo and San Juan mountain ranges recharges the supply each spring. But as the climate warms, there's less snow, and water evaporates more quickly than usual from the ground and crops.

"This entire community, this culture, was built around irrigated agriculture," said state Sen. Cleave Simpson of Alamosa, a Republican and a fourth-generation farmer. But since 2002, the valley's unconfined aquifer has lost 1 million acre-feet of water — or enough to cover 1 million acres of land in water 1 foot deep — due to persistent drought and overuse. Now the communities in the valley face a deadline to replenish the aquifer, or face a state shutdown of hundreds of irrigation wells.

“We’re a decade ahead of what’s happening in the rest of Colorado” because of the intensity of water scarcity, said Simpson, who manages the Rio Grande Water Conservation District.

“This is not drought anymore — this is truly the aridification of the West,” Simpson said. That’s how scientists are describing a long-term trend toward persistent dryness that can be stopped only by addressing human-caused climate change.

James, who is an epidemiologist and engineer, has been studying links between climate and health in the valley for the past 15 years. She found that during dust storms in the San Luis Valley, which have been growing more frequent, more people visit the hospital for asthma attacks. And she has surveyed farmworkers on how drought is affecting their mental health.

In the domestic well study, James is focusing on arsenic, which she said has been gradually increasing in valley drinking wells over the past 50 years. Arsenic levels in San Luis Valley groundwater are “markedly higher than [in] many other areas of the U.S.,” according to James. She is also investigating ethnic disparities, as one study there showed Hispanic adults had higher levels of arsenic in their urine than non-Hispanic white adults did. (Hispanic people can be of any race or combination of races.)

James now aims to test 1,000 private wells in the valley to explore the connections between drought, water quality, and health. So far, she said, a small proportion of wells show elevated levels of heavy metals, including arsenic, uranium, tungsten, and manganese, which occur naturally in the soil. Unlike public water supplies, private domestic wells are not regulated, and they may go untested for years. James is offering participants free water testing and consultation on the results.

In Conejos County, John Mestas’ daughter, Angie Mestas, jumped at the chance for a free test, which would cost $195 at a local lab. Angie, a 35-year-old schoolteacher, said she used a lifetime of savings to drill a drinking well on her plot of land, a wide-open field of chamisa with sweeping views of the San Luis Hills. But she won’t drink from it until she tests for arsenic and E. coli, which are common in the area. As she awaits test results, she has been hauling 5-gallon jugs of water from her father’s house each time she spends the weekend at her newly constructed yurt.

A Colorless, Odorless Threat

Meanwhile, Julie Zahringer, whose family settled in the valley from Spain nearly 400 years ago, has been watching water-quality trends firsthand. Zahringer, 47, grew up driving a tractor on her grandfather’s ranch near San Luis, Colorado’s oldest town — and hanging out in the lab with her mother, a scientist.

As a chemist and laboratory director of SDC Laboratory in Alamosa, Zahringer tests private and public drinking water in the valley. She estimated that 25% of the private wells tested by her lab show elevated arsenic.

“It’s colorless, it’s odorless,” Zahringer said. “Most families don’t know if they’re drinking arsenic.”

To Zahringer, the link to climate seems clear: During dry periods, a well that usually hovers around 10 µg/L of arsenic may easily double or triple in concentration, she said. One possible reason is that there's less water to dilute the natural contaminants in the soil, though other factors are at play. The arsenic levels used to be fairly stable, she said, but after 20 years of drought, they're fluctuating wildly.

"Now, more and more rapidly, I'm seeing the same well that I just tested three years ago — it doesn't even look like the same well" because levels of contaminants have risen so much, said Zahringer, who also serves as a member of the Colorado Water Quality Control Commission. At her own drinking well, the arsenic level jumped from 13 to 20 µg/L this year, she said.

Zahringer's observations are important firsthand anecdotes. James aims to explore, in a rigorous scientific study with a representative sample of wells and extensive geochemical data, the prevalence of arsenic and its connection to drought.

Research is still in the early stages, but scientists have several hypotheses for how drought could affect arsenic in drinking water.

In the San Joaquin Valley, a major agricultural hub in California, research led by hydrologist Ryan Smith linked rising arsenic in groundwater to "land subsidence," a phenomenon first documented in Vietnam.

Land subsidence — when the ground sinks due to aquifer overpumping — appears to release arsenic from the clay into the water, said Smith, an assistant professor at Colorado State University. In California, the overpumping was strongly correlated to drought, he said.

However, other factors, such as how deep a well is, also play a role: Another study of the same California aquifer system found that while arsenic increased in deeper groundwater, it decreased in shallower water due in part to oxidation.

Smith is now working with James in the San Luis Valley study, where he hopes a wealth of geochemical data will offer more answers.

Meanwhile, community leaders in the valley are adapting in impressive and innovative ways, James said.

Zahringer said if arsenic shows up in a private well, she encourages clients to install reverse osmosis water filtration at the kitchen sink. The equipment costs about $300 from an outside supplier, though filters costing less than $50 may need to be changed every six to 18 months, she said. People who treat their water for arsenic should continue to test every six months to make sure the filters are effective, said Zahringer. SDC Laboratory offers an arsenic test for $25.

"People don't want to test their water because it tastes good and their grandpa drank it," she said. But "the cure for it is so easy."

Original Article: Inside Climate News by Melissa Bailey

Every drop of the Colorado River counts. So what about evaporation?

For more than a hundred years, California, Arizona, and Nevada never accounted for evaporation on the lower basin of the Colorado River as they divided its water between themselves and later with Mexico. Their logic held that as long as there was more water than people used, they could ignore small losses from natural processes. More importantly, it was politically fraught—for decades, the lower basin states have been unable to reach an agreement about how evaporation should be taken into account when sharing the river's waters. Even as a 23-year-long megadrought sucked moisture out of the already arid region, evaporation stayed off the books with decision making.

But now, as water managers scramble to find a solution to a river that's been overused, mostly for irrigation-heavy crops like livestock feed, they're forced into a harsh reality: every drop counts, including those that disappear into the air.

In August 2022, the Biden administration ordered California, Arizona, and Nevada to cut their annual allotments from the river by significant amounts. Last month, the White House released a plan outlining two options, which would reduce the states' use of the river by as much as one quarter: evenly split reductions on the lower basin, which divides the river's flow from the tip of Arizona down to northern Mexico, between the three states, or make reductions based on senior water rights, which means fewer cuts for California. On May 22, after much politicking, the states proposed an alternative deal that pledges to use 13 percent less water from the river overall. But it's still unclear if and how the proposed plan accounts for evaporation.



The lower basin of the Colorado River stretches west from the northern border of Arizona, down to Mexico. USGS

How much water is evaporating from the lower basin of the Colorado River?

One way to measure how much water dries up in the system each year is by looking at the evaporation losses on Lake Mead and Lake Powell, the nation's two largest reservoirs, located in Nevada and Arizona and Utah and Arizona, respectively. About 1.9 million acre-feet or 13 percent of the water from the reservoirs across the entire river is lost to evaporation each year, says Jack Schmidt, director of the Center for Colorado River Studies at Utah State University.

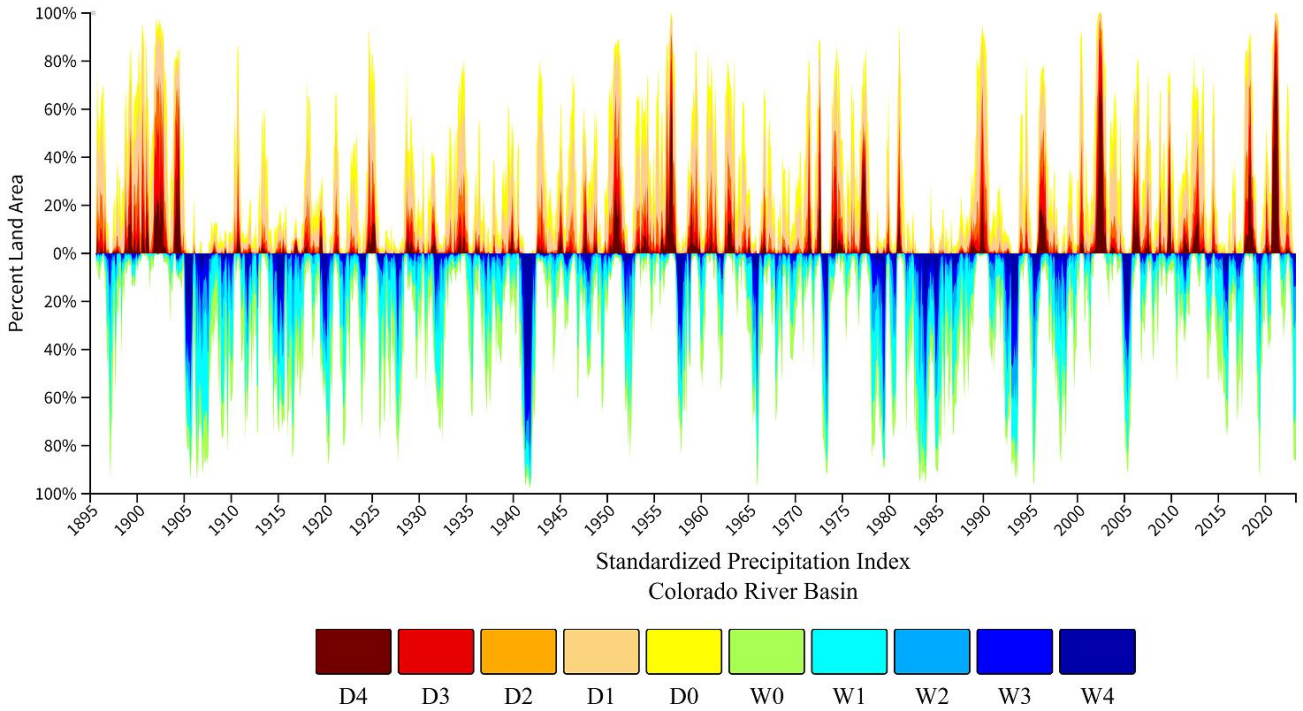
In particular, the lower basin (which includes Lakes Mead, Mohave, Havasu, and a few smaller mainstream reservoirs) lost an average of 906,000 acre-feet of water per year to evaporation from 2016 to 2020, according to Schmidt, who cites data from the Bureau of Reclamation. To put that number into context, Nevada can legally use about 300,000 acre-feet per year with the existing deal. "The evaporation of water in the lower basin is equal to three Nevadas. Some people would say that's a big number," Schmidt says. Other estimates put the amount of water lost to evaporation even higher at about 1.5 million acre-feet per year, or about five Nevadas.

But the overall amount of water that evaporates hasn't actually changed that much in the past decade. That's because there's just less water in the reservoirs, which means there's less water to lose," according to Katherine Earp, a hydrologist for the Nevada Water Science Center. At the same time, she adds, as the reservoirs become shallower, the water becomes warmer, and evaporation increases slightly.

[Related: See inside Glen Canyon Dam as Lake Powell levels drop]

Evaporation occurs when energy, usually in the form of heat, turns a liquid into gas. In this case, sunlight heats up water from the reservoirs and transforms it into water vapor. While the process seems straightforward, many factors affect how much evaporation occurs on the reservoirs. "It's the sun; it's dry winds sweeping across the reservoirs; it's whether or not it's cloudy," Schmidt says. "It's all about the heat and the relative humidity of the air over the reservoir." A warming climate can accelerate those drivers as well, he says.

Earp cautions that scientists don't know how much climate change and evaporation will cut into water held in the lower basin. She says there are two factors that could see direct impacts: the reservoirs' temperature and depth. "Those are changing as the [lakes along the Colorado River] are changing," she says. "Most of the evaporation is being done right at the surface with the wind. So that's not changing. We've always had a big hot desert—we will continue to have a big hot desert."



The Standardized Precipitation Index (SPI) measures water supply, specifically precipitation. SPI captures how observed precipitation (rain, hail, snow) deviates from the climatological average over a given time period—in this case, over the 9 months leading up to the selected date. Red hues indicate drier conditions, while blue hues indicate wetter conditions. Data are available monthly from 1895–present. US Drought Monitor

What can states in the Colorado River deal do to fight evaporation?

Even if the states took immediate action to prevent evaporation on the Colorado River, it wouldn't be simple. The reservoirs are too big for quick fixes. "People put covers on their swimming pools and hot tubs," Schmidt says. "You're not going to do any of that on Lake Powell and Lake Mead—these are reservoirs are more than 100 miles long." Instead, he outlines two potential solutions: consolidating water from the two major reservoirs into one or pumping some of the water underground.

Schmidt did the math behind the first option. In a white paper published in 2016, he examined how much water might be saved if the lower basin states fill Lake Mead and put any remaining water into Lake Powell. "Right now we manage the system to equalize the storage contents in Lake Mead and Lake Powell, and so we sort of maximize the surface area exposed to the sun," he says. But he found the savings would be minimal, about 50,000 acre-feet of water across the two reservoirs, and says it should be used as a second-tier strategy.

[Related: Solar panels and water canals could form a real power couple in California]

In the second option, water from the reservoirs would slowly be cached underground. Arizona and California already store some water underground in recharge basins with

the intention to put water back into local aquifers. But there's a risk of not being able to track and recover all of the water that seeps back into the ground. Still, Schmidt says recharge basins might be a good option if evaporation gets worse. "It's a technique trusted by water managers," Schmidt says. "Yes, it's uncertain. But those uncertainties do not concern people enough that they don't do it."

Earp says the subterranean-storage strategy might be difficult in southern Nevada, where the geology can't store such large volumes of water. "When users can't use all the water, they do store excess in smaller orders in Arizona and Las Vegas. But doing the whole lake is a much bigger scale thing," she says. "I don't know if it would work."

Both Earp and Schmidt agree that evaporation will keep playing a role in negotiations over the lower basin. "The most fundamental attribute of the river is it's fully tapped out," Schmidt says. "When the natural flow of the river system declines, and you begin to account for everything (because you must), then evaporation is a significant process. And somebody's got to account for it."

Original Article: Popsci by Zayna Syed

$1.5M grant will help remove 'high-hazard' dam from downtown Flint

With $1.5 million awarded through Michigan's Dam Risk Reduction Grant Program (DRRGP), Genesee County Parks and Recreation soon will begin removing the last crumbling remnants of the concrete dam and restoring the river channel with five natural rock riffles so fish can pass through unimpeded. Kayakers, too.

"This grant will make a substantial impact by restoring the natural flow of the Flint River, improving fish habitat, and creating new recreational opportunities for the residents of Flint and surrounding communities," said Barry June, director of the Genesee County Parks and Recreation Commission (GCPRC). "The project will reconnect Lake Huron to the Flint River above Hamilton Dam for the first time in 100 years and support spawning runs of lake sturgeon and walleye, as well as allowing recreational navigation of the river."

In all, the state grant program awarded $15.3 million to improve safety at 16 Michigan dam sites (locations listed below). A separate $855,650 federal grant announced in April 2022 – funded through the Bipartisan Infrastructure Law and managed by the GCPRC – will also help fund the Hamilton Dam removal as part of the ongoing Flint River Restoration Project.

Built in 1920, Hamilton Dam has a history that spans lumber milling, providing a water source for local industry, and regulating the river's flow. In the 1960s, it became the upstream anchor point for an extensive downtown flood control project. But the structure deteriorated over time, with engineers warning since the late 1980s of the dam's potential failure. The then-Michigan Department of Natural Resources and Environment ultimately assigned it a "high hazard potential" rating and an "unsatisfactory" condition assessment and mandated its replacement.

"High hazard would be significant environmental, economic, or flooding impacts," said Luke Trumble, supervisor for the Dam Safety Unit at the Michigan Department of Environment, Great Lakes, and Energy (EGLE).

In 2018, the dam's failing upper structure and floodgates were removed, leaving water to flow over a low-stepped concrete wall, or weir. It remains classified as a high-hazard dam, with sinkholes, seepage, settling concrete, and age-related deterioration. Its demolition will remove a barrier keeping fish from 25 miles of the river – including five miles of habitat for lake sturgeon, a fish the Michigan Department of Natural Resources is working to rehabilitate. Accompanying restoration will enhance the instream habitat and return the river to more natural conditions. The work is expected to take several years.

"Removal of the weir will enhance lake sturgeon restoration efforts in both the Flint and Saginaw river watersheds by creating additional rearing habitat for juvenile lake sturgeon above the barrier and spawning habitat for returning adults," U.S. Fish and Wildlife Service project leader Scott Koproski told the University of Michigan-Flint, whose campus hugs the Flint River above and below the dam.

The Michigan Legislature authorized the DRRGP last year. Administered through EGLE, it aims to supply private owners with resources for proper management of existing dams and reduce the overall risk of dam failure in Michigan.

In addition to Hamilton Dam, DRRGP funding will support dam safety projects in Albion, Alger, Baldwin, Brooklyn, Clarkston, Holly, Manchester, Marquette, Republic, Rose City, Saline, Tecumseh, White Cloud, and Ypsilanti.

Additional funding opportunities for dam risk reduction will be announced publicly when they are ready for applicants.

Original Article: Michigan.gov

'Unprecedented snowpack': Nevada flooding leads to state of emergency

Gov. Joe Lombardo declared a state of emergency in northern Nevada on Monday night due to "significant" snowmelt flooding.

Because of an "unprecedented winter snowpack," seasonal water runoff, flooding, mudslides and other issues have hit large sections of northern Nevada. Affected communities include: Churchill, Douglas, Elko, Eureka, Humboldt, Lincoln, Lyon and Storey counties, as well as the Fallon Paiute-Shoshone Tribe and the Walker River Paiute Tribe.

The declaration of emergency will enable the state and impacted communities to receive federal assistance to protect residents, repair damage and mitigate further funding, the governor's office said in a statement Monday night.

Snowmelt projections estimate the area will be impacted by flooding for an additional seven weeks, according to the governor's office. The emergency declaration may be amended to include additional counties in the next few days.

"As snowmelt flooding threatens infrastructure damage to our communities, I urge all residents to follow local guidance, remain alert, and to proactively plan transportation routes," Lombardo said in the statement. "My office will continue to partner with local, state, and federal agencies to provide direction, support, and resources where needed."

Original Article: Las Vegas Review Journal by Jessica Hill

Texas lawmakers agree on billion-dollar plan to expand water supplies, fix infrastructure

Texas lawmakers agreed on a plan to spend a billion dollars on new water projects and repair aging infrastructure to fortify Texas against droughts and keep up with a growing population that has strained the state's water supplies.

Texas Senate and House negotiators finalized language for Senate Bill 28 and Senate Joint Resolution 75 late Saturday night. Together, the bills would earmark $1 billion to upgrade Texas' failing water infrastructure and jumpstart massive water supply projects, from marine desalination to treating "produced water" — water that comes up from the ground during the oil fracking process.

"The truth of the matter is, under today's growth and going forward, we don't have enough [water]," state Sen. Charles Perry, who has spearheaded water policy, told senators during a budget debate Friday. The money for the water plan will be allocated only if the legislation takes effect.

Perry, R-Lubbock, warned senators that the need is probably far larger than $1 billion: Between fixing water infrastructure and increasing the state's water supply, he said, "it's probably a $500 billion price tag."

"We, as a state, have started down the right path, but I want to remind everybody, it's a path that has no end," Perry said. "Our water resources are stretched and will continue to be stretched."

Senate Bill 28 was approved by the full House in a 134-4 vote and in a unanimous Senate vote on Sunday. The bill now heads to Gov. Greg Abbott's desk. If the bill and SJR 75 clear the governor's office, the plan will be put before voters in the fall.

As part of an agreement on how to spend part of the state's historic $32.7 billion cash surplus, lawmakers also allocated $125 million for the state to use to match federal water infrastructure money. The state's matching funds will unlock more than $750 million from the federal Infrastructure Investment and Jobs Act that could be used for a host of projects, such as replacing lead water pipes and removing water contamination from drinking water systems.

Water disruptions are a regular part of life for many Texans. Leaky pipes and old treatment plants stressed by dwindling supply, more demand and extreme weather events prompt frequent alerts to boil water or avoid using it altogether. Droughts lead

to mandatory water usage restrictions — hundreds of utilities asked customers to cut back on water use last summer during the worst drought in a decade.

During the brutal 2021 winter storm that caused nearly statewide power outages, almost 15 million Texans experienced water disruptions, told to either boil their water or refrain from using it at all.

By 2070, the Texas Water Development Board projects a water shortage of between 5 million and 7 million acre-feet during a drought of record if new water sources are not developed, a challenge it has outlined in the State Water Plan. The agency, which largely functions as a bank that provides low-cost loans, plans to fill that gap by financing new water projects.

But the Legislature's $1 billion plan for its new water projects calls for a much more ambitious goal: Lawmakers want another 7 million acre-feet of water by 2033, not 2070. That's more than enough to fill Lake Livingston north of Houston, Amistad Reservoir in South Texas and Sam Rayburn Reservoir in East Texas combined.

The water development board's existing plan relies heavily on building new reservoirs. But Perry, who has led much of the Legislature's water policy, has soured on reservoirs, criticizing the projects as moving too slowly or being unrealistic to make up the state's projected shortage.

Texas' reservoirs have already proven vulnerable to extreme drought, especially as higher temperatures brought by climate change accelerate evaporation rates. Reservoir levels across the state plummeted late last summer, particularly along the Rio Grande. The drought has since eased across much of the state.

In a sort of rebuttal to the board's reservoir plans, lawmakers in the state's budget required the agency to "evaluate the feasibility" of the controversial Marvin Nichols Reservoir, which the board has included in the state's water plan for years as a new water source for the growing Dallas-Fort Worth metroplex. The reservoir has drawn the ire of both local residents whose land would be flooded and environmental conservationists.

Perry has advocated for desalination plants, importing water from other states and treating produced water over building new reservoirs. His version of SB 28 would have limited uses of the New Water Supply for Texas fund to those favored ideas, but the House wanted to also allow the money to be used to pay for things like aquifer storage and treating wastewater for drinking water.

In the end, lawmakers struck a compromise that eliminated language about importing water from other states as well as treating wastewater, but included aquifer storage. At least a quarter of the $1 billion appropriation to water this session will need to go to the newly created supply fund that prioritizes desalination, produced water and aquifer storage projects.

SB 28 also creates the Texas Water Fund, from which the board could fund a wide range of water infrastructure projects that lawmakers hope will fix some of the state's aging

water pipes, particularly in small and rural communities that have historically been left out of bonds for water projects.

While lawmakers directed the agency to prioritize rural and small communities for the money, a House amendment to also prioritize economically disadvantaged communities was dropped in the final version — a huge loss for colonias, small communities primarily on the Texas-Mexico border that lack basic services such as water hookups, sewage and plumbing.

Alex Ortiz, a water resources specialist at the Lone Star Chapter of the Sierra Club, called the decision "blatant environmental racism."

"There's no good reason to have deleted that provision," Ortiz said. "It didn't mandate anything other than [prioritizing] and paying attention to communities of color."

Water lobbyists in the Capitol expect the governor to allow the measures to take effect. If he does, voters will get a final say on the November ballot.

"Come November, it will be very important that Texans remember that their water infrastructure has seen a lot of vulnerabilities, from not having enough water, sometimes having too much water, to aging infrastructure that's breaking," said Sarah Kirkle, the director of policy and legislative affairs for the Texas Water Conservation Association, which represents water professionals. "We have a lot of pressing needs."

The final allocation of $1 billion is less than the $3 billion floated earlier in the session, by which Kirkle said her group is somewhat disappointed. At the same time, she said, they are "very thankful for that investment."

"The water needs in Texas are so large," she said.

Original Article: Longview News Journal by Erin Douglas

GLOBAL WATER NEWS

Iran vs Afghanistan: Why Helmand water-sharing dispute is boiling over, decades after treaty

With Afghanistan and Iran locked in a water dispute, tension between the two neighbours has escalated after two Iranian security personnel and a Taliban fighter were killed in a border clash Saturday.

The dispute is over the Helmand River, a critical source of drinking water, irrigation and fishing for both countries. While the two countries signed a treaty on sharing water resources in 1973, it was never ratified, leaving the Helmand's waters a topic of dispute.

Earlier this month, Iranian President Ebrahim Raisi attacked the Taliban over possible violations of his country's water rights. "We will not allow the rights of our people to be violated," he said. Raisi also urged the Taliban to allow Iranian hydrologists to check the water levels of the river.

In response, the Taliban's foreign minister, Amir Khan Muttaqi, said Iran should not ignore its drought conditions and ought to resolve the issue in "face-to-face talks instead of making noises".

The situation has been on the boil ever since 2021 with the opening of the Kamal Khan Dam in Afghanistan's Chahar Burjak district. While drought-ridden Iran says the dam is an environmental concern, Afghanistan argues that dams will secure water for it in line with the 1973 treaty.

"Afghanistan would no longer give free water to anyone, so Iran should provide fuel to Afghans in exchange for water," then Afghan president Ashraf Ghani had said at the inauguration of the dam.

In July last year, Iranian Foreign Minister Hossein Amirabdollahian spoke to Muttaqi over the telephone and discussed Tehran's rights to the Helmand's water.

What the 1973 Helmand treaty says

The Afghan-Iranian Helmand River Water Treaty of 1973 stipulates that Afghanistan must deliver water to Iran at a rate of 22 cubic metres per second per annum with an additional four cubic metres per second, thereby supplying an annual average of 820 million cubic metres under normal conditions.

The Helmand River originates in the Afghan Hindu Kush mountain range and flows across Afghanistan before it branches just near the border with Iran. It splits into the Shele Charak River that forms the border between the two countries, and the Sistan River which flows westward into Iran.

While the 1973 treaty ensures that Iran has access to the river, according to Article V, Afghanistan has complete ownership of the rest of the water supply.

"Afghanistan shall retain rights to the balance of the water of the Helmand River and may make such use or disposition of the water as it chooses," Article V states, adding that Iran cannot make claims to any excess water, even if it "may be available in the Helmand lower delta and may be put to a beneficial use".

The article says Afghanistan has absolute unilateral rights over the water supply of the river, giving it the authority over agricultural and hydroelectric projects and more. Kabul,

however, must also ensure that the water is not polluted by industrial chemicals and does not become unsuitable for use in agriculture.

Barbs exchanged

On Saturday, Afghanistan's Ministry of National Defense put up a tweet saying that "looking for excuses for war is not in the interest of either side".

According to local Afghan news reports, "the situation is under control" in the conflict zone in Iran's Sistan and Baluchestan province.

"Local Iranian and Afghan officials have held negotiations on the cause of the clashes and agreed to continue their talks," Alireza Marhamati, the deputy provincial governor of Sistan and Baluchestan province, said.

Iran is one of the few countries in the region that have maintained diplomatic relations with Kabul since the Taliban takeover in 2021, retaining its embassy in the country. Tehran, however, has not formally recognised the new Afghan government, though it has decided to engage with the Taliban.

Original Article: The Print by Dishha Bagchi

India monsoon advances after stalling for 11 days

India's monsoon rains advanced into some more parts of southwest Bay of Bengal after stalling for the past 11 days at a far-flung island, weather department said on Tuesday.

The monsoon, the lifeblood of the country's $3 trillion economy, delivers nearly 70% of the rain that India needs to water farms and recharge reservoirs and aquifers.

Nearly half of India's farmland, without any irrigation cover, depends on the annual June-September rains to grow a number of crops.

Monsoon rains arrived over the remote Andaman and Nicobar Islands on May 19, but then didn't make any progress until May 30, the India Meteorological Department (IMD) said.

Monsoon advanced into some parts of southwest Bay of Bengal on Tuesday and conditions are favourable for further advance into more parts of the region during the next 2-3 days, the IMD said.

Rains usually lash mainland Kerala around June 1 and cover the whole country by mid-July. Timely rains trigger planting of crops such as rice, soybeans and cotton.

This year, the onset of the monsoon over Kerala is likely to be slightly delayed. The onset of monsoon rains over the southern Indian state is likely to be on June 4, with a model error of plus/minus 4 days.

Original Article: Reuters by Rajendra Jadhav

Combined impact of climate change, population growth poses serious threat to India's water security: Experts

The combination of climate change and population growth poses a serious threat to India's water security, and without adequate measures to address these challenges,

water scarcity will worsen with social, economic and environmental impacts, experts have warned.

According to the United Nations (UN), India might have already become the most populous country in the world with over 142 crore people. However, the government is yet to conduct a census to give an official figure.

Experts highlighted the urgent need for better water management, policy reforms, and protection of natural ecosystems to address the combined challenge of climate change and population growth on water security.

Climate change further exacerbates the challenges, they said, with rising temperatures, altered precipitation patterns, and sea-level rise intensifying the water scarcity problem.

According to Aditi Mukherjee, an Intergovernmental Panel on Climate Change (IPCC) author, poor water management due to distorted policies and incentives has long plagued India's water situation.

"Climate change aggravates these problems by increasing rainfall variability and extreme weather events," she told PTI.

Mukherjee highlighted the historical impact of water-intensive crops introduced during the green revolution and faulty urban design as contributing factors to India's water woes. Proper policies, institutions, incentives, and governance are necessary to mitigate the water crisis.

The challenges faced by India are not limited to water scarcity.

Rising sea levels and storm surges caused by intensifying tropical cyclones result in saline intrusion in coastal areas, further diminishing freshwater resources, she said.

Preserving mangrove forests and adopting appropriate land-use practices become critical to protect coastal regions as traditional hard infrastructure like sea walls offer only temporary solutions, Mukherjee said.

With 18 per cent of the world's population but only 4 per cent of its water resources, India is among the most water-stressed in the world.

The per capita availability of water will dip from 1,486 cubic metres to 1,367 cubic metrs by 2031, according to the government data.

The situation of water scarcity worsens during summer in the country.

Anjal Prakash, an expert and research director at Bharti Institute of Public Policy, Indian School of Business, also stressed that both climate change and population growth pose significant challenges to water resources in India.

"Rising temperatures accelerate evaporation rates, depleting surface water and groundwater reserves. Altered precipitation patterns lead to unpredictable monsoons, causing floods in some areas and droughts in others. These extreme events reduce water availability, adversely affecting agricultural productivity, water supply, and overall economic stability," he said.

To tackle these issues effectively, a comprehensive approach is required, he added.

"India needs to implement sustainable water management practices, develop policies that promote efficient water use, and protect crucial ecosystems such as mangrove forests. Only through concerted efforts can India secure its water resources for future generations and ensure a resilient and sustainable water future," he said.

According to estimates by the UN, India's population is expected to increase for the next three decades before beginning to decrease.

Ashok Kumar, Director-Farm Prosperity at Transform Rural India, sheds light on the increased burden faced by women and young girls in rural areas due to water scarcity.

"As safe drinking water sources become scarce and are often situated far from dwellings, women and young girls are forced to undertake arduous journeys to fetch water. This situation leads to heightened drudgery and potential health risks as polluted water sources contribute to waterborne diseases. The impact is more severe in hilly and plateau regions due to limited water storage capacity," Kumar said.

He said livestock, a crucial source of income for rural households, faces reduced productivity as a result of water stress.

Insufficient fodder availability, unclean drinking water, and unsanitary conditions increase parasite load and waterborne diseases among animals. Livestock rearers, herders, shepherd families, and inland fishermen who rely on stressed water sources face significant challenges. Conflicts may arise between fishing and farming communities as they compete for access to water, Kumar said.

He further said that unpredictable yields in farming pose a major threat to smallholder farmers heavily reliant on rainfall for crop cultivation.

"The water stress caused by climate change leads to irregular yields, reduced incomes, and a subsequent decline in investment in agriculture. Farmers may resort to unsustainable practices such as mining groundwater from unreplenishable sources or engaging in water theft, further exacerbating the water scarcity issue. This situation ultimately drives farmers towards distress migration, leaving behind vulnerable groups such as the elderly and children in villages," he added.

Original Article: The Tribune India

Major water conservancy projects accelerate trillions of investment to expand domestic demand and benefit people's livelihood

Irrigation canals run through fertile fields, and dams rise from the ground. Since the beginning of this year, several major water conservancy projects including the Yaojiaping Water Conservancy Project in Hubei and the Sanba Reservoir in Sichuan have started construction, accelerating the construction of a national water network and improving the pattern of water resource allocation.

Last year, my country's investment in water conservancy construction exceeded one trillion yuan for the first time. This year, the construction of the national water network has been further accelerated. In the first quarter, the investment in water conservancy

construction across the country was 189.8 billion yuan, a year-on-year increase of 76%. From a local perspective, Guangdong, Hebei, Chongqing and other provinces and cities have announced water conservancy investment plans for 2023, and the investment amount has increased significantly compared with last year.

The National Development and Reform Commission stated that the national water network project has a large scale and high investment demand. It will take the national water network project as an important support area and maintain a reasonable intensity of investment within the central budget. At the same time, deepen the reform of investment and financing systems and mechanisms, actively guide various investment entities, especially private enterprises, to participate in accordance with laws and regulations, and promote and accelerate the construction of water network projects through market-oriented reforms.

Major water conservancy projects accelerated

Water is the lifeline, and the carrying space of water determines the space for economic and social development. A national water network with smooth circulation and orderly regulation can effectively improve the ability to allocate water resources and provide strong water support for economic and social development.

The large mechanical iron arm swung and the bucket broke the ground. On May 20, one of my country's 150 major water conservancy projects and an important node project of the southern Yunnan water network – the main project of Zaodu Reservoir in Chongqing started construction. The total investment of the project is 10.123 billion yuan. It is expected that the diversion tunnel will be completed by the end of 2023 and meet the flow conditions. In 2027, the gate will be closed for water storage.

According to the person in charge of the Zaodu Reservoir Project Office, after the completion of the project, the flood control capacity of the Qijiang District where the main project is located can be increased from once in 20 years to once in 50 years. The newly added annual water supply is about 179 million cubic meters, and the south of Chongqing will form a multi-source water supply guarantee pattern.

In the project of diverting the river to fill the Han River at the Anle Estuary on the right bank of the Han River downstream of the Danjiangkou Reservoir Dam, the construction team is working non-stop.

As a follow-up water source project of the South-to-North Water Diversion Middle Route Project, the Diversion Project diverts water from the Three Gorges Reservoir area of the Yangtze River into the Han River. After the implementation of the project, the multi-year average north-to-north diversion volume on the middle line of the South-to-North Water Diversion Project will increase from 9.5 billion cubic meters to 11.51 billion cubic meters.

The relevant person in charge of the Ministry of Water Resources recently introduced that since the beginning of this year, the Ministry of Water Resources has

comprehensively accelerated the construction of water conservancy infrastructure, and vigorously promoted the early start of multiple batches of projects. In the first quarter of this year, 7,239 new water conservancy projects were started across the country, 1,948 more than the same period last year. Eleven major water conservancy projects including Yaojiaping Water Conservancy Project in Hubei and Fenghuangshan Reservoir in Anhui were newly started, 6 more than the same period last year.

According to the recently released “National Water Network Construction Planning Outline”, in the next step, relevant departments will promote a number of major water conservancy projects around improving water resource allocation, water supply guarantee system, and river basin flood control and disaster reduction system. Among them, in the Yangtze River Basin, we will focus on promoting the construction of control hubs for tributaries such as the Qujiang River and Tuojiang River in the upper reaches, the Qingjiang River System in the middle reaches, and the Shuiyang River and Qingyi River in the lower reaches.

Water conservancy investment in many places has increased significantly year-on-year

Water conservancy projects are livelihood projects and important development projects, which play a significant role in stabilizing investment and expanding domestic demand.

According to data from the Ministry of Water Resources, last year, my country completed an investment of 1,089.3 billion yuan in water conservancy construction, an increase of 43.8% over 2021, and reached the trillion-dollar level for the first time. Investment in water conservancy construction continued to increase this year. In the first quarter, the country completed investment in water conservancy construction of 189.8 billion yuan, a year-on-year increase of 76%. Six provinces, including Guangdong, Yunnan, Hebei, Fujian, Zhejiang, and Sichuan, completed investments exceeding 10 billion yuan in the first quarter.

According to the 2023 water conservancy investment “mission statement” of various regions, the investment in water conservancy in Hubei, Hebei, Chongqing and other provinces and cities this year has increased significantly compared with last year. Among them, the scale of investment in water conservancy in Chongqing will reach 39 billion yuan, an increase of 50% over the previous year; the investment in the water conservancy industry in Liaoning Province in 2023 is planned to be 22.1 billion yuan, an increase of 15% over the previous year; the scale of investment in water conservancy in Hebei will reach 70 billion yuan Yuan, an increase of about 20% year-on-year; investment in water conservancy in Hubei Province strives to reach 62.5 billion yuan, an increase of 25% year-on-year.

“During the ’14th Five-Year Plan’ period, the national plan to complete water conservancy investment amounted to 5.2 trillion yuan, an increase of 57% compared with the actual investment amount of the ’13th Five-Year Plan’. In 2022, 35.7% of the progress has been completed, and the implementation is expected to be accelerated in the future.” Zhixin Investment Research Luo Huanjie, a senior researcher at the Academy of Macroeconomics, said.

According to the previous introduction of the Ministry of Water Resources, every investment of 100 billion yuan in major water conservancy projects can drive GDP growth by 0.15 percentage points.

Luo Huanjie said that water conservancy investment has a very obvious stimulating effect on related industries and overall investment. “The industry chain of major water conservancy projects has a strong driving effect, involving a large amount of earthwork development and concrete pouring, requiring the use of a large amount of bulk raw materials, machinery and electromechanical equipment, etc., and has a driving effect on the relevant upstream, midstream and downstream industry chains.” Luo Huanjie said.

Actively guide various investors to participate

Industry insiders pointed out that the large-scale construction of major water conservancy projects requires high investment. While increasing financial investment, it is necessary to give full play to the role of the government and the market and guide various investment entities, especially private capital, to participate.

The relevant person in charge of the Ministry of Water Resources introduced that last year, while striving to increase financial investment in water conservancy projects, they made full use of local government special bonds and policy-based development financial instruments, and actively promoted the development of the public-private partnership (PPP) model and water conservancy projects. Pilot infrastructure investment trusts (REITs). Throughout the year, 203.6 billion yuan of local government special bonds were implemented, an increase of 52%, and financial credit and social capital were 320.4 billion yuan, an increase of 78%.

“In recent years, the degree of diversification of investment entities in the water conservancy field has increased. However, due to factors such as low financial returns and long return cycles of water conservancy projects, the enthusiasm for social capital investment is still not high, and the proportion of investment is significantly lower than government investment.” Wu Youhong, director of the Investment System and Policy Research Office of the Investment Research Institute of the China Academy of Macroeconomics, said.

“The national water network project has a strong public interest, but at the same time it also has a certain operational nature, so it is necessary to give full play to the role of government investment and market financing, state-owned capital and private capital.” Zhao Chenxin, deputy director of the National Development and Reform Commission, said recently The press conference held by the State Council Information Office stated

that the next step is to deepen the reform of the investment and financing system and mechanism, implement the water price standard and charging system, expand the scale of equity and debt financing, and accelerate the construction of water network projects through market-oriented reforms.

Wu Youhong suggested that policy support and regulatory services should be strengthened according to the functional attributes, investment scale, and profitability of different types of water conservancy projects. For water conservancy projects with operating income, social capital should be actively encouraged and guided to participate in investment, construction and operation through equity cooperation, franchising, and government-social capital cooperation. Actively explore the use of comprehensive development models, build a “fat and feed thin” mechanism, effectively integrate water conservancy projects with strong public welfare and low profitability with related industries with high profitability, and promote the integrated implementation of all-factor resources.

Original Article: Breaking the Lastest by Wang Zixu

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