

Veles Water Weekly Report

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VelesWater



WATER FUTURES MARKET ANALYSIS

Welcome to ***WATERTALK***

by Joshua Bell

CLICK THE LINK BELOW

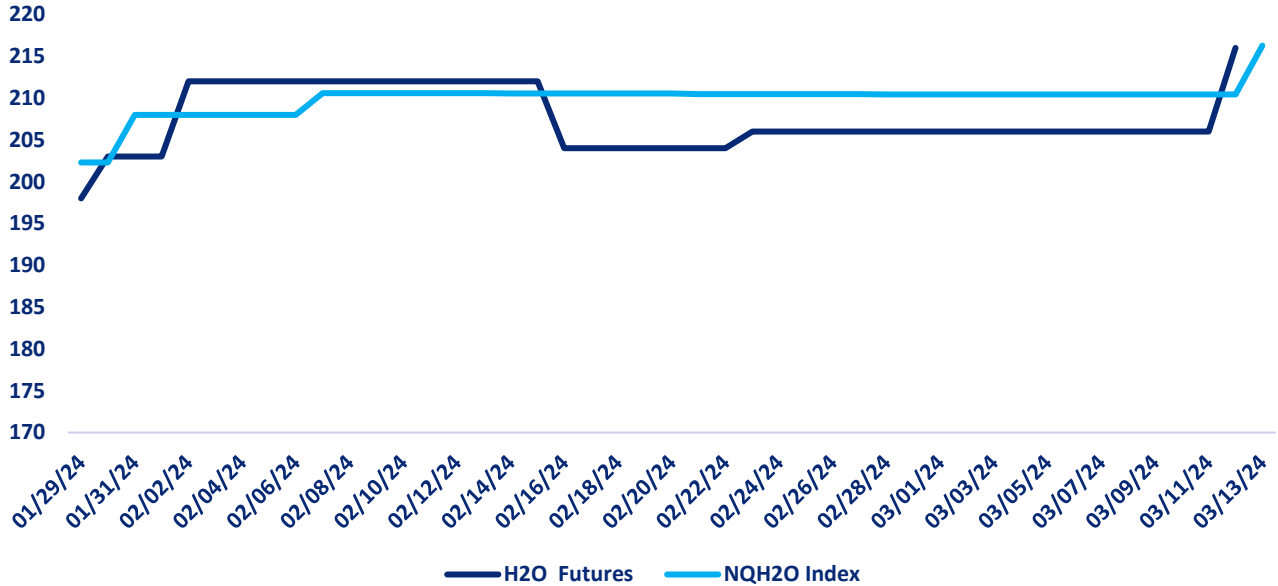
“A 2 minute technical analysis video of H2O futures”

<https://vimeo.com/923248194?share=copy>



NQH2O INDEX PRICE vs H2O FUTURES PRICE

1 Month Price Performance NQH2O Index vs H2O Futures



Price Chart Based upon Daily Close

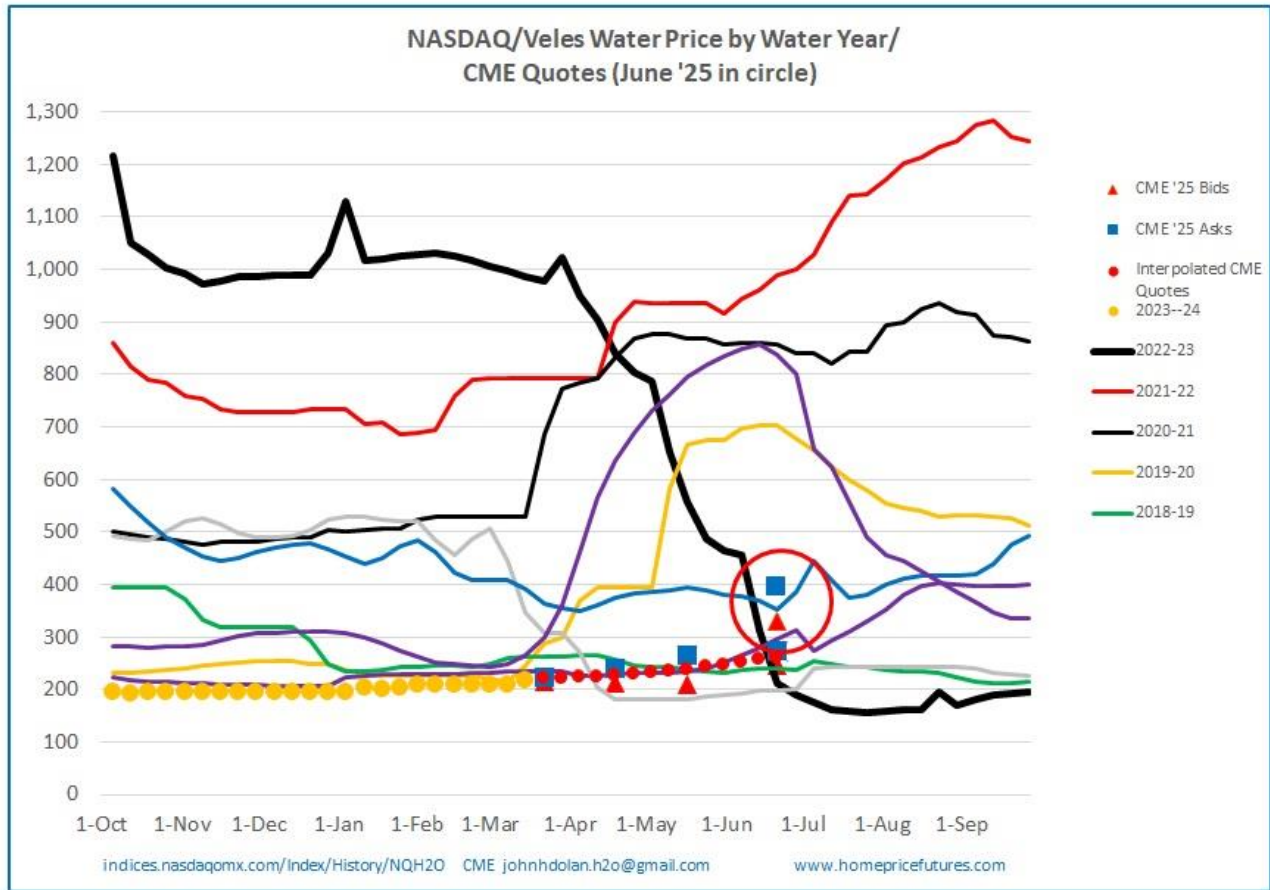
The new NQH2O index level of \$216.27 was published on March 13th up \$5.83 or 2.77% from the previous week. The March is considered the front month. The futures have been closing at a discount of \$0.23 to \$4.44 versus the index over the past week.

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

| | |
|--------|---------|
| Mar 24 | 216@223 |
| Apr 24 | 212@239 |
| May 24 | 209@265 |
| Jun 24 | 246@275 |
| Jun 25 | 329@395 |



NQH20 INDEX HISTORY



The graph above shows the CME Water contracts for Nov, Dec '23, and Mar, June '24 expirations superimposed over historical Nasdaq Veles water indices. A red line has been added to interpolate between contracts for the 2023-24 water year. Note that the contracts have been very thinly traded.

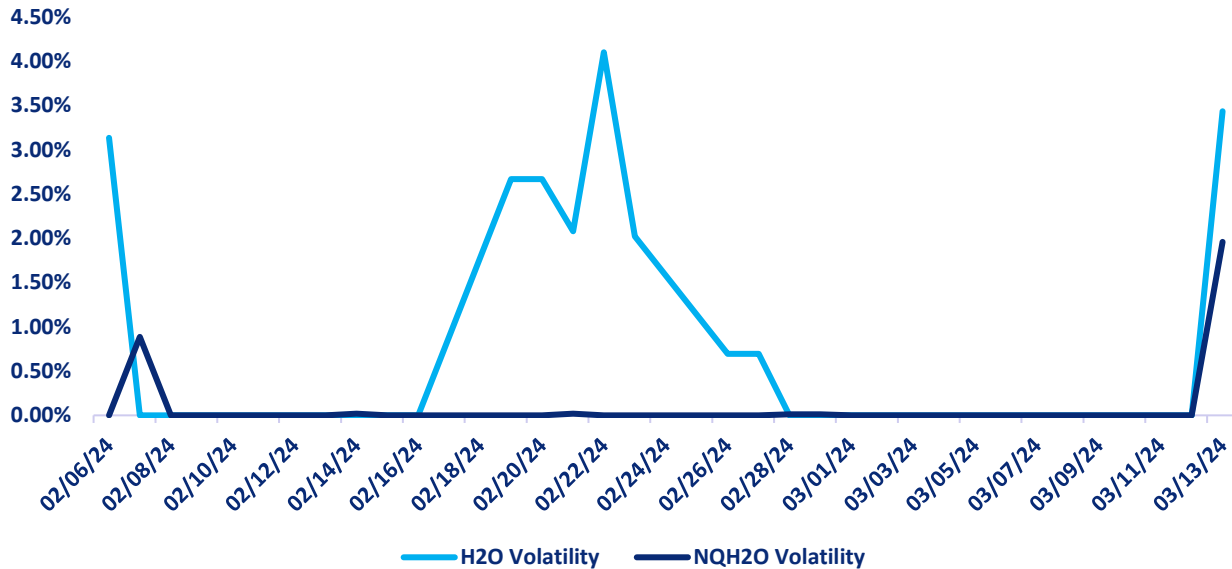
Given precipitation from last year, and prediction of El Nino, current CME quotes are well below recent index values for both “average” and drought years.

(John H Dolan, CME Market Maker)



H2O FUTURES AND NQH2O INDEX VOLATILITY ANALYSIS

Daily H2O Futures Volatility vs Daily NQH2O Index Volatility



DAILY VOLATILITY

Over the last week the March contract daily future volatility high has been 3.43%.

| ASSET | 1 YEAR (%) | 2 MONTH (%) | 1 MONTH (%) | 1 WEEK (%) |
|-------------|------------|-------------|-------------|------------|
| NQH2O INDEX | 54.20% | 4.80% | 3.21% | 2.77% |
| H2O FUTURES | N/A | 9.48% | 7.63% | 4.85% |

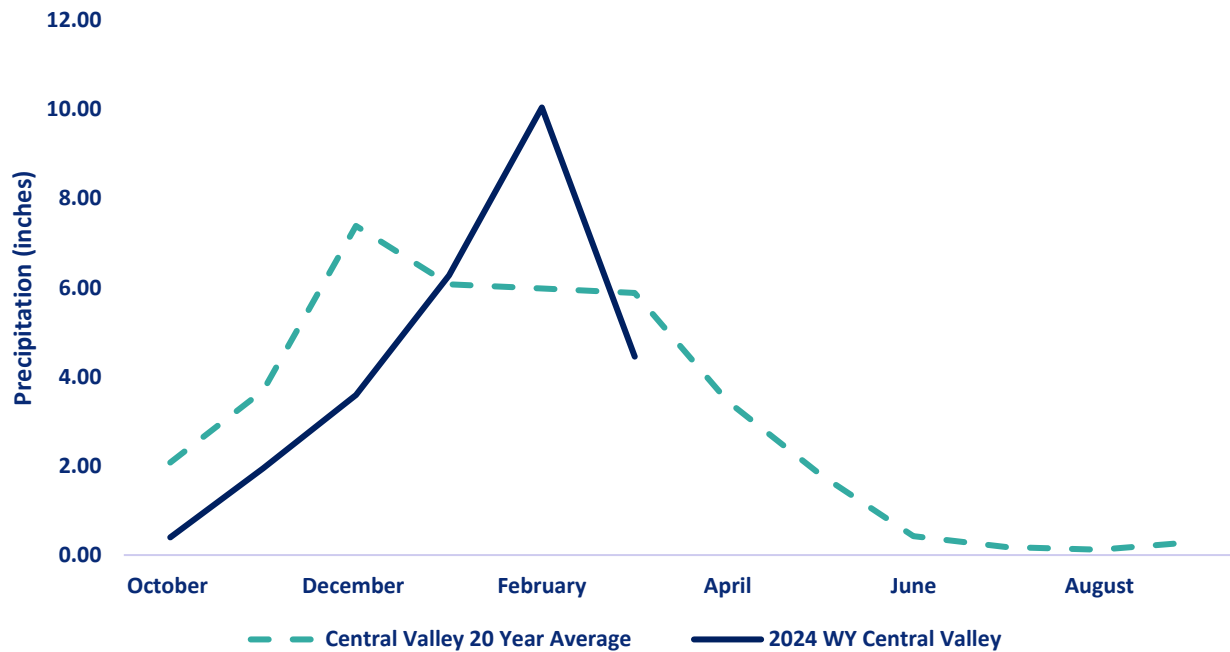
For the week ending on March 13th, the two-month futures volatility is at a premium of 4.68% to the index, down 3.28% from the previous week. The one-month futures volatility is at a premium of 4.42% to the index, down 1.32%. The one-week futures volatility is at a premium 2.08% to the index, a reversal of 2.10% from the previous week.

*Above prices are all **HISTORIC VOLATILITIES**. All readings refer to closing prices as quoted by CME.*



CENTRAL VALLEY PRECIPITATION REPORT

Central Valley Precipitation Index



Central Valley average is calculated using data from 19 weather stations in the Central Valley, California.
Data as of 13/03/2024

| STATION | MTD (INCHES) | WEEK ON WEEK CHANGE (INCHES) | % OF 20 YEAR AVERAGE MTD | 2024 WYTD VS 2023 WYTD % | 2024 WY VS 20 YEAR AVERAGE TO DATE % |
|---------------------------------|--------------|------------------------------|--------------------------|--------------------------|--------------------------------------|
| SAN JOAQUIN 5 STATION (5SI) | 4.48 | 0.17 | 76.84 | 178 | 84 |
| TULARE 6 STATION (6SI) | 3.22 | 0.16 | 81.50 | 197 | 85 |
| NORTHERN SIERRA 8 STATION (8SI) | 5.66 | 1.22 | 71.99 | 124 | 97 |
| CENTRAL VALLEY AVERAGE | 4.45 | 0.51 | 75.72 | 166 | 89 |

RESERVOIR STORAGE

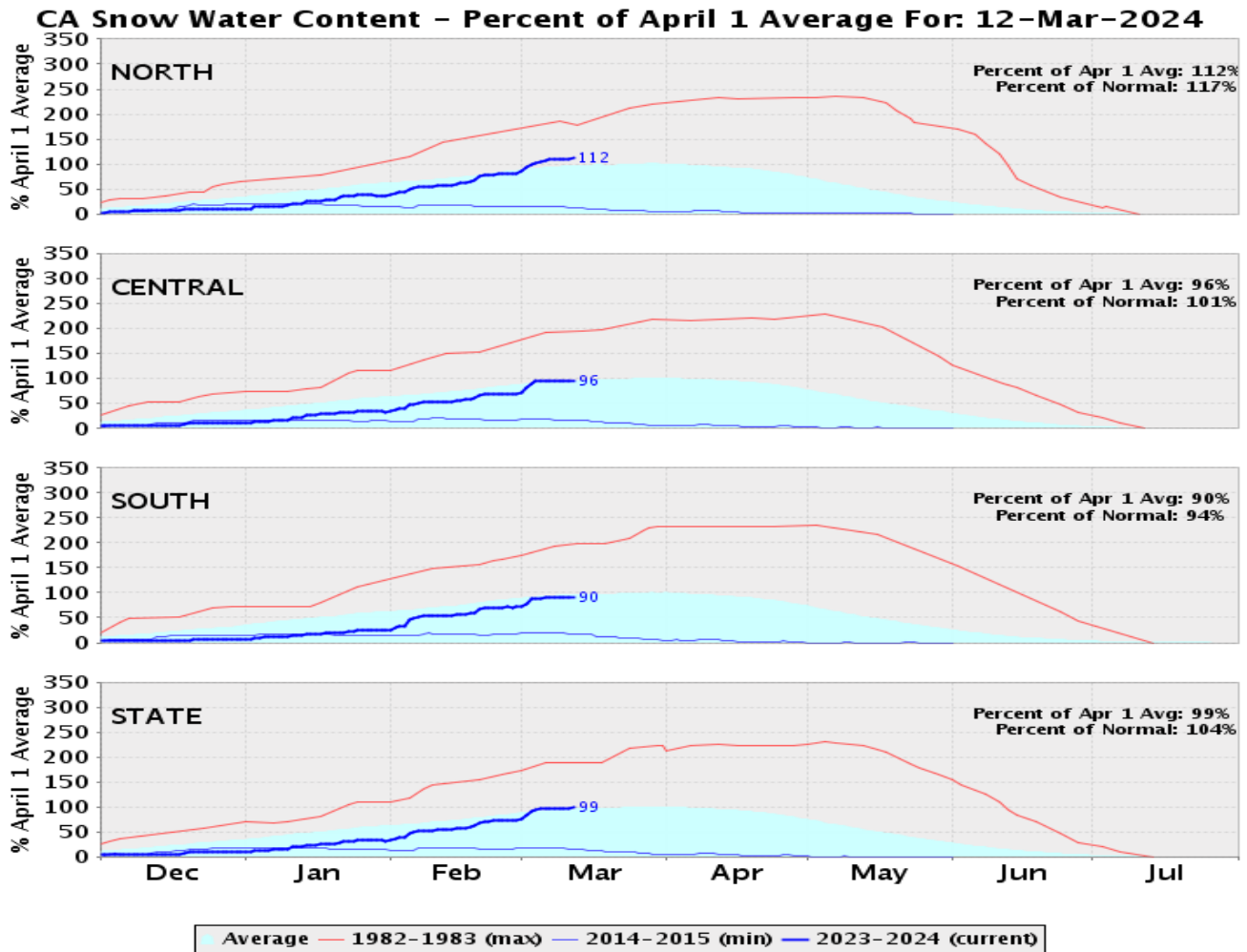
| RESERVOIR | STORAGE (AF) | % CAPACITY | LAST YEAR % CAPACITY | *% HISTORICAL AVERAGE |
|---------------|--------------|------------|----------------------|-----------------------|
| TRINITY LAKE | 1,836,532 | 75 | 33 | 107 |
| SHASTA LAKE | 3,860,096 | 85 | 63 | 114 |
| LAKE OROVILLE | 2,987,262 | 84 | 76 | 128 |
| SAN LUIS RES | 1,483,198 | 73 | 85 | 88 |

*% 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 | 31.9 | 1.13 | 168 | 117 | 112 |
| CENTRAL SIERRA | 25.2 | 1 | 219 | 101 | 96 |
| SOUTHERN SIERRA | 19.2 | 0.8 | 241 | 94 | 90 |
| STATEWIDE | 24.6 | 1.3 | 218 | 104 | 99 |

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

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



DROUGHT MONITOR

California

[Home](#) / California

Map released: Thurs. March 7, 2024

Data valid: March 5, 2024 at 7 a.m. EST

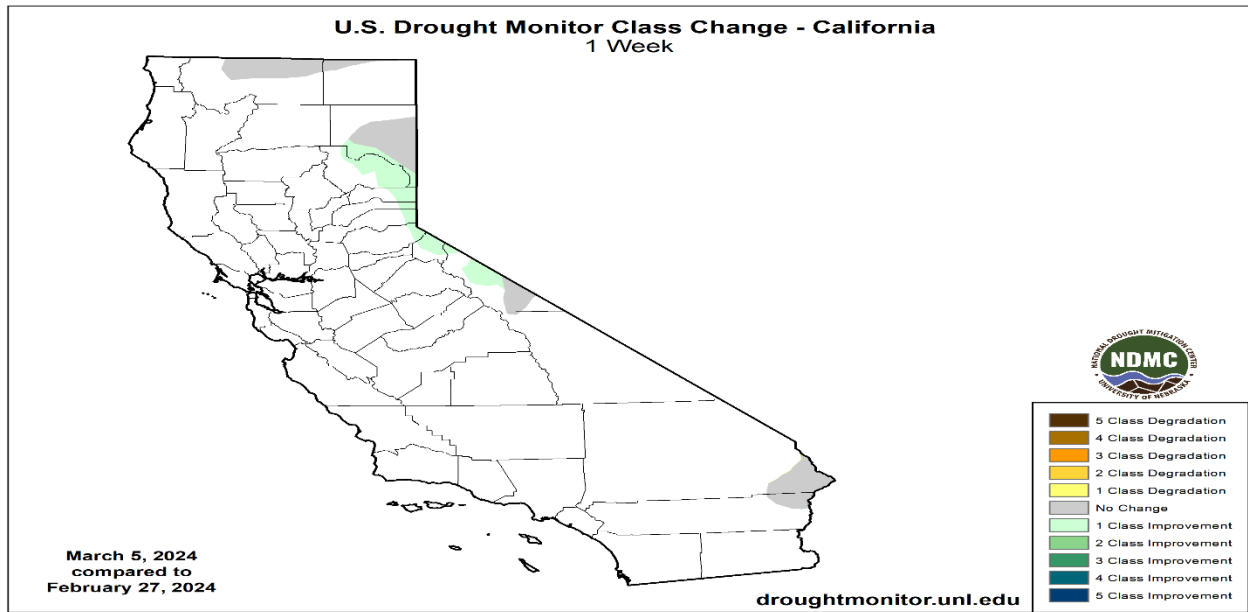
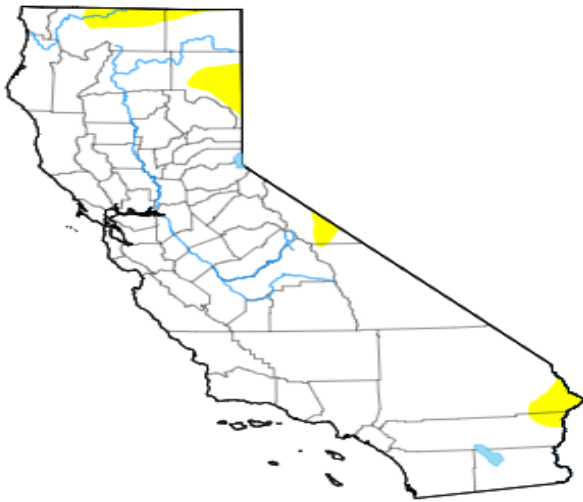
Intensity

- 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):
[Curtis Riganti](#), National Drought Mitigation Center

Pacific Islands and Virgin Islands Author(s):
[Denise Gutzmer](#), National Drought Mitigation Center



| Week | Date | None | D0-D4 | D1-D4 | D2-D4 | D3-D4 | D4 | DSCI |
|-----------------------------------|----------------------------|-------|-------|-------|-------|-------|------|------|
| Current | 2024-03-05 | 95.46 | 4.54 | 0.00 | 0.00 | 0.00 | 0.00 | 5 |
| Last Week to Current | 2024-02-27 | 92.97 | 7.03 | 0.00 | 0.00 | 0.00 | 0.00 | 7 |
| 3 Months Ago to Current | 2023-12-05 | 96.33 | 3.67 | 0.00 | 0.00 | 0.00 | 0.00 | 4 |
| Start of Calendar Year to Current | 2023-12-26 | 96.65 | 3.35 | 0.00 | 0.00 | 0.00 | 0.00 | 3 |
| Start of Water Year to Current | 2023-09-26 | 94.01 | 5.99 | 0.07 | 0.00 | 0.00 | 0.00 | 6 |
| One Year Ago to Current | 2023-03-07 | 26.84 | 73.16 | 43.06 | 19.00 | 0.00 | 0.00 | 135 |

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

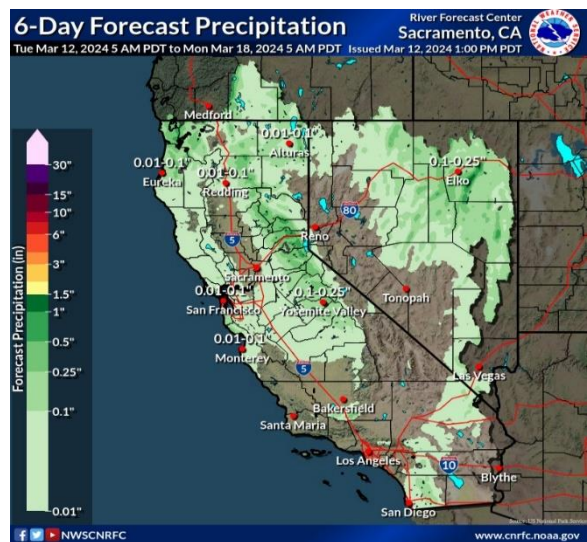
The satellite picture shows a frontal system from the Pacific which is about to reach the Northwestern Canadian coastline. This is not expected to reach as far south as the LA region. Inland from this frontal system there is considerable cloud cover over the Northern Rockies. There is some scattered cloud around the Gulf of Mexico with a storm brewing in the Midwest, and the rest of the US is relatively clear. There is no monsoon activity at present.



10 Day Outlook

High pressure over the Pac NW and into the north and central portions of the region and an upper low centered around the NV/CA/AZ border Friday and then wobbles around there as it weakens Saturday into Sunday. Models and ensemble members vary on exact track of the low and how long the low will stick around into early next week. Some members show no precip for our region and others show a few showers. Some members move it farther south and east Sunday. There is a chance of showers and slight chance of thunderstorms rotating around the low over far Srn NV and Srn CA (especially over the desert and north and east slopes) mainly on Friday and Saturday. The forecast mainly uses a blend of WPC and NBM and some of previous forecast which resulted in a few hundredths increase over the east slope of the San Diego County mtns Friday afternoon, otherwise little change for the afternoon forecast. Precipitation amounts expected to be around a tenth of an inch or less Friday and Saturday. The forecast is currently dry for Sunday as low weakens and may move south and east. Freezing levels generally around 10,000 ft and higher in NW CA and around 5000-7000 ft over Srn CA and NV Friday and Saturday and rising to around 7000ft-9000 ft over Srn CA and NV on Sunday.

Map Ref: Zoom Earth



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



WESTERN WEATHER DISCUSSION

Heavy precipitation fell this week across much of the central and northern Pacific Coast, and heavy snow also fell in a major storm in the Sierra Nevada. Significant snow amounts also fell across parts of Idaho and northwest and southwest Montana. Improving snowpack in these areas and lessening precipitation deficits led to improvements in drought or abnormal dryness in numerous locations. Recent precipitation in western and central Oregon continued to chip away at long-term precipitation deficits, leading to the removal of one long-term moderate drought area and coverage reductions of another. Meacher and Park counties in Montana have missed out on recent snowfall, leaving current snowpack numbers very low, and moderate drought worsened to severe drought. Heavy precipitation in northwest Washington (with some locations likely seeing over 9 inches of liquid precipitation) led to a reduction in moderate drought and abnormal dryness coverage. Along the Arizona-New Mexico border, severe drought coverage was locally reduced in a reassessment of short- and long-term drought conditions.

Reference:

Rocky Bilotta, NOAA/NCEI

Ahira Sanchez-Lugo, NOAA/NCEI



WATER NEWS

CALIFORNIA WATER NEWS

Second San Joaquin Valley groundwater subbasin recommended for state takeover

The Friant-Kern Canal was called out specifically as one of the reasons the state should take over pumping in the Tule groundwater subbasin in Tulare County.

The recommendation was contained in a recently released staff report to the Water Resources Control Board.

While the report stated groundwater management plans covering the subbasin didn't adequately address subsidence and continued depletion of the aquifer and degradation of water quality in general, it also noted the significant harm to the Friant-Kern Canal, which brings water 152 miles south from Millerton Lake to Arvin.

Excessive overpumping caused land beneath a 33-mile stretch of the Friant-Kern Canal to collapse, creating a sag that reduced the canal's carrying capacity south of Pixley by 60%.

The Friant Water Authority, which manages the canal on behalf of the Bureau of Reclamation, has sued the Eastern Tule Groundwater Sustainability Agency (GSA), alleging its policies have allowed farmers to continue overpumping causing greater subsidence beneath the canal than the two entities had agreed to in 2020.

The sinking canal also didn't escape the state's notice.

A draft report to the State Water Resources Control Board, the enforcement arm of California's groundwater law, states that plans to control overpumping in the region are so poor they will likely continue allowing harm to drinking wells and other critical infrastructure "such as canals (e.g., Friant-Kern Canal)."

The report recommends the state put the subbasin, which covers the southern half of Tulare County's valley portion, into "probationary status." That would put the state in charge on an interim basis while groundwater agencies have year to alter their plans to address concerns.

Under that interim status, the state could set pumping amounts for farmers, require them to install well meters, pay up to \$40 per acre foot extracted and issue steep fines for noncompliance.

This is a repeat, essentially, of what has already occurred in the Tulare Lake subbasin, which covers Kings County. A draft report also recommends Tulare Lake be put on probation.



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A probation hearing for that subbasin is scheduled for April 16. Four other valley subbasins, Kern, Kaweah, Chowchilla and Delta-Mendota, will also likely have probation hearings. Kaweah is set for November 2024, with the others going into 2025. The recommendation for the Tule subbasin to be put into probation did not come as a surprise to some area water managers.

“It is clear to me that they have a good handle on the big issues facing the subbasin,” said Eric R. Quinley, general manager of Delano-Earlimart Irrigation District.

Delano-Earlimart has invested \$43 million in recharge basins, the potential of which cannot be realized because of continued excessive groundwater pumping by landowners in surrounding groundwater agencies. Many of those farmers are on ground outside of water districts and don’t pay to import water, as farmers in Delano-Earlimart and other districts do.

“We should have much higher levels of groundwater, but it will continue to go down even though we’re putting water in because of pumping happening elsewhere,” he said. Protecting canals and other infrastructure is a key focus of the state’s groundwater law, which mandates regions bring aquifers back into balance, meaning more water isn’t pumped out than goes back into the ground.

Friant Water Authority Chief Operating Officer Johnny Amaral said the state’s report recommending probation hit all the right points.

“Friant Water Authority is pleased that the staff report contains such an intense level of focus on subsidence and protecting the integrity of the (canal),” he said. “It should be the goal and priority of all involved.”

While local agencies were tasked with coming up with plans to protect aquifers, the state acts as a backstop evaluating those plans and then enforcing pumping reductions, if needed.

While Quinley wasn’t surprised by the recommendation for state intervention, he is hoping to keep Delano-Earlimart out of probation. A number of groundwater agencies in the Tule subbasin, as well as other subbasins, are hanging their hopes on what’s known as “the good guy clause.”

That refers to a clause in the Water Code that states: “The board shall exclude from probationary status any portion of a basin for which a groundwater sustainability agency demonstrates compliance with the sustainability goal.”

However, Water Board staff have already recommended against excluding any groundwater agencies from probation in both the Tule and Tulare Lake subbasins stating that no agencies in either subbasin “have demonstrated compliance with the sustainability goal.”

Quinley was undaunted: “We have and will continue to work to get (Delano-Earlimart) excluded.”

Original Article: [SJV Water by Lisa McEwen](#)



‘Simply catastrophic’: California salmon season to be restricted or shut down — again

California’s fishing industry is bracing for another bad year as federal managers today announced plans to heavily restrict or prohibit salmon fishing again, after cancelling the entire season last year.

The Pacific Fishery Management Council today released a series of options that are under consideration, all of which either ban commercial and recreational salmon fishing in the ocean off California or shorten the season and set strict catch limits. The council’s decision is expected next month; the commercial season typically begins in May and ends in October.

While more Chinook salmon returned from the ocean to spawn last year than in 2022, fishery managers said the population is expected to be so small that they must be protected this year to avoid overfishing.

Fall-run Chinook salmon are a mainstay of commercial and recreational fishing and tribal food supplies. But their populations are now a fraction of what they once were — dams have blocked vital habitat, while droughts and water diversions have driven down flows and increased temperatures, killing large numbers of salmon eggs and young fish.

The plan is a devastating blow for an industry still reeling from last year’s closure. State officials estimate that last year’s closure cost about \$45 million — which the fishing industry says vastly underestimates the true toll.

“There’s no way to sugarcoat it, as it’s simply catastrophic,” said Scott Artis, executive director of the Golden State Salmon Association, which represents the commercial and recreational fishing industry, other businesses, restaurants and environmentalists.

“The fishing industry and many thousands of salmon families and businesses eagerly waiting to get back to work are potentially facing another year in the harbor instead of putting food on the table.”

The options are likely to evolve as the Pacific Fishery Management Council continues to analyze them over the next month. Two call for significantly shortened seasons and harvest limits for both commercial and sportfishing off California this year. The third would cancel the season for the second year in a row.

“In response to poor river and ocean conditions, California stocks are forecast to have 2024 abundance levels that are well below average,” Marci Yaremko, the California Department of Fish and Wildlife’s appointee to the Pacific council, said today. “The options that have been developed that do authorize some fishing are very precautionary.”

Harvest limits and other restrictions on the number of fish caught per trip are new concepts for managing ocean salmon fisheries, Yaremko said.

“Even the best option that they give us there is crumbs compared to a regular salmon season,” said Jared Davis, captain of the Salty Lady, a charter fishing boat.



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Still, of all the options, he said, he'd prefer complete closure. The shortened seasons don't offer enough days to sustain his business and the potential repercussions aren't worth it.

"I think fishing on low abundance such as we have this year is reckless and irresponsible," he said. "It's really playing with fire for us to take any fish out of there."

Sarah Bates, who owns a commercial fishing boat berthed at Fisherman's Wharf in San Francisco, called the decision "tragic."

"We're looking at numbers of fish that don't even make it worthwhile to untie the boat," she said. "It's not enough fish to pay for the maintenance and preparation."

RJ Waldron, 48, put his sportsfishing boat, the Sundance, up for sale in January. When the salmon season closed last year, an estimated 85% of his business dried up. Few clients took him up on his offer to switch to halibut, striped bass or rockfish.

Buying the boat eight years ago to run a charter fishing business out of the East Bay had been a dream come true for Waldron, a long-time fishing and hunting guide.

"Basically this last year, I've just been blowing through my cash, blowing through the savings, just trying to stay afloat," Waldron said. "I put everything I had into this fishing business, into the salmon. And it's totally out of my control. I can't resurrect it."

"We're looking at numbers of fish that don't even make it worthwhile to untie the boat. It's not enough fish to pay for the maintenance and preparation."

SARAH BATES, COMMERCIAL FISHERWOMAN IN SAN FRANCISCO

California's commercial fleet and recreational anglers still await federal disaster aid for last year's losses. The federal government allocated only \$20.6 million in disaster funding, and a year later, none of the salmon fishers CalMatters interviewed has received a check.

Waldron called the lack of disaster aid a "big slap in the face."

Davis said he tried to weather the storm by arranging trips for halibut, striped bass, rockfish and lingcod. Still, he estimates that his business was down 80% from a normal year.

Seeing the season restricted this year "breaks my heart," he said. "It's what I love, and it's a passion. It's something I've been doing my whole life, and I know that there's a lot of others in the industry that it's the same for."

Original Article: [Cal Matters by Rachel Becker](#)

California's Plan to Store More Storm Water Against Future Drought

California is beginning to identify places to store storm water after concerns that groundwater supplies are decreasing.

The California Department of Water Resources has recently announced its new groundwater mapping project that will "provide critical information" about the underground water supply, it said in a statement.



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The Statewide Airborne Electromagnetic (AEM) Survey Project mapped 95 groundwater basins of priority in the state by scanning depths of 1,000 feet into the earth, using helicopter-based technology.

The mapping project will allow officials to decide where replenishment is needed.

Groundwater supply is vital to California's water supply. It provides 30 to 60 percent of all water in the state, depending on how its reservoir water storage is faring. Groundwater is used mainly during dry periods and is an essential buffer against drought. The Western state has only recently emerged from a prolonged drought, meaning officials are looking to see how groundwater supply is holding up.

Original Article: [Newsweek by Robyn White](#)

First Phase of AEM Survey Project to Map Groundwater Supplies Gets Completed

The Department of Water Resources (DWR) has completed its mapping project in all high-and-medium-priority groundwater basins in California. The Statewide Airborne Electromagnetic (AEM) Survey Project has encompassed helicopter-based technology to scan subsurface depths of up to 1,000 feet, providing critical information about underground aquifers. This data, now publicly accessible, will be used to help with the identification of locations for groundwater recharge projects.

"Data from these initial statewide AEM surveys are already being used by local groundwater agencies," Deputy Director of Sustainable Groundwater Management, Paul Gosselin said in a press release. "We are excited to move into the next phase, expanding data collection efforts and providing new tools for understanding and managing California's groundwater on a local, regional, and statewide level."

Requirements of the Sustainable Groundwater Management Act make recharge projects a vital component of drought mitigation strategies. AEM survey data will reportedly facilitate expedited project development to ensure that resources are allocated efficiently. DWR's ongoing efforts, including Basin Characterization, aim to enhance understanding and management of groundwater basins. Innovative tools like online AEM Data Viewers enable broad access to complex geologic data, fostering collaboration and informed decision-making.

Original Article: [Agneta West by Brian German](#)

After another wet winter, is the West still facing a water crisis?

Time is running out for the West's wet season, but recent storms have done wonders for the snowpack and the drought across much of the region, especially in California.

"The drought situation across the western U.S. has improved considerably as a result of a very wet winter," Jay Famiglietti, a hydrologist at Arizona State University, told USA TODAY.



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In fact, both California and Nevada are "essentially drought-free" at the moment, which is "really unusual," he said.

Elsewhere, the giant reservoirs of the Colorado River Basin, Lakes Mead and Powell, are now about one-third full, said Brad Udall, senior scientist at Colorado State University. This is up from the same time last year, when they were 25% full, but still far from their historic highs of the early 2000s, when they were 95% full.

But the wet winter is not a panacea for the long-term western water crisis, which is "here to stay," Udall said. "I like to say it is a collision of 19th-century water law, 20th-century infrastructure and 21st-century population growth and climate change."

A promising drought forecast in California

The drought forecast looks promising in California: "The combination of the abundance of rain and snow from the winter of 2022-2023, the state of the reservoirs, and what has happened this winter gives a high confidence that drought conditions will remain absent in California well into 2025," AccuWeather California weather expert Ken Clark said, in a statement.

This is good news for both the short-term drought concerns and the long-term battle against widespread drought, AccuWeather said. "Years of drought took their toll on the state's water table, so back-to-back winters with blockbuster storms have replenished water reservoirs and quenched the parched landscape," said AccuWeather meteorologist Brian Lada.

Lakes Mead and Powell remain at 'dangerously low levels'

"Although both reservoirs have experienced wet winters over the past few years, they both remain at dangerously low levels after a couple of decades of megadrought," Famiglietti said.

The two reservoirs, fed by the Colorado River, provide the water 40 million Americans depend on.

Specifically, Lake Mead has risen over 3.5 feet since its summer low because of the current wet winter. Lake Powell, however, has actually dropped about 23 feet since its summer 2023 high, which was a result of the wet winter of 2022-23.

And additionally, a pair of wet winters doesn't solve the long-term problem: The Colorado River has been in crisis because of a multidecade drought in the West intensified by climate change, rising demand and overuse. The river also serves Mexico and more than two dozen Native American tribes, produces hydropower, and supplies water to farms that grow most of the nation's winter vegetables.

What about California's current snowpack and reservoir levels? Have the recent storms helped?

The recent blizzard across California lifted its snowpack levels considerably, Famiglietti said. "Snowpack levels are now 'normal' across the state for this time of year, and nearly all of the state's major reservoirs are above historic averages for this time of year," he



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said. "These higher reservoir levels will alleviate pressure on the state's perennially overtaxed groundwater reserves."

On Tuesday, NOAA on X said there's been a "HUGE improvement in the Sierra Nevada snowpack since January 1st ... thanks to several atmospheric rivers and the record setting winter storm event this past weekend."

In a statement, California Department of Water Resources Director Karla Nemeth last week said, "We are now in the last month of the traditional snow season and while conditions have dramatically improved since the beginning of the year, March will be critical in determining if we finish above or below average."

Original Article: [USA Today by Doyle Davis](#)

US WATER NEWS

Saudi Business to Leave Arizona Valley Amid Groundwater Spat

Arizona officials said a Saudi-owned company they targeted over its use of groundwater to grow forage crops is moving its farming operation out of a valley in the Southwestern state's rural west.

Gov. Katie Hobbs and the Arizona State Land Department announced late Thursday that Fondomonte Arizona is officially no longer pumping water in the Butler Valley groundwater basin. Some residents of La Paz County had complained that the company's pumping was threatening their wells.

A statement by Hobbs says an on-site inspection had confirmed that Fondomonte was moving to vacate the property. Fondomonte has several other farms elsewhere in Arizona that are not affected by the decision.

A call placed Friday seeking comment from Fondomonte's Arizona office was not immediately returned.

Current Arizona regulations allow virtually unfettered groundwater pumping in the state's rural areas.

Climate-challenged countries like Saudi Arabia have increasingly looked to faraway places like Arizona for the water and land to grow forage for livestock and commodities such as wheat for domestic use and export.

Foreign and out-of-state U.S. farms are not banned from farming in Arizona nor from selling their goods worldwide. American farmers commonly export forage crops to countries including Saudi Arabia and China.

Fondomonte, a subsidiary of Saudi dairy giant Almarai Co., held four separate lease agreements in the Butler Valley Basin to grow alfalfa that feeds livestock in the Gulf



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kingdom. In October, Arizona's State Land Department notified Fondomonte that three of its four leases in the Butler Valley Basin would not be renewed. Fondomonte was simultaneously notified that the fourth lease would be canceled as well.

The Arizona governor's office said the State Land Department decided not to renew the leases the company had in Butler Valley due to the "excessive amounts of water being pumped from the land — free of charge."

Fondomonte appealed the cancellation, and that process is still pending. The last lease ended on Feb. 14.

Another company, the United Arab Emirates-owned Al Dahra ACX Global Inc., grows forage crops in California and Arizona, including on Butler Valley land it leases from a private North Carolina-based company. It is a major North American exporter of hay.

Hobbs took credit for the end of Fondomonte's operation in the valley.

"I'm not afraid to hold people accountable, maximize value for the state land trust, and protect Arizona's water security," she said.

Original Article: [Food Manufacturing by Anita Snow](#)

Unprecedented Water Rights Claim Stokes Okefenokee Legal Battle

A water rights claim by the US government at Georgia's Okefenokee National Wildlife Refuge is a rare and possibly unprecedented move east of the Mississippi River to block development outside federal lands.

The move awakens "dormant" water rights that the federal government has never asserted on the East Coast because the region is historically too wet to need to exercise them at public lands and military bases, said Georgia State University law professor Ryan Rowberry.

"It's saying when states decide to act, if they are going to compromise the quantity of water flowing into federal reservations, they are going to have to deal with the federal government, and the federal government's right can supersede states' rights," he said.

In January, the Fish and Wildlife Service [wrote](#) Georgia regulators to assert its federal reserved water rights at Okefenokee. The assertion aims to prevent Twin Pines Minerals LLC from pumping so much groundwater for a proposed titanium dioxide mine that it could cut off part of the swamp's water source, imperiling its biodiversity and original purpose as a refuge for migratory birds.

The agency's action is the latest development in a long-running battle over North America's largest blackwater swamp and the mine, which was embroiled in a related fight over waters of the US, or WOTUS, under the Clean Water Act. The Okefenokee Swamp is a haven for migratory birds, endangered wildlife species and more than 600 species of plants.



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The Georgia Environmental Protection Division in February issued a [draft permit](#) for Twin Pines to build its mine, followed by a public hearing March 5. A timeline for final approval hasn't been set, state officials say.

Quantifying Water Rights

Twin Pines plans to build its mine on a sandy ridge that hems in the swamp three miles east of the refuge boundary. The company needs to pump water from an underlying aquifer to de-water its mine pits.

Mike Oetker, Fish and Wildlife Service acting regional director overseeing Okefenokee, in the letter asked Georgia regulators to work with the agency to quantify the amount of water the refuge needs to maintain the swamp's wildlife habitat.

The National Park Service conducted a hydrological study of the swamp that found Twin Pines' pumping would remove 16% of the groundwater that recharges the swamp, Oetker wrote. The mine could harm Okefenokee through either groundwater withdrawals or re-direction of current flows into the swamp, he said.

"Any decision regarding the proposed mining permit must be made with consideration of federal reserved water rights," Oetker wrote. "It is imperative that these rights be safeguarded to ensure the long-term health and viability of the Okefenokee wetland ecosystem."

Georgia EPD is reviewing the letter and hasn't yet responded, spokesman John Eunice said.

Twin Pines President Steve Ingle said the mine won't harm Okefenokee. The Fish and Wildlife Service didn't respond to a request for comment.

John Leshy, who served as Interior solicitor in the Clinton administration, said he knows of no precedent for federal assertion of water rights east of the Mississippi River.

Federal reserved water rights include all the water needed to maintain the purpose of the Okefenokee refuge, which President Franklin Roosevelt created to protect migratory birds in 1937 with an executive order under the Migratory Bird Conservation Act, Oetker wrote.

He said that a unanimous 1976 Supreme Court opinion in *Cappaert v. US* held that the federal government has the right to preserve its surface and groundwater from diversion.

In *Cappaert*, the justices ruled that groundwater pumping in Nevada near Devil's Hole National Monument—created to protect the endangered pupfish and now part of Death Valley National Park—violated the federal government's right to enough water to maintain the purpose of the monument.

Unique to West

The company denies that the federal government has any claim to reserved water rights at Okefenokee.

Federal reserve water rights is a doctrine exclusive to Western water law, and there is no legal basis for it in the original 13 states, including Georgia, according to Twin Pines attorney Lewis Jones of Jones Fortuna LP in Decatur, Ga.



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The federal government once had legal claim to all the West, where water rights came with the land it controlled, but that was not the case in Georgia, one of the original colonies, where the federal government had no original claim to water rights, he said. That means that the Fish and Wildlife Service doesn't have water rights to Okefenokee that it could reserve, he said.

The Fish and Wildlife Service's claim "is a novel theory that has never been tested in the East," Jones said. "They're trying to use any means they can to stop a project they don't like."

Other legal experts say *Cappaert* puts the government on solid ground to make its water rights claim.

Federal reserved water rights in eastern states are based on the intent for protecting the land, not the status of the land prior to federal acquisition, Rowberry [wrote](#) in a 2013 legal paper on the issue.

Rowberry said eastern national parks can claim reserved water rights if the intent of their creation was to use water for federal purposes, such as at South Carolina's Congaree National Park, which was created by Congress to protect a swamp similar to Okefenokee.

The Justice Department since 1982 has argued that even though most federal reserved water rights are asserted on lands the government reserved from the public domain as it did in the West, lands acquired by the US have enforceable water rights, too, said Robert Fischman, an environmental law professor at Indiana University.

Federal water rights preempt state law, and they can be asserted regardless of the age of the state or the type of water rights system the state uses, he said.

The law on federal reserved water rights is clear, and the Fish and Wildlife Service "is putting Georgia on notice that issuing this permit would impair its federal water right and, presumably, be contrary to public interest," said Melinda Taylor, senior lecturer at the University of Texas at Austin School of Law. Leshy said the *Cappaert* precedent gives the Fish and Wildlife Service a strong case in part because the ruling establishes that a prior federal reservation of water prevents subsequent assertions of groundwater rights under state law.

But Taylor said case law is unclear whether federal water rights take precedent over state groundwater regulations. Georgia's regulations require the state to determine whether the mine's permit would be detrimental to other uses, she said.

The Fish and Wildlife Service's biggest challenge in asserting its water rights at Okefenokee is quantifying them in the first place, said William Caile, of counsel at Holland & Hart LLP in Denver.

"That's going to be a technical and factual issue," relying on complex hydrological assessments of the groundwater system around the swamp, Caile said.

Mining outside the refuge's boundaries threatens the government's ability to manage a freshwater ecosystem, and asserting water rights there is one tool the Fish and Wildlife



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Service has to prevent it, said Andrew Mergen, a visiting environmental law professor at Harvard Law School.

“I would agree that east of the Mississippi that this is really rare,” he said. “As the refuge was created for certain purposes, the lands and waters were reserved for those purposes. They were included in the reservation for the bird sanctuary, for what became the refuge.”

Original Article: [Bloomberg Law by Bobby McGill](#)

As Oregon enforces its water use requirements, small farmers face the consequences

As Oregon more actively enforces state rules around water usage, some farmers have learned that they’ve been operating illegally for years.

Christina del Campo surveys her field, pointing out the garlic she hopes will grow on its own, and the blueberries she’ll no longer be able to sell.

“This section of the field, I don't know if I will even plant it,” she said. “I am potentially just going to put in a cover crop and build up the soil while I live in limbo and see what's gonna happen with water rights.”

This is Oak Song Farm, a property located off Lorane Highway near Eugene, with just over half an acre dedicated to agriculture.

For seven years, del Campo has used well water to grow vegetables here, which she’s sold at farmers markets and to her neighbors. She said that’s been her primary source of income.

“It's like a convenience store,” said del Campo. “People can stop in. I see a lot of people come on Sunday mornings to grab fixings for breakfast.”

However, everything changed last September. That’s when Oak Song Farm received a letter from the regional office of the Oregon Water Resources Department. It was a notification that the farm couldn’t irrigate its commercial crops without a water right.

Del Campo said this came as a complete surprise. Today, she said her business has been essentially destroyed.

“I don’t know why growing food is illegal,” she said. “That’s what doesn’t make sense to me.”

Water is a publicly-owned resource in Oregon, meaning property owners need government approval for many of its uses.

“It’s a finite resource,” said Mike McCord, the Northwest Region Manager with the Oregon Water Resources Department. “The system of appropriation has been in place since 1909 in Oregon. It allows us to better manage the resource by having a permitting system.”

There are some exemptions, as those without a water right can use up to 5,000 gallons a day for commercial or industrial purposes. However, this doesn’t include irrigation, said McCord.



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For del Campo, it's a frustrating double standard. She estimates she was using fewer than 1,000 gallons daily for agriculture.

"I'm not overusing water. I'm not overusing land," said del Campo. "I'm just trying to have a small business and provide my community with food."

The letter to Oak Song Farm was one of 24 sent in a batch last fall throughout District 2, which covers the Southern Willamette Valley. The department said some recipients later confirmed they were acting legally.

McCord said officials use aerial photography, complaints from neighbors, and in-the-field observation to find potential violations. He said new funding in 2021 allowed the state to hire more staff for enforcement.

However, he said the rules surrounding water rights haven't significantly changed since Oak Song Farm opened.

"What I'd like people to hear is that before someone invests in something like this, they should do the diligence on it to know what [they] can and can't do, and what [they] may or may not need in order to do it," said McCord.

Advocates for small farms say the exemptions can be confusing, and there's a lack of knowledge in the real estate community that can mislead new property owners.

"When you farm for other people, you just don't know all the business side of it," said del Campo. "And so when I signed up for my business license, I would figure that that would be the time someone would tell me, 'Hey, do you have water rights?'"

Original Article: [KLCC by Nathan Wilk](#)

City of Rifle commits \$100,000 to the Shoshone Water Rights Purchase

The Rifle City Council listened to a funding request from a Colorado River District representative during their Wednesday regular session.

"We are asking that the City of Rifle consider a funding request for \$100,000," Amy Moyer said, Director of Strategic Partnerships for the Colorado River District.

The Colorado River District, as Moyer explained, is asking for the money because they're trying to purchase the Shoshone Water Rights.

The Shoshone Hydro Power Plant sits in Glenwood Canyon and is owned by the Public Service Company of Colorado, a subsidiary of Xcel Energy. It produces 15 megawatts of hydro power, which is enough to power around 15,000 homes.

"To operate the plant, water is diverted from the Colorado River near the Hanging Lake tunnel, it travels around two and half miles through a tunnel, drops through the penstocks, and is immediately returned to the river," Moyer explained.

The historic Shoshone Water Rights, Moyer continued, are extremely important, especially to those in the Western Slope of Colorado.



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“They’re among the largest non-consumptive water rights on the Colorado River, the first being the senior water right that was appropriated in 1902, that carries 1,250 cubic feet per second (cfs), and the second water right that’s associated with the Shoshone Hydro Power Plant, that’s an additional 158 cfs, so that’s a total of 1408 cfs,” Moyer said.

Non-consumptive means that this water is diverted from the Colorado River, but is then put back, ensuring that any water used can then be beneficial later on in its journey downriver.

“It also means that the river operates year-round,” Moyer said.

Moyer explained the district’s reasoning for wanting to go forward with purchase now: “We’re standing on a decades-long foundation of many governmental entities that have worked pretty tirelessly to line up these pieces to secure these water rights. We also have a willing partner in Xcel energy, the current owner of the water rights being willing to sell them,” Moyer said.

She added that they have historic funding opportunities on both the state and federal side that make a purchase price for the magnitude of the water rights a real opportunity for the Western Slope. Other reasons for the purchase happening now are seeing impacts of a hotter and dryer future, and the stability of Western Slope in terms of communities that draw on the water.

“Preserving the Shoshone Water Rights is incredibly important to our recreation economy. River recreation contributes \$14.6 billion to the state’s GDP,” Moyer said about the multiple benefits to Colorado and the Western Slope if they attain these rights.

Other benefits of this 250 mile stretch would be for the agriculture, water quality and environment of the Colorado River, which includes four species of endangered fish.

Moyer said that Public Service Company of Colorado and the Colorado River District signed a purchase and sale agreement to transfer ownership of the historic Shoshone Water Rights to the Colorado River District on Dec, 19, 2023, for a purchase price of \$98.5 million.

There are four parts to the agreement. One of those parts is securing funding for that purchase price.

“We’re working with our west slope coalition partners to secure \$10 to \$20 million of that purchase price. The Colorado River District has already committed \$20 million. At the end of January, the state of Colorado, through the Colorado Water Conservation Board, also committed \$20 million to the purchase price,” Moyer said. “All of that is aimed at setting us up for success to request \$49 million from the federal government.” The Colorado River District is requesting these funds in advance to be put into an escrow account, which wouldn’t be used unless they did all that was asked of them in the purchase agreement between the district and the Public Service Company of Colorado.



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“If, for any reason, the purchase and sale agreement was terminated, the funds, with interest, would be returned to all of the coalition partners and public entities,” Moyer said.

The Colorado River District doesn’t need these funds until the end of 2027, but they’re working on these funding commitments now because they believe it’s important to their ask of federal funding.

The City Council authorized staff to sign a letter committing \$100,000 to the purchase of the Shoshone Water Rights. This would be in the budget for 2025.

“I just want everyone to realize how historic this Shoshone Water Rights Purchase is and how it can totally save the western slope in case something ever happened to Xcel or that power plant. So I’m glad they came in and I’m glad we’re partnering with them,” Councilor Clint Hostettler said in their closing comments for the meeting.

Original Article: [Post Independent by Katherine Tomanek](#)

States relying on major river for water are pushing to make a deal before next presidential inauguration — here's why

The seven states that depend on the Colorado River for water have been trying to reach a long-term agreement on water rights before the next presidential inauguration. As the New York Times reported, they are worried that a possible change in leadership could delay negotiations about how they will share the water.

"Whenever there's an administration change, that significantly disrupts things," JB Hamby, Colorado River Board of California chairman and the state's lead negotiator, told the Times. "If we can get a draft ready and in place by the end of the year, that will ensure that we get the hard work done."

However, time is running out to reach a consensus on water allocations. The 1922 Colorado River Compact, which, along with later agreements, determines how Colorado River water gets distributed, has associated temporary guidelines that expire in 2026.

According to the Salt Lake Tribune, the U.S. Bureau of Reclamation — a section of the U.S. Department of the Interior that manages water projects — requested that the states submit their plan this month so the agency would have time to finalize the new regulations.

E&E News reported that the Upper Basin states — which include Colorado, New Mexico, Utah, and Wyoming — are planning to submit their proposal by March 11. Top water officials expect to return to the negotiating table over the next several weeks to hash out details.

The Colorado River — which runs from the central Rocky Mountains in Colorado to the Gulf of California — supplies water to as many as 40 million people in Colorado, New Mexico, Utah, Wyoming, Arizona, California, and Nevada. It's also a vital resource for 30 Native American tribes and Mexico and irrigates millions of acres of farmland, according to the U.S. Department of the Interior.



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Top of Form

Bottom of Form

However, the river faces an increasingly uncertain future because of the changing climate, overuse, and ongoing tensions between the states that share the diminishing resource.

Yale Climate Connections reported that the Colorado River's flows have dropped by 20% since delegates from the seven states initiated the Compact. Without a substantial decrease in heat-trapping pollution, climate scientists said river flows could decline an additional 20% by 2050 and 35% by 2100.

In 2023, the Lower Basin states — California, Arizona, and Nevada — agreed to reduce their water use by three million acre-feet through 2026 in exchange for federal funding. However, water officials and researchers say the states must think long-term and embrace water conservation to tackle the water crisis.

"How do we live with the river that we have, not the river that we hope and dream for?"

Becky Mitchell, the lead negotiator for the state of Colorado, told the Times.

Original Article: [The Cool Down by Kristen Lawrence](#)

Biden-Harris Administration announces \$94 million WIFIA loan to upgrade wastewater infrastructure in New Lenox, IL

Today, the U.S. Environmental Protection Agency (EPA) announced a \$94 million Water Infrastructure Finance and Innovation Act (WIFIA) loan to the Village of New Lenox in northeastern Illinois. The community in New Lenox is growing and putting stress on the water infrastructure. EPA's loan will help finance the construction of a modern wastewater system to meet the needs of over 33,000 community members.

Since 2018, EPA's WIFIA program has announced nearly \$20 billion in financing to support over \$43 billion in water infrastructure projects that are strengthening drinking water, wastewater, and stormwater infrastructure while creating over 140,000 jobs.

"Wastewater treatment is a critical infrastructure service that is essential for the health and wellbeing of communities and important local waterways. EPA's low-cost loans have a track record of success. They save communities millions of dollars and create jobs while improving water infrastructure to help communities like New Lenox thrive," said EPA Acting Assistant Administrator for Water Bruno Pigott. "I'm proud that EPA is helping New Lenox increase their wastewater system's capacity ensuring a dependable system for generations to come."

The Village of New Lenox's New Water Resource Recovery Facility Project will modernize the local wastewater infrastructure to ensure it has capacity to accommodate for its growing population and protect local waterways, like the Jackson Branch stream, from pollution. This funding will help pay for a new resource recovery facility, a new gravity sewer system, a pump station, and force main, which all work to move wastewater from one place to another. This will increase system resiliency, as the village is shifting from



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three outdated treatment plants to one modern plant. Through this project, New Lenox will reduce operations and maintenance costs and lower energy consumption by about 30%. As a result of this project, New Lenox plans to decommission the existing wastewater facilities, and use the land to create public parks and green space.

“The WIFIA loan program, and the great Staff that assists in the pursuit of the loan, have allowed the Village of New Lenox to reach the 'moon shot' of our strategic goals, rebuilding our entire sanitary system,” said Village Administrator Kurt Carroll.

WIFIA financing, combined with funding from the Illinois Water Pollution Control Loan Program, will allow the community to accelerate their replacement of aging infrastructure. The Village of New Lenox will save \$22 million with EPA’s WIFIA loan while project construction and operation will create over 600 jobs.

Original Article: [EPA by Macy Pressley](#)

Colorado River basin states pitch two alternative plans

After months of tense discussion over the future of the Colorado River, western states that depend on the river’s water submitted two competing plans for how it should be managed in the long-term on Wednesday.

Current guidelines for managing the river expire at the end of 2026. The U.S. Bureau of Reclamation will now consider the states’ proposals before finalizing a long-term management plan ahead of the 2026 deadline.

Water negotiators from lower and upper states along the Colorado River provided the federal government with separate proposals on Wednesday, after states could not agree on how to share the river’s dwindling water supply.

Under the proposal released by Nevada, Arizona, and California, the three states would conserve 1.5 million acre-feet of Colorado River water each year to address structural deficits in the Lower Basin states and future acidification caused by climate change.

Lower Basin states asked the federal government to determine water cuts based on the volume of water in all Colorado River reservoirs, rather than on water elevations in Lake Mead and Lake Powell, like it currently does.

The plan would also establish a 50-50 split between the lower and upper basin states if reductions beyond the initial 1.5 million acre-feet of water are needed.

“While addressing the structural deficit in the Lower Basin is a critical step in stabilizing the Colorado River, developing durable, long-lasting solutions requires all water uses to manage demands and commit to water conservation,” said Southern Nevada Water Authority General Manager John Entsminger, Nevada’s representative on the Colorado River. “Providing a framework that would better align future water demands with available supplies, the Lower Basin (plan) provides greater protection for the river and more certainty for its users.”



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A competing proposal from the Upper Basin states of Wyoming, Colorado, New Mexico and Utah on Wednesday suggested the federal government determine water cuts based on the water levels in Lake Mead and Lake Powell, instead of all Colorado River reservoirs, as suggested by Nevada, Arizona, and California. As part of their proposal, Upper Basin states also asked the federal government to determine their reductions using actual water conditions in October, rather than predictions in August as it does now.

Water negotiators for Nevada, Arizona, and California described their proposal as a “more holistic approach to Colorado River management” that could provide more certainty to Lower Basin states’ water users.

“The Lower Basin Alternative creates resiliency and proposes climate change is a shared responsibility of all those that depend on the Colorado River,” said Colorado River Commissioner for California JB Hamby in a statement. “We need new ways of thinking to solve problems that have been unresolved for nearly a century and solutions for future challenges like climate change and extended drought... Each basin, state, and sector must contribute to solving the challenges ahead. No one who benefits from the river can opt out of saving it.”

Last year, Reclamation initiated an environmental review process to develop new rules for post-2026 operations. Since then, water managers across the Colorado River Basin – including federal, state, and tribal managers – have been attempting to negotiate a consensus-based proposal.

All seven Colorado River basin states did manage to agree on a short-term proposal that’s expected to conserve at least 3 million acre-ft of water through the end of 2026, while a new long-term plan is developed by Reclamation.

The short-term conservation plan — supported by all seven Colorado River basin states — was selected by Reclamation as their “preferred alternative” in a final environmental impact study released Tuesday.

Proposed short-term guidelines will allow the federal government to reduce water releases from Lake Powell down to 6 million acre-ft if lake’s surface elevation is predicted to drop below 3,500 ft over 12 months.

Elevations remain historically low

Reclamation Commissioner Camille Calimlim Touton said the short-term agreement will allow officials to prevent the reservoir from falling to critically low levels, while the federal government focuses on building a consensus-based, long-term agreement with all affected states.

“Everyone across the basin has remained united in our shared understanding that we could not, and will not, solve this crisis unless we do so together,” Touton said in a press call Tuesday.

Modeling by the U.S. Bureau of Reclamation, which manages the drought-stricken reservoirs, found that the risk of Lake Powell and Lake Mead reaching critically low levels



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has been substantially reduced, Touton said. Conservation investments and improved hydrology over the last year has reduced the chance of reservoirs falling below critical elevations to 8% at Lake Powell and 4% at Lake Mead through 2026.

As of March, Lake Mead's surface elevation has reached 1,075 ft, its highest level since May 2021, according to the bureau. Lake Mead is 29 ft higher than it was a year ago, and upstream Lake Powell is 41 ft higher.

However, elevations in these reservoirs remain historically low. Lake Powell is still only 34% full, while Lake Mead is 37% full.

"The past two decades have culminated in critically low reservoir conditions in the Colorado River Basin and across the West, putting a strain on people and businesses, and wildlife and their habitats. The prolonged drought crisis is driven by the effects of climate change, including extreme heat and low precipitation," Touten said.

Funds from the Inflation Reduction Act will be used to invest up to \$670.2 million in water conservation efforts, which will support more than half of the total 3 million acre-feet of water conservation stipulated under the short-term proposal. On Tuesday, reclamation officials also announced an investment of \$160 million for three new system conservation implementation agreements in California, which will conserve nearly 400,000 acre-feet of water in Lake Mead through 2026.

The agreements include a partnership between Palo Verde Irrigation District and Metropolitan Water District to conserve up to 351,063 acre-feet of water, a joint deal between Bard Water District and Metropolitan Water District to up 18,090 acre-feet of water, and an agreement by the Coachella Valley Water District to conserve up to 30,000 acre-feet of conserved water through 2026.

However, Upper Basin and Lower Basin states have historically been at odds about how to share Colorado River water, and have struggled to come to agreements during the past few years. Those disagreements have led to a stall in negotiating new guidelines to replace the 2007 Colorado River management rules.

The Department of the Interior's acting deputy secretary, Laura Daniel-Davis, alluded to those pending issues on Tuesday.

"We are committed to pursuing a collaborative consensus based approach to ensure that any action from the department is done with as much consensus as possible," said the Department of the Interior's acting deputy secretary, Laura Daniel-Davis, on Tuesday. "I want to be clear, we are not expecting every single issue to be smoothed out between the upper and lower basin. But the reality is that everyone is saying the same thing. We are all committed to a basin-wide solution."

Original Article: [Source NM by Jennifer Solis/ Nevada Current](#)

**GLOBAL WATER NEWS****Groundwater recharge is sensitive to changing long-term aridity**

Sustainable groundwater use relies on adequate rates of groundwater recharge, which are expected to change with climate change. However, climate impacts on recharge remain uncertain due to a paucity of measurements of recharge trends globally. Here we leverage the relationship between climatic aridity and long-term recharge measurements at 5,237 locations globally to identify regions where recharge is most sensitive to changes in climatic aridity. Recharge is most sensitive to climate changes in regions where potential evapotranspiration slightly exceeds precipitation, meaning even modest aridification can substantially decrease groundwater recharge. Future climate-induced recharge changes are expected to be dominated by precipitation changes, whereby changes in groundwater recharge will be amplified relative to precipitation changes. Recharge is more sensitive to changes in aridity than global hydrological models suggest. Consequently, the effects of climatic changes on groundwater replenishment and their impacts on the sustainability of groundwater use by humans and ecosystems probably exceed previous predictions.

Original Article: [Nature by Berghuijs, W.R., Collenteur, R.A., Jasechko, S. et al. Groundwater recharge is sensitive to changing long-term aridity. Nat. Clim. Chang. \(2024\). <https://doi.org/10.1038/s41558-024-01953-z>](https://doi.org/10.1038/s41558-024-01953-z)

An amplified groundwater recharge response to climate change

Groundwater recharge replenishes aquifers and enables them to sustain irrigated agriculture and household water access, but the sensitivity of recharge to climate change remains unclear. Our analysis of global recharge rates demonstrates their sensitivity to climatic conditions, implying that amplified and nonlinear impacts of climate change on recharge rates are likely.

Original Article: [Nature by An amplified groundwater recharge response to climate change. Nat. Clim. Chang. \(2024\). <https://doi.org/10.1038/s41558-024-01955-x>](https://doi.org/10.1038/s41558-024-01955-x)

How the Groundwater Crisis May Impact Data Centers

For organizations thinking about where to build a data center, there's a new consideration to add to the list: Groundwater availability. Although groundwater conditions haven't traditionally been as important as factors like energy sources and network infrastructure when constructing data centers, groundwater is poised to play an increasingly important role in shaping the reliability and cost-effectiveness of data centers in the decade to come.

Here's why – and what data centers owners can do to help ensure groundwater issues don't undercut their infrastructure strategy.



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Why Data Centers Need Groundwater

The main reason why data centers need access to groundwater is straightforward:

Water plays an important role in cooling IT equipment within many data center facilities, and much of that water is pumped from underground aquifers.

The exact amount of water that a data center consumes in a day can vary depending on the types of cooling systems a facility employs and the efficiency of those systems. But the volumes can be vast: Each Google data center uses about 450,000 gallons of water per day, for example. That's equivalent to the daily water consumption of about 1,500 U.S. households, according to the EPA – and we're talking here about water consumption by Google data centers, which are probably more water-efficient than the average facility.

The Growing Importance of Groundwater to Data Centers

Water availability has always been important for data center cooling purposes. But two trends are now making it increasingly vital.

One is growing pressure surrounding ESG (or however you choose to label goals associated with social and environmental responsibility). More businesses now face mandates from shareholders, customers, regulators and the public at large to be good stewards of the environment, and their ability to protect local groundwater is one facet of ESG. This is why, for instance, AWS has committed to reporting Water Usage Effectiveness (WUE) metrics on a regular basis.

This isn't to say that data center operators had no reason to care about their facilities' impact on groundwater in the past. Water sustainability has always been a noble goal. But the reality is that the surge of interest in ESG means that businesses that once paid little attention to groundwater impact now care about their performance in this regard. The second main reason why groundwater has become more consequential to data center operators is that there is simply less of it to go around. Growing populations, increased use of water for agricultural purposes and prolonged droughts in some regions have contributed to serious groundwater shortages in the United States and beyond.

Mitigating Groundwater Shortages for Your Data Center

Compared to other types of ESG challenges, groundwater shortages are especially hard for data center operators to address. You can address demand for renewable energy by building solar panels or wind farms, for instance. But you can't make more groundwater. There are, of course, steps that data center operators can take to use the groundwater available to them more efficiently. Raising the overall server room temperature can reduce cooling needs, decreasing the amount of water necessary for cooling. HVAC system modernization can improve water usage efficiency, too. And "recycling" water by recirculating it through cooling systems, as opposed to feeding new water into the systems constantly, can reduce overall water use.

That said, water efficiency measures like these only go so far. Faced with the risk that groundwater aquifers might run totally dry, some data center operators may need



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to do more than simply invest in water efficiency. They'll need to reconsider where they build data centers in the first place.

Relocating Data Centers To Protect Water Access

This is why, over the coming decade, the industry may see a move to relocate data centers to regions that provide more sustainable groundwater supplies.

Currently, several of the regions in the United States where data center concentrations are densest – such as Phoenix, Dallas and parts of California – are among those experiencing varying degrees of water availability crises. Data center owners that want to reduce the impact of their facilities on the environment are likely to need to move their infrastructure to places with more water.

For that reason, we may see more data center construction in places like the Eastern United States, which so far has been less affected by water shortages. It's also possible that data center operators will invest in infrastructure capable of moving water across long distances to mitigate local groundwater limitations, but that's an expensive proposition that may not permanently solve groundwater challenges for the industry.

Original Article: [Data Centre Knowledge by Christopher Tozzi](#)

Two billion people are threatened by land subsidence

In an era where nearly two billion people worldwide are threatened by land subsidence, understanding and addressing this geohazard has become a critical mission.

Land subsidence involves the sinking of the earth's surface, triggered by a range of natural and human-induced factors. This process presents significant risks to urban infrastructure, agriculture, and the availability of water resources.

Natural vs. human factors

Subsidence can unfold in two distinct ways: it can strike suddenly or emerge gradually over years. This phenomenon is driven by a mix of natural events, such as earthquakes and volcanic activity, and human actions, including groundwater abstraction and mining. Subsidence poses a significant challenge in densely populated areas. There, it can cause buildings to collapse and damage vital infrastructure. Such events not only endanger lives but also add complexity to the management of resources.

Furthermore, experts have identified groundwater abstraction as a primary catalyst for subsidence. This process involves actively removing water from underground reserves for both consumption and irrigation.

As water is extracted, the ground above it compacts, leading to sinking land. This connection between groundwater use and subsidence highlights the urgent need for careful water resource management.

AI-powered insights into subsidence

A recent study sheds new light on this issue. The research was led by Tsimur Davydenko, a Ph.D. researcher at Colorado School of Mines, along with Dr. Pejman Tahmasebi and



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Professor Nima Shokri. The team utilized deep machine learning to predict global land subsidence impacts.

“Land subsidence is a destructive phenomenon that damages infrastructure and aquifers, as well as putting human lives at risk. Population growth has played an undeniable part in resource extraction that has led to subsidence,” noted the researchers.

The groundbreaking work has led to the creation of the world’s first global map of subsidence rates. This map serves as a vital tool, informing groundwater management policies and guiding efforts to mitigate subsidence.

Widespread impact of subsidence

The researchers conducted an extensive analysis of 46,000 subsidence scenarios, taking into account variables such as climate, geography, and soil composition.

Through rigorous examination, the team determined that over 6.3 million square kilometers of land are at significant risk of subsidence. This area is home to nearly 25% of the global population, highlighting the widespread impact of this issue.

Mitigation and adaptation strategies

The research also underscores the importance of reducing reliance on groundwater. Proposed strategies include enhancing water use efficiency, implementing stricter regulations, promoting water-smart agriculture, and investing in water recycling technologies.

Additionally, exploring alternative water sources like treated wastewater and rainwater harvesting could play a crucial role in sustaining water supplies without further depleting groundwater reserves.

The findings reveal that unconsolidated sediments are particularly vulnerable to subsidence, with cultivated lands being the most at-risk. Regions like South Asia face the highest threat, with millions of people potentially impacted.

Broader implications

The research serves a dual purpose: it aids in the planning and preparedness of communities affected by subsidence and lays the groundwork for refining predictive models. These improved models will help local authorities develop targeted strategies for mitigation, enhancing the resilience of vulnerable areas.

The researchers noted that enhancing these models to capture details such as groundwater abstraction depth and the impact of industries will be vital in addressing the intertwined challenges of population growth, groundwater dependency, and climate change-induced droughts.

With land subsidence poised to remain a critical global issue, the integration of innovative research, strategic policy-making, and community engagement will be essential in safeguarding our future.

Original Article: [Earth.com by Rodielon Putol](#)



VELES WATER WEEKLY REPORT

Water Works: Jacobs And Mott MacDonald Team Up For Thames Water's Multi-Billion Pound Projects

Jacobs Solutions Inc J, along with Mott MacDonald, has been selected by Thames Water as the technical partner to support the delivery of its future asset investment programs worth \$5.9 billion (£4.7 billion).

Thames Water is one of the top water and waste utility companies in the U.K. The SRO technical framework supports three major water infrastructure projects critical to delivering water security for the south of England: the London Water Recycling, South East Strategic Reservoir Option and Severn to Thames Transfer projects.

As per this eight-year professional services framework deal, Jacobs and Mott MacDonald will deliver several technical, engineering, environmental, regulatory and planning consent services to take the schemes through the development phase and into delivery. Jacobs Senior Vice President Kate Kenny said, “Jacobs and Mott MacDonald combine tremendous global capabilities from major complex water infrastructure programs, and together with our U.K. planning experience will provide innovative support. As the need for long-term, integrated water management solutions intensifies, we’ll work collaboratively with Thames Water to solve some of the U.K.’s greatest water resources challenges.”

Last month, Jacobs Solutions reported first quarter FY24 results, with revenue and EPS exceeding estimates, with a 9.5% YoY revenue growth and adjusted EPS of \$2.02.

Original Article: [Trading View/ Bezinga](#)

Water companies to invest more than £180m to tackle sewage spills

Water companies are to invest more than £180m to tackle sewage spills as part of a fast-tracked investment in overflow prevention measures by April 2025.

The investment includes artificial intelligence systems, accelerated wetland programmes, installing new in-sewer monitors and recruiting and training specialist staff.

The government said it expects the measures to prevent more than 8,000 spills polluting English waterways.

Water bills to rise in England and Wales by 6% from April

Anglian Water will invest £50 million, Severn Trent will invest £41 million, Southern will invest £10 million, South West will invest £32 million, United Utilities will invest £39 million and Wessex will invest £8 million.

Environment Secretary Steve Barclay said the investment is part of government efforts to “push for better performance from water companies and hold them to account”.

He said: “The amount of sewage being spilled into our rivers is completely unacceptable and the public rightly expects action.



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“This money will mean more cutting-edge technology, including artificial intelligence, and more specialist staff to detect and reduce spills.

“Today’s announcement builds on significant work by this Government to protect and strengthen our waters with increased investment, stronger regulation and tougher enforcement action.”

The investment will add to the water companies’ previous £3.1 billion investment for the period of 2020 to 2025.

It is the latest move to tackle concerns over levels of pollution being dumped into rivers, lakes and around the coasts from sources including overflow pipes and processing plants, causing harm to wildlife and the health of beachgoers as well as affecting tourism and leisure industries.

Giles Bristow, chief executive of Surfers Against Sewage, said: “It’s great to see the Government fast-tracking investment on the decades-old issue of sewage pollution.

“The informed and angry voices of constituents across the UK are clearly making those in power listen and take visible actions to address the sewage scandal.

“Despite today’s welcome announcement, questions still remain on the scale and scope of the Government’s ambitions for our rivers and seas.

“We’ll be watching closely to ensure that it’s the polluters, not the consumer, that pays to clean up this mess.”

Original Article: [ITV News by South West Water](#)

Thames Water accused of ‘misleading’ customers over level of debt payments

Thames Water has been accused of “misleading” customers after telling them that just a few pennies in every pound spent on their bills is paid to its lenders.

The debt-laded firm is Britain’s biggest water company, serving 16 million customers in London and the south-east of England. It has sent a breakdown of its costs in bills to customers, including spending 48p of every pound on infrastructure, 20p on the supply and treatment of water, and 3p to its lenders.

However, critics of the company said Thames was playing down the true cost of its £14bn debt pile after analysis by the Guardian found the firm had on average spent almost 28% of its annual revenues servicing its debts between 2018 and 2023. Nearly all of Thames’s revenues come from customer bills.

In its bill breakdown, Thames said: “To invest in our network, we borrow money at efficient rates while keeping your bills as low as we can.”

In a similar breakdown in the company’s annual report, it included the 3p figure alongside a caveat that explained it was based on “net cashflows”, excluding new loans raised, repayments of borrowings and other financing costs.

The campaigner and former Undertones singer Feargal Sharkey said: “It is misleading. If one lesson has been learned in recent years, it’s that water companies cannot be



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trusted. Whether it's about how they finance their debt or how much sewage is being dumped."

Original Article: [The Guardian by Alex Lawson, Anna Leach and Carmen Aguilar Garcia](#)

Water credits market being created to unblock development

The Budget confirmed that Cambridge is a model of sustainable urban growth and has committed to its future as an innovative economic centre.

In its Case for Cambridge, the plan is to develop Cambridge as Europe's science capital, expanding on its current research base as a leader in life sciences and tech innovation. The future development corporation will receive long term funding settlement at the next Spending Review.

There are plans to build 150,000 homes in the area by 2050.

The government also announced £10.2m to support the development of the Cambridge Biomedical Campus, Europe's leading centre for medical research and health science and £7.2m to unlock improvements to transport at the Campus, opening new opportunities for infrastructure-led development. A further £3m is granted to support the Cambridge University NHS Trust with developing longer term capacity and delivery plans for the site.

But previous development plans have been held up by Environment Agency objections to several planning applications in the Cambridge area due to increased abstraction and risk deterioration to water bodies.

In a joint statement from Department for Levelling Up, Housing and Communities (DLUHC), Department for Environment Food and Rural Affairs (Defra), the Environment Agency and Greater Cambridge Shared Planning Service announced guidance and a new water credit system in an attempt to unblock the restrictions on construction.

It says that Cambridge Water's previous draft Water Resources Management Plan (WRMP) was not able to satisfactorily demonstrate that there was enough water to supply all of the new properties contained in the emerging joint Local Plan without risk of deterioration of the local water environment, including chalk streams.

"We expect Cambridge Water to publish and deliver a WRMP to provide a sustainable, safe, sufficient supply of water to meet all of the planned development in the future across the Cambridge area.

"The water company will need to work closely with other water companies to ensure delivery of major new water resource infrastructure. This includes working with Anglian Water and Affinity Water to develop new transfer of water to Cambridge from Grafham Water, and supporting work from Anglian Water, to develop a new reservoir in the Fens. We are committed to working together to support this longer-term work in our respective roles."



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DLUHC and Defra, working with the Environment Agency and local partners, have made a significant commitment, including major investments in water savings measures to offset water usage associated with new development.

Water credits

The government has spent nearly £9m on the development of a water credits market. The scheme is currently being designed and will be tested shortly, together with a launch of a wider communications push "to allow the people and businesses of Cambridge to use water wisely and help protect the environment." The scheme will be operational for as long as it is required. Those living and working in the Greater Cambridge area will be able to access free water saving devices such as new shower heads and taps.

Modelling undertaken by DLUHC demonstrates that the scheme should deliver water savings that are sufficient to address concerns raised around sustainable water supply to the Cambridge area. Ongoing monitoring, undertaken with partners including the Environment Agency, will aim to ensure the savings are realised to an agreed timeline, it says.

The statement says a robust water credit system will be in place to assure those water savings and credit certificates will be issued to developers and housebuilders. And it wants application of enforceable planning mechanisms so that planning permissions are linked to water savings measures in a robust way.

The scheme is expected to unlock 9000 homes and 300,000sq m of commercial space. A market framework is being established with a market operator overseeing water credits which are allocated to developers to ensure that the impact of water demand from new development is neutralised. Initial government investment will be used to retrofit both household and non-household properties in Cambridge to provide the initial credits, with any property owners meeting the market requirements for retrofits able to supply the market in future.

Once the system is up and running the market operator will match up buyers and sellers of water credits. Developers will be expected to increase levels of water efficiency and reuse (where possible), with the remaining water that cannot be reduced, offset through the purchase of credits. Water savings provided through retrofits will be monitored and assured, using water company metering data and assured through the EA and the market operator.

Defra is encouraging water companies to provide developer incentives for meeting a standard of 110 litres per person per day (l/p/d) or lower, which could relieve some of the burden. Examples include the discount or zero charge provided by United Utilities, Severn Trent, and Northumbrian Water. The United Utilities discount has saved developers more than £25m and created a potential saving of 3.8m l of water per day. Thames Water also provide a £200 per home developer incentive for using the fittings-based approach.



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The government says it is investing over £1m in nature-based solutions (NBS), which can effectively enhance the long-term flow of water bodies, improve resilience to floods and improve biodiversity. "It will ensure water that would otherwise flow out to sea is captured for public use. A further £1.45m in agriculture will position Cambridge as a trailblazer area for the government's national approach to water management in the agricultural industry."

On nature-based solutions, groundwater modelling of NBS in the Cam catchment suggests NBS could have a significant benefit for sustaining groundwater and river flow levels, with results showing that they could offset up to 8.1ML/d of additional abstraction as part of a water neutrality approach for the catchment. This would maintain access to water for longer during dry periods and would help prevent deterioration of water bodies. A Water Resources East trial of nature-based solutions in the Cam catchment is underway to see if this theoretical modelling works in practice.

If demonstrated, then NBS could provide an additional water saving mechanism which, over the long-term, can be sustainably funded through the water credits system. This would allow landowners to restore their land and receive investment for doing so and private investors can offset additional water use in new developments.

Original Article: [Environment Analyst/ Brownfeild and Regeneration Network](#)

Thames Water not included in £180m sewage cleanup plan. It has an £8bn bill instead

More than £180m has been stumped up to clean up Britain's sewage network, but the country's biggest offender Thames Water is left off the list.

Water companies have 'fast-tracked' funding for the next year which is set to prevent around 8,000 sewage spills, which pollute English waterways.

The environment secretary made the announcement this morning. saying it would include investment in AI systems to manage stormclouds, new in-sewer monitors, as well as new recruitment.

This comes after the Secretary of State wrote to water and sewage companies last year, directing them to reduce sewage, by ramping up their commitments to deliver new funding.

It is understood the environment agency is disappointed that Thames Water did not make a fresh funding commitment, and was unable to accelerate investment.

According to Bloomberg, six English water firms included are Anglian Water Services, Severn Trent, Southern Water, South West Water, United Utilities Group and Wessex Water Services.

The funding commitment raised eyebrows, as it fails to include Thames Water, the biggest water company that services greater London.

Thames Water has come in for major criticism in recent years for its sewage spillages and water leaks.



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In a bid to get a grip, it has built up a mammoth £18bn debt pile, amid swirling rumours the utilities behemoth will be wound down or nationalised.

When approached for comment, Thames Water outlined that it has spent – and is intending to invest – in a total of almost £8bn to clean up its act. A far cry from the £180m committed by the six other firms.

Original Article: [Yahoo Finance by Jack Mendel](#)

Drought impact on pharmaceuticals in surface waters in Europe: Case study for the Rhine and Elbe basins

Hydrological droughts are expected to increase in frequency and severity in many regions due to climate change. Over the last two decades, several droughts occurred in Europe, including the 2018-drought, which showed major adverse impacts for nature and different sectoral uses (e.g. irrigation, drinking water). While drought impacts on water quantity are well studied, little understanding exists on the impacts on water quality, particularly regarding pharmaceutical concentrations in surface waters. This study investigates the impact of the 2018-drought on concentrations of four selected pharmaceuticals (carbamazepine, sulfamethoxazole, diclofenac and metoprolol) in surface waters in Europe, with a major focus on the Elbe and Rhine rivers. Monitoring data were analysed for the period of 2010–2020 to estimate the spatiotemporal patterns of pharmaceuticals and assess the concentration responses in rivers during the 2018-drought compared to reference years. Our results indicate an overall deterioration in water quality, which can be attributed to the extremely low flow and higher water temperatures ($\sim +1.5$ °C and $+2.0$ °C in Elbe and Rhine, respectively) during the 2018-drought. Our results show an increase in the concentrations of carbamazepine, sulfamethoxazole, and metoprolol, but reduced concentrations of diclofenac during the 2018-drought. Significant increases in carbamazepine concentrations (+45 %) were observed at 3/6 monitoring stations in the upstream part of the Elbe, which was mainly attributed to less dilution of chemical loads from wastewater treatment plants under drought conditions. However, reduced diclofenac concentrations could be attributed to increased degradation processes under higher water temperatures ($R^2 = 0.60$). Moreover, the rainfed-dominated Elbe exhibited more severe water quality deterioration than the snowmelt-dominated Rhine river, as the Elbe's reduction in dilution capacity was larger. Our findings highlight the need to account for the impacts of climate change and associated increases in droughts in water quality management plans, to improve the provision of water of good quality for ecosystems and sectoral needs.

Original Article: [Science Direct by Mark P. Lentz, Duncan J. Graham, Michelle T.H. van Vliet](#)



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