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January 13th 2022

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Welcome to **WATERTALK**

by Joshua Bell

CLICK THE LINK BELOW

“A 2 minute technical analysis video of H2O futures”

https://vimeo.com/665537753
The new NQH2O index level of $706.39 was published on the 12\textsuperscript{th} of January, down $27.51 or 3.75%. The Futures have traded at a discount to the index of $1.90 to a $17.39.

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

- January 22: 688@696
- February 22: 670@701
- March 22: 675@745
- June 22: 758@820
The graph above lays out the Nasdaq Veles water index by year, showing 2013-2022. In very dry years, prices clearly rise through the spring, peaking in May to July (with the exception of 2015) as demand for water from farmers peaks. Prices then taper off heading into the winter on reduced demand, and the possibility of rain/snow. The restricted ability to “carry” water, much like one can do with financial contracts, gives this index the same type of seasonal pattern that one sees on some other commodities.

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

(John H Dolan, CME Market Maker)
Over the last week the January future volatility high has been 2.46% on January 12th and a low of 0% for the rest of the week.

For the week ending on the January 12th the two-month futures volatility is at a premium of 1.99% to the index, down 1.99% from the previous week. The one-month futures volatility is at a premium of 1.25% to the index, down 0.62% from last week. The one-week futures volatility is at a premium of 0.91% to the index, down 0.45% from the previous week. The one-week futures volatility has jumped by 3.12% week on week on week and the one month volatility has jumped 2.91% week on 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 Index

Central Valley average is calculated using data from 19 weather stations in the Central Valley, California. Data as of 12/01/2022

<table>
<thead>
<tr>
<th>STATION</th>
<th>MTD (INCHES)</th>
<th>WEEK ON WEEK CHANGE (INCHES)</th>
<th>% OF 20 YEAR AVERAGE MTD</th>
<th>2022 WYTD VS 2021 WYTD %</th>
<th>2022 WY VS 20 YEAR AVERAGE TO DATE %</th>
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</thead>
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<tr>
<td>SAN JOAQUIN 5 STATION (5SI)</td>
<td>0.04</td>
<td>0.04</td>
<td>0.64%</td>
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<td>138</td>
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<tr>
<td>TULARE 6 STATION (6SI)</td>
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<td>0.00</td>
<td>0.00%</td>
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<td>127</td>
</tr>
<tr>
<td>NORTHERN SIERRA 8 STATION (8SI)</td>
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<td>0.57</td>
<td>18.50%</td>
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<tr>
<td>CENTRAL VALLEY TOTAL</td>
<td>1.40</td>
<td>0.20</td>
<td>6.38%</td>
<td>34</td>
<td>138</td>
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</tbody>
</table>

**RESERVOIR STORAGE**

<table>
<thead>
<tr>
<th>RESERVOIR</th>
<th>STORAGE (AF)</th>
<th>% CAPACITY</th>
<th>LAST YEAR % CAPACITY</th>
<th>HISTORIC ANNUAL AVERAGE CAPACITY %</th>
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</thead>
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<tr>
<td>TRINITY LAKE</td>
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<td>SHASTA LAKE</td>
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<td>33</td>
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<td>54</td>
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<tr>
<td>LAKE OROVILLE</td>
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<td>78</td>
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<tr>
<td>SAN LUIS RES</td>
<td>704,541</td>
<td>35</td>
<td>48</td>
<td>52</td>
</tr>
</tbody>
</table>

Reference: California Water Data Exchange
Snow Water Equivalent Dashboard

*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.*
The US Drought Monitor release their statistics with a 1-week lag to this report. Over the past week there has been significant class 1 improvements in extreme (D3) drought conditions 16.33%. Severe Drought (D2) conditions have improved by 18.66%. For the first time in over a year the recent precipitation has improved moderate (D1) drought conditions by 0.70%.
The current satellite picture shows a dispersing weather system in the Vancouver Seattle region bringing precipitation to this region.

To the West of this, there are 2 frontal systems approaching which may bring precipitation to the Northern US.

The South Western US looks dry with a high pressure system in place which will mean this week will be a dryer than average week.

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

Our models are still showing that there will be more ongoing precipitation over the next few months.

10 Day Outlook
High pressure over the region with an upper level low meandering offshore of the Southern CA/Baja coast bringing dry conditions over the weekend. Models continue to differ with the track timing and strength of this low. It may get close enough and move inland to Southern CA on Monday for scattered light precip. The forecast mainly uses WPC with a little EC and GFS on Monday. A shortwave approaches the Pacific NW coast early Tuesday for possible light precip for far NW CA. Precipitation amounts are only a few hundredths or less. Generally dry conditions with below normal precipitation expected to continue through next week.

Reference: National Weather Service / California Nevada RFC / Sacramento CA
Heavy precipitation and a generous snowpack in mountainous areas led to more improvement here, based in part on monthly statistics for December. Improvement was brought into large swaths of the region, especially across central Montana, much of Idaho and Utah, western Nevada, and part of central and southern California. It was a wet week with 2 to locally 6 inches of precipitation reported from the Cascades westward to the Coast in the Pacific Northwest and adjacent parts of California, further reducing dryness and drought in areas where such conditions have already been removed. Some areas in California already received more precipitation in the last 3 months than they had in the prior 12 months.

Reference:

Richard Tinker, NOAA/NWS/NCEP/CPC
Curtis Riganti, National Drought Mitigation Center
Rising heat and hardships could hit San Joaquin Valley within three decades, study predicts

Within three decades, the San Joaquin Valley’s annual average temperature could increase by 4 degrees, worsening water quality and health hazards in the impoverished communities of California’s agricultural heartland, according to a new regional climate change report. Those hit hardest by the increasing heat will be poor farming communities that lack the resources necessary to adapt, according to the UC Merced report. That conclusion was based on dozens of recent scientific studies on a variety of issues related to climate change, and assumes a worst-case scenario for global carbon emissions.

“Many families in San Joaquin Valley rely on agriculture as their main source of income,” said Jose Pablo Ortiz-Partida, a climate and water scientist for the Union of Concerned Scientists and co-author of the report. “Now, climate change is gunning for them. They need all the help they can get.”

The report, part of California’s Fourth Climate Change Assessment, paints a dire portrait of life in the southern Central Valley as increasing water scarcity, poverty, low air quality and rising temperatures conspire to erode health, economic opportunity and environmental resources for the region’s most disadvantaged.

“Not every San Joaquin Valley community has the resources to become climate-resilient — and that breaks my heart,” said Ortiz-Partida, who collaborated on the 99-page report with researchers at UC Merced and Cal State Fresno. “Climatic changes are coming on too fast. Wells are already going dry, and more and more people are struggling for basics such as food and clean water in a region of 4.3 million residents — 55% of whom live in poverty.”

The valley’s annual average maximum temperature increased by 1 degree from 1950 to 2020, the report says, and is projected to increase by as much as 4 to 5 degrees by midcentury.

If heat-trapping greenhouse gases continue to rise at high rates, the report suggests, half of the Valley’s eight counties will have average annual maximum temperatures over 80 degrees by the end of the century, which is more than an 8-degree increase compared with historical conditions.

Chronic diseases and heatstroke will probably increase with climate change, according to the report, along with “deterioration of private property, canals, dams, roads, and railways. Levees protecting floodplains, cities, and farmlands will become more unstable
VELES WATER WEEKLY REPORT

due to increasing land subsidence, droughts and associated over-pumping, wildfires and floods.”

These changes are already underway in the nation’s leading agricultural center, renowned for its abundance of row crops, dairies, grapes, almonds and pistachios. The changes are due to a convergence of forces: increasingly frequent droughts and heat waves that are fueled by climate change; new environmental protections and state groundwater regulations; and cutbacks in water allocations, authors say.

As Valley farmers have continued to drill more and deeper wells, groundwater levels have plummeted. At the same time, pesticides and nitrates from fertilizer and animal waste have leached into the groundwater supplies of small farming communities such as Tooleville, East Orosi and East Porterville in Tulare County and Tombstone Territory in Fresno County.

Original Article: The LA Times by Louis Sahagún

Here’s what Gov. Gavin Newsom plans to do with California’s multibillion-dollar surplus

Buoyed by another massive surplus, Gov. Gavin Newsom on Monday unveiled a wide-ranging $286 billion spending proposal for 2022-23, prioritizing more money to fight COVID-19 and tackle climate change, homelessness, the rising cost of living and other issues that plague the Golden State.

The state is so flush with cash, with a surplus projected at more than $45 billion, the governor will be faced with a little-known provision that may force California to do something else with its bounty in the coming year: Give state taxpayers some of their money back.

At a marathon news conference Monday, laden with slides, Newsom kicked off the state’s annual six months of budget negotiations with a positive note about California’s finances after another strong year for stocks and a record housing market that stuffed the state’s coffers.

“I’m optimistic about the future,” said Newsom, who warned that the state’s financial picture could change and priorities could shift as the pandemic rages into its third year. Newsom demurred when asked whether the state would send some of its surplus back to taxpayers in the form of more stimulus checks.

“That’s an open-ended question,” he said, adding that the state’s projected surplus — which the state’s Legislative Analyst’s Office tabbed at $31 billion last fall — could shift significantly in the coming months. But, he said, “there likely will be substantial contributions back to taxpayers.”

Under California law, Newsom may have little choice. The voter-approved Gann limit is a spending cap that sets a limit on the amount of money the state can spend, although there are ways to restructure a budget to avoid triggering the limit. Right now, Newsom’s team thinks the state could exceed the limit by more than $2 billion.
VELES WATER WEEKLY REPORT

With schools struggling to rebound after a devastating year of online learning, the 2022-23 budget proposal calls for $70.5 billion on K-12 education and another $21.8 billion on higher education.

Perhaps Newsom’s most urgent priority is a $2.7 billion COVID-19 response package aimed, in part, at expanding testing capacity and bringing in more medical workers as the state heads into its third year of the ongoing pandemic. Unlike his other budget proposals, Newsom wants lawmakers to green light spending some of that money soon, as the state faces an ongoing surge of the highly infectious omicron variant.

The budget also aims to address more long-standing problems, including climate-related issues such as wildfires and drought. It calls for an additional $1.2 billion to boost forest management and $750 million to round out last year’s $5.2 billion water package to help residents, farmers and wildlife respond to the historic drought. Long-term, the budget proposes spending $6.1 billion in 2022 and 2023 for incentives to expand electric vehicles, trucks and buses, along with building charging stations and creating programs to encourage in-state manufacturing.

In 2020, Newsom announced that California would become the first state in the nation to ban the sale of new passenger vehicles that run on gasoline, starting in 2035, as a key effort to reduce climate change. Newsom also proposed Monday spending $4.2 billion on the controversial high-speed rail project and $3.7 billion on regional and local transit and rail programs, like light rail, ferries and bike lanes.

Original Article: Mercury News by Emily Deruy

California’s recent rains won’t end our stubborn drought.

California just received more precipitation in the last three months of 2021 than it got in the previous year. The mountains are heaped with historic amounts of heavy snow. But the rain had no sooner given way to sun than state regulators issued new rules forbidding water-wasting practices such as hosing down sidewalks and driveways. What’s going on?

The short version is that, although 33.9 trillion gallons of water have fallen on the state since Oct. 1, that’s not enough to wash away our tenacious drought. Here are some graphics to help to tell the story.

The latest U.S. Drought Monitor report, released Thursday, shows continuing improvement across the West because of what it called heavy precipitation and generous snowpack in mountainous areas. But all of California still remains in some level of drought. And much of the state remains in the severe or extreme category.

Though many Southern California locations are near or above 200% of normal precipitation through December, said Jayme Laber, a hydrologist at the National Weather Service in Oxnard, main-stem rivers saw minimal flow, and reservoir and groundwater levels are still low.
Most of Southern California’s bountiful precipitation last month was washed out to the Pacific, and most reservoirs in the region are low, Laber said. For example, Castaic Lake is about 45.6% full; Lake Piru is only 22.9% full; Lake Casitas is at 34.9%. Jameson Reservoir is the most flush, at 66.5%, but it is also one of the smallest reservoirs. Original Article: The LA Times by Paul Duginski

Despite snowpack is 202%, drought far from over according to officials

The Department of Water Resources (DWR) conducted the first snow survey of the season at Phillips Station last week and for the first time in a long time, the news was very positive. Early winter storms have provided a strong start to the season and although we aren’t out of a drought just yet, it’s a good start. Last Thursday’s manual snow survey recorded 78.5 inches of snow depth and a snow water equivalent of 20 inches, which is 202 percent of average for this location on this date. The snow water equivalent measures the amount of water contained in the snowpack and is a key component of the Department of Water Resources’ water supply forecast. Statewide, the snowpack is 160 percent of average.

“We could not have asked for a better December in terms of Sierra snow and rain,” said Department of Water Resources Director Karla Nemeth. “But Californians need to be aware that even these big storms may not refill our major reservoirs during the next few months. We need more storms and average temperatures this winter and spring, and we can’t be sure it’s coming. So, it’s important that we continue to do our part to keep conserving; we will need that water this summer.”

Californians only need to look to last winter and the state’s disappointing snowpack runoff due to high temperatures, dry soil and evaporation as a reminder that changes to our climate mean it will take more than an average year to recover from drought.

“California continues to experience evidence of climate change with bigger swings between wet and dry years and even extreme variability within a season. A wet start to the year doesn’t mean this year will end up above average once it’s all said and done,” said Sean de Guzman, Department of Water Resources Snow Surveys and Water Supply Forecasting Unit manager.

December is the first of the three typically wettest months of California’s water year. Significant January and February precipitation would be required to generate enough runoff to make up for the previous two winters that were California’s fifth- and second-driest water years on record.

California has experienced wet Decembers before, only to have storms disappear for the season’s remainder. In 2013, the first snow survey provided promising results after a wet December, similar to this year. However, the following January and February were exceptionally dry and the year ended as the driest on record, contributing to a record-breaking drought.
VELES WATER WEEKLY REPORT

On average, the Sierra snowpack supplies about 30 percent of California’s water needs and the snowpack is an important factor in determining how the Department of Water Resources manages the state’s water resources. Its natural ability to store water is why the Sierra snowpack is often referred to as California’s “frozen reservoir.”

As spring sets in, the snowpack begins to melt. Water that is not absorbed into the ground, called “runoff,” trickles into mountain streams, which feed rivers and eventually aqueducts and reservoirs, where it can be stored for use throughout the dry season. Climate change is affecting California’s snowpack, as more precipitation falls as rain and less as snow. Excessively dry soils and dry, warm spring temperatures are also reducing yearly runoff.

Due to these climate-induced changes, the Department of Water Resources is investing in partnerships and implementing emerging and proven technologies to improve forecasts of precipitation, seasonal snowpack and runoff to support more efficient water management now and to help estimate the impacts of climate change on future flood and drought conditions. Forecast improvements and monitoring enhancements increase the reliability of data used to inform water managers about flood risks, allowing opportunities to create more storage in reservoirs ahead of big storms while also ensuring water supply reliability in periods of dry or drought conditions.

Original Article: Gold Country Media by Bill Sullivan

Here is a plan to create more water for California

Former Congressman Tom Campbell’s recent commentary “Why the delay on critical water storage projects,” published on these pages on January 3, criticized the California Water Commission’s ongoing failure to build the water storage projects that were approved by voters in 2014. There is an answer to the concerns raised by Campbell: The Water Infrastructure Funding Act of 2022, a constitutional initiative proposed for the November 2022 state ballot.

This initiative, currently being circulated for signatures, requires two percent of the state’s general fund be used to construct new water supply projects, and it doesn’t sunset until new projects add five million acre feet per year to the state’s water supply. Two million acre feet per year can come from waste water recycling, another 1 million from conservation programs, and the rest from runoff capture into off-stream reservoirs and aquifers. And to ensure projects are environmentally responsible, it still gives the California Water Commission the final authority over what projects to fund.

Instead of identifying specific projects for funding, this initiative carefully defines eligible projects to include everything that would produce more water, from conservation and water recycling, aquifer recharge, new reservoirs and aqueduct restoration to runoff capture and brackish/ocean water desalination. It also funds remediation projects, such as replacing the pipes in public schools in Los Angeles.
VELES WATER WEEKLY REPORT

The initiative is attracting broad based and bipartisan support. The centerpiece of the proposed initiative is the requirement to set aside two percent of the state general fund until 5 million acre feet of water per year is produced by a combination of new water projects and new conservation programs. But this goal is accompanied by a provision of equal importance, a project category eligible for funding that focuses not only on water quantity, but water quality, and water equity. Quoting from the initiative itself (Section 3, subsection (b), part 6), eligible for funding are “projects designed to increase the clean, safe and affordable supply of water to all Californians with emphasis on California’s disadvantaged communities.”

There is a strong environmentalist argument in favor of more water infrastructure. If climate change is a genuine threat, then the need to upgrade California’s water infrastructure becomes more urgent, not less. This initiative funds projects to store storm runoff in off-stream reservoirs and underground aquifers. It funds projects to recycle urban wastewater. It leaves the choice of projects to approve up to the Water Commission, which environmentalists can hardly accuse of being hostile to environmentalist priorities.

There is also a compelling economic argument for more water infrastructure. Subsidizing water infrastructure is easily a tax neutral proposition, if not positive. Lowering the cost of water means lower prices for food, utility bills, housing, and all other products and services that depend on affordable water. This means tax revenues spent subsidizing water projects are offset by less government spending on subsidies and rebates to low and middle income households. And the economic growth enabled by more affordable water creates more profits and more tax revenue.

This simple economic argument, which leans old-school Democrat and decentralizes wealth, used to inform public infrastructure spending without debate. In the 1930s, the Works Progress Administration publicly funded roads, public buildings, rural electrification, and water infrastructure that are still paying economic dividends today. Similarly, in the 1950s and 1960s, the California State Water Project publicly funded a water system that, despite decades of neglect, enables millions to live in coastal cities.

Original Article: Daily News by Edward Ring

Preparation will mitigate water crisis, not restricting water rights

December brought significant snowpack to the Sierra, breaking records set in the 1970s. But areas like Mendocino and Sonoma are still showing severe drought conditions, and our state’s reservoirs have a long way to go to recover from last year’s historic lows. Recent rains unfortunately do not mean rest for California water policymakers, local governments and regional water agencies. With increasingly severe weather conditions year after year, we anticipate that California will be facing significant water deficits on a recurring basis.
Knowing this now, water planners and state leaders can be smarter about how we prepare and how we respond, with the goal of avoiding the extreme steps taken by the state last year to restrict water use.

Ukiah’s experience with water shortages and the Russian River watershed’s dramatic, headline-capturing shortfall in 2021 provides key information for water managers on the state and local level to learn – specifically, the need for strategic, regionally-focused, long-term preparation to prevent last-minute turmoil and curtailments.

To start, city and agency decision-makers must prioritize local infrastructure investment. Conservation and emergency cutbacks are not sufficient. Instead, local communities need a dynamic system that provides flexibility and responsiveness to changing supply levels, demand levels and supply sources.

The city of Ukiah recognized years ago that investing would be critical for ensuring a reliable water supply, given our region’s dependence on the Russian River and increasing drought conditions. In addition to implementing conservation measures for business and residential properties, we shifted emphasis to recycled water supplies and groundwater.

Our recycled water project already helped reduce diversions from the Russian River by 70%-80% this past summer and helped Ukiah residents avoid the most draconian cutback measures.

As part of their strategic planning, decision-makers should look beyond borders at regional needs. Water connectivity is real; building capacity for one region alone in the face of limited shared water resources risks leaving other communities vulnerable to water poverty.

Because we pursued a diverse water portfolio, Ukiah was able to share water to help meet the human health and safety needs of our neighbors. The city’s senior appropriative water right from 1872 proved extremely important as a regional asset, allowing Ukiah to help nearby coastal communities that ran out of groundwater this summer and had no other options.

Finally, the state must reward, not punish, local agencies that plan for responsible water use and make critical infrastructure upgrades. State rules should not impose unfair restrictions on water right holders who have taken steps to ensure they can keep water flowing even when drought conditions are exacerbated. Creating redundancy through diversified water portfolios is the responsible, not wasteful, way forward. Any future curtailments have to be better informed on both the demand and the supply side of the equation, recognizing that water in California is not a zero-sum game.

Given Ukiah’s extraordinary efforts to plan and prepare, we have significant concerns with how the State Water Resources Control Board curtailed pre-1914 water rights in response to the drought. This ruling completely ignored the city’s unique position in terms of its water right seniority, its investments in a diverse and sustainable water
VELES WATER WEEKLY REPORT

portfolio, and its rare ability to execute necessary water transfers. Water curtailments that fail to recognize unique conditions discourage thoughtful planning and thwart the ability to coordinate creatively with regional partners.

Gov. Gavin Newsom’s Water Resilience Portfolio identifies four goals: maintain and diversify water supplies; protect and enhance natural ecosystems; build connections; and be prepared. The state should incentivize cities and stakeholders that are actively working in alignment with the portfolio, rather than hinder their ability to serve their communities.

A smart approach is collaboration on plans that leverage shared technology and engineering, establish regional conservation strategies and respect existing water rights. The realities of California droughts will persist well into the future. Incentivizing and rewarding foresight and thoughtful planning, not forced restrictions, are the keys to helping communities develop meaningful water resiliency.

Original Article: Cal Matters by Sean White

Sen. Bill Dodd introduces remote water monitoring bill

Sen. Bill Dodd introduced a new remote water monitoring bill this week aimed at encouraging more efficient use of water.

With California experiencing longer and more frequent droughts, the new legislation that was authorized on Wednesday will allow for the remote sensing of water diversions and create a more accurate measurement of available resources, according to a press release from Dodd’s office.

“Climate change means Californians must continue to remain vigilant about our water use,” Dodd said. “This bill takes a big step in that direction by helping us more accurately track where this vital resource is going and empowering us to chart a more sustainable water future. It’s a commonsense measure that will help ensure we have water for generations to come.”

Dodd previously wrote laws to the Open and Transparent Water Data Act and reinvigorated the state’s stream gage program to measure in-stream flows. This latest proposal, Senate Bill 832, would authorize the California Department of Water Resources to allow remote sensing technology to measure diversions from major water users including agriculture and municipal water districts. The information would be reported to the California Water Resources Board.

The bill is expected to be supported by California water managers and environmental stewards.

“This is another example of how Sen. Dodd is improving the way we manage our precious water resources across the state,” said Grant Davis, Sonoma County Water Agency general manager.

Original Article: Daily Democrat by Robyn Dobson
Gov. Ducey wants Arizona to invest $1B in desalination, other water infrastructure

Gov. Doug Ducey on Monday proposed spending $1 billion from the state’s general fund over three years to help “secure Arizona’s water future for the next 100 years.” In his final State of the State address, the governor said the budget he sends to lawmakers will prioritize water infrastructure including desalination.

“Instead of just talking about desalination, the technology that made Israel the world’s water superpower,” he said, “how about we pave the way to make it actually happen?” Long discussed as an idea to deliver some of Mexico’s share of the Colorado River without drawing down Lake Mead, seawater desalination on the Sea of Cortez would pump treated water to Morelos Dam near Yuma for distribution in Mexico. The U.S. parties paying into the program would then take some of Mexico’s river water as compensation.

While desalination was the only new water initiative Ducey specified in his speech, his office later emailed a statement noting that the budget would promote new technologies and encourage reuse and efficiency upgrades.

Arizona, Salt River Project and partners in Mexico, California, Nevada and the federal government participated in a binational report on the desalination proposal in 2020. It is estimated that two plants, each situated on the sea’s eastern shore south of Puerto Peñasco and each producing 100,000 acre-feet a year, would cost $3 billion to $4 billion in upfront costs. That and annual operating costs would create a price of $2,000-$2,200 per acre-foot, which consultants determined would be in line with other potential sources of new water.

An acre-foot is 326,000 gallons, which the Arizona Department of Water Resources estimates can support about three households for a year.

The binational desalination report estimated that the river’s users in the Southwest and Mexico will face a water deficit of about 1.2 million acre-feet a year by 2035, so a 200,000-acre-foot project would cover about a sixth of the need. Water recycling, conservation or other projects would need to cover the rest.

In a recent interview, Arizona Water Resources Director Tom Buschatzke told The Arizona Republic that such a plant could come online in the next decade. With climate change creating a hotter and drier river basin, he said, “it’s being looked at much more seriously from both sides” of the border.

Arizona already has committed $100 million over the next two years pay users to keep water in storage behind Hoover Dam and is also in talks with California and Nevada for a potential water-recycling project in Southern California that would allow California to
 Nebraska announces $500M plan to claim water from Colorado

LINCOLN, Neb. -- Nebraska Gov. Pete Ricketts announced a $500 million plan Monday to divert water out of Colorado under a 99-year-old compact between the states that allows Nebraska to seize access to Colorado land along the South Platte River and build canals.

Ricketts said Nebraska would invoke its rights under the South Platte River Compact amid concerns that Colorado's plans for the river could reduce water flows into his state by as much as 90%, taking a potentially huge toll on Nebraska's agricultural and power industries and likely affecting water supplies in the state's two largest cities, Omaha and Lincoln.

“We are very concerned about what is going to happen with these projects,” Ricketts, a Republican, said at a news conference. The reduced streamflows “are going to have a dramatic impact on our ability to feed the world.”

The compact, approved in 1923, is a water-sharing agreement between the states that entitles Nebraska to 120 cubic feet per second (897.6 gallons) from the river during the irrigation season between April 1 and Oct. 15, and 500 cubic feet per second (3,740 gallons) during the non-irrigation season.

Under the compact, Nebraska can build, maintain and operate canals within Colorado's borders that divert water from the South Platte River for use by Nebraska. It also gives Nebraska the power to buy land from Colorado landowners or gain access by invoking eminent domain. Nebraska's move is likely to trigger lawsuits between the states.

Nebraska Attorney General Doug Peterson, a Republican, said Colorado has been issuing water usage permits that would cut into Nebraska's rightful share.

“It’s critical that we be able to maintain these flows,” Peterson said.

Colorado released a report this month that identified 282 new projects within the South Platte River Basin on their side of the border, at a total cost of $9.87 billion. According to the report, the Colorado population living within the river basin is expected to grow 42% to 70% between 2015 and 2050, creating more demand for water. The report also warned that climate change may reduce streamflows and shift snowmelt patterns to earlier in the year, while creating greater agricultural demand for water.

Original Article: ABC News by Grant Schulte/ Associated Press

2021 weather year cost US $145 billion, deadliest since 2011, report says

The United States staggered through a steady onslaught of deadly billion-dollar weather and climate disasters in an extra hot 2021, while the nation's greenhouse gas emissions
VELES WATER WEEKLY REPORT

last year jumped 6% because of surges in coal and long-haul trucking, putting America further behind its 2030 climate change cutting goal.

Three different reports released Monday, though not directly connected, paint a picture of a U.S. in 2021 struggling with global warming and its efforts to curb it.

A report from the Rhodium Group, an independent research firm, on Monday said that in 2021 America's emissions of heat-trapping gas rebounded from the first year of the pandemic at a faster rate than the economy as a whole, making it harder to reach the country's pledge to the world to cut emissions in half compared to 2005 by 2030. And last year was the deadliest weather year for the contiguous United States since 2011 with 688 people dying in 20 different billion-dollar weather and climate disasters that combined cost at least $145 billion, the National Oceanic and Atmospheric Administration said Monday.

That was the second highest number of billion-dollar weather disasters - which are adjusted for inflation with records going back to 1980- and third costliest.

"It was a tough year. Climate change has taken a shotgun approach to hazards across the country," said NOAA climatologist and economist Adam Smith, who compiles billion-dollar weather disasters for NOAA.

Scientists have long said human-caused climate change makes extreme weather nastier and more frequent, documenting numerous links to wild and deadly weather events. They say hotter air and oceans and melting sea ice alter the jet stream which brings and stalls storm fronts, makes hurricanes wetter and stronger, while worsening western droughts and wildfires.

Last year's weather disasters included a record-shattering heat wave in the Pacific Northwest where temperatures hit 116 degrees in Portland, a devastating and deadly cold icy storm in Texas, a widespread windstorm called a derecho, four hurricanes that caused intense damage, deadly tornado outbreaks, mudslides and a persistent drought and lots of wildfires.

While 2020 set the record for the most billion-dollar disasters, in 2021 "the extremes seemed a bit more profound than in 2020," Smith said.

Last year, billion dollar weather disasters were more than twice as deadly as in 2020, when those extremes killed 262 people. The last deadlier year was 2011. Hurricane Maria in 2017 killed nearly 3,000 people in Puerto Rico, which isn't part of the contiguous United States.
Changes in where people live and housing vulnerability were factors, Smith said, "but the 800-pound gorilla in the room is, of course, climate change, because that's accelerating all of these trends in regards to disaster potential for damage."

"We're having these compound cascading events one after another, after another," Smith said. "A lot of trends are going in the wrong direction."

The last five years have cost $742 billion in 86 separate billion-dollar weather disasters, an average of more than 17 a year, a new record. That's nearly $100 billion more than the combined total of all the billion-dollar disasters from 1980 to 2004, adjusted for inflation and far more the three billion-dollar disasters a year that the nation averaged in the 1980s.

Original Article: ABC 7 News by Seth Borenstein/ Associated Press

Groundwater study group releases final report, recommendations for legislature

The Mohave County West Basin Water Users Study Committee has issued its final report, containing 10 recommendations to go before the Arizona Legislature to address groundwater supplies in the basin that serves Kingman and other areas of Mohave County that aren't on the Colorado River.

Rep. Regina Cobb and Sen. Sonny Borrelli served as co-chairs of the 10-member committee formed in August of 2019 to receive and analyze Arizona Department of Water Resources groundwater data for the Hualapai Valley and Sacramento Valley basins and make recommendations to ADWR on programs and policies. The committee met twice in 2019 then suspended operations during 2020 because of the COVID-19 pandemic before resuming activity in August of 2021. The committee met in September, October and November before submitting its recommendations in its final report to ADWR, both chambers of the Arizona Legislature and Gov. Doug Ducey before the end of the year.

At its Nov. 17 meeting, the committee adopted 10 recommendations:

- Legislature should debate and act on legislation to manager groundwater in rural areas and that any such legislation should grandfather in existing irrigators.
- Groundwater legislation should protect property owner and constitutional rights, including property rights, distribution of powers and due process of law.
- Any basin designated as a rural management area should be prohibited from being designated as an active management area.
- Consideration should be given to adopting an irrigation non-expansion area coterminous with a Mohave County rural management area and that the non-
expansion area should allow irrigating additional acreage if doing so does not increase total water usage within the non-expansion area.

- Any management plans for a rural management area be subject to hearings and final approval similar to active management area plans and that the Legislature and ADWR consider existing authorities and separation of powers.
- For the Hualapai Valley and Sacramento Valley basins, a rural management area should be an option for basins or sub-basins at risk based on several conditions.
- Management plans and goals for rural management areas should consider the goals established in voter-approved municipal general plans and adopted comprehensive economic development strategies for any municipality or county within a rural management area.
- Membership of each rural management area should include representatives for certain stakeholder groups.
- A rural management area should be implemented, withdrawals from non-exempt water users should be reported annually, efforts should be made to ensure data for the groundwater model remains accurate and up to date, state resources should be provided for water resource planning and economic development efforts should not relay on water-intensive uses.
- Permanent state funding should be provided for any rural management area.

In addition to Cobb and Borrelli, members of the study committee included State Land Commissioner Lisa Atkins, Mohave County Supervisor Travis Lingenfelter, Sandy Fabritz, Clay Overson, Patrick Cunningham, John Hansen, John Summers and Anita Waite.

The committees analysis and recommendations relied heavily on a comprehensive report prepared by Matrix New World Engineering at the request of the Arizona Department of Water Resources. The committee also heard presentations on separate groundwater models, conducted for the City of Kingman and Mohave County under a 2017 contract with the U.S. Geological Survey.

Original Article: Mohave Valley Daily News

Intel pays water authority $32M to build 6-mile pipeline

For Intel, making the computing chips that power modern devices is impossible without water.

Millions of gallons are needed each day to rinse the chemicals that polish each layer of the tiny semiconductors.

The chip-making giant announced a $3.5 billion retrofit of its Rio Rancho plant in May to boost production capacity of its chip-packaging technology. To support water demand for the expansion, the company will pay the Albuquerque Bernalillo County Water Utility Authority to build a $32 million, 6-mile water pipeline from two wells west of Universe Boulevard to the Rio Rancho plant.
Linda Qian, spokeswoman for Intel New Mexico, said the company will then filter the non-potable groundwater on site into “ultrapure water.”

“We use that ultrapure water to clean the surface of the silicon wafer,” Qian said. “If you think of the chip process as building layers on top of a wafer, in between each of those layers, you rinse with ultrapure water.”

When the 200-acre site opened, Qian said, manufacturing demanded about 2 gallons of fresh water to produce 1 gallon of ultrapure water.

Now, the ratio is about 1 to 1.

Intel estimates demand at the expanded plant could be 1 million to 3 million gallons of water a day.

The pipeline project will also replace well motors, pumps and casings. Intel also uses water for cooling towers, industrial equipment and landscaping.

“Most of our water is used and recycled, and used again, treated and then discharged,” Qian said. “A portion of the water we use is lost to irrigation or some other processes, so our restoration efforts are focused on closing that gap.”

In 2020, Intel pumped more than 756 million gallons of groundwater for its New Mexico plant, according to company data.

The company treated and discharged about 705 million gallons, or 93% of its withdrawals, back into the municipal system.

Intel has a goal of restoring more water than it uses by 2030.

In New Mexico, Intel has funded watershed restoration projects with Audubon, Trout Unlimited and the National Forest Foundation.

Qian said the company is pursuing more water and habitat projects with conservation groups to balance the increase in groundwater pumping.

The city-county water utility treats Intel’s wastewater again before discharging it into the Rio Grande.

Original Article: Rio Ranch Observer by Theresa Davis/ Albuquerque Journal

‘Nonrenewable resource’: As western Kansas dries up, Legislature revisits water policy

For the better part of a decade, the drinking water supply for a small southwest Kansas town was almost constantly contaminated with unsafe levels of radium, a radioactive element that can cause cancer.

The city of Lakin found unsafe levels of uranium in its water in 2007, said Mike Heinitz, the city’s administrator. For years, it sent quarterly notices telling residents they could be consuming high levels of uranium before opening a multimillion dollar treatment facility in 2015.

Now, Lakin’s water meets federal standards. But neighboring Deerfield, downstream on the Arkansas River, might have to pipe in water from Lakin for the same reason.
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Uranium and sulfate flow into Kansas from Colorado on the Arkansas River. Quality of the water in that part of the state is expected only to get worse as groundwater supplies are depleted, causing concentrations of the contaminants to rise. It’s one of myriad water issues facing Kansas that members of the House Water Committee studied in informational meetings last year. This legislative session, committee members will look to reorganize the Kansas agencies that deal in water and identify long-needed funding for projects.

“We learned that it’s not critical, but it’s a situation we need to deal with and we need to have a plan put in place now,” said Rep. Ron Highland, a Wamego Republican who chairs the committee. “And we can’t wait, quite frankly.”

Lakin residents’ water bills doubled, Heinitz said, to pay for the uranium treatment. The High Plains aquifer, which supplies water to huge swaths of Kansas, is fast depleting, threatening farmers’ access to water and, by extension, the state’s largest industry. And in eastern Kansas, reservoirs that provide drinking water are filling with sediment, forcing Kansas to consider costly dredging or come up with another way to protect residents’ access to drinking water.

Highland said the state has, for years, vastly underfunded projects needed to ensure Kansans — and Kansas farmers — have the water they need to survive.

“The funding is a little trickier,” Highland said, “because we’re up against education and all the social programs in our state. And there’s just not enough money to go around.”

Highland didn’t say how the committee might restructure the 16 state agencies that play some role in regulating water quality and quantity. He has some ideas but wants to discuss them with colleagues.

But he said he has spoken with Lt. Gov. David Toland about identifying federal funds to help with some water projects.

Original Article: The Kanas Reflector by Allison Kite

Drought-stricken Oregon farmers embark on water bank pilot program

Central Oregon irrigators will participate in a water bank this summer under a pilot program designed to help drought-stricken farmers get by.

Getting water to Central Oregon farmers who need it most takes time and investment, mainly in the form of new pipelines that are replacing leaky canals. But irrigation districts are also coming up with innovative ways to share water around the Deschutes Basin.

The newest idea is a water bank pilot program which will provide a cash payment to Central Oregon Irrigation District patrons who “volunteer not to use irrigation water for the 2022 irrigation season,” according to the Deschutes River Conservancy, which is facilitating the program. The unused water will be sent to North Unit Irrigation District, a junior water rights holder that has experienced limited water resources during the current drought. Once in the hands of North Unit, the water will be added to the district’s overall supply for the summer of 2022.
Kate Fitzpatrick, executive director of the conservancy, said the program will be evaluated after a year and possibly extended, depending on interest from irrigation district patrons. She said the program is temporary and the COID patrons will retain their water right and can use the water in 2023. “The point of the program is to help with drought relief for North Unit Irrigation District, as well as to restore flows in the Upper Deschutes River,” said Fitzpatrick. The program is potentially lucrative for landowners who don’t want to use their water rights — it’s free money for patrons who may not want to water their property or have no crops or livestock to water. The program is also an option to consider for COID patrons who simply want to help North Unit farmers who depend on water for their livelihood, said Fitzpatrick. Each COID landowner can receive $100 per acre that they don’t water, paid by North Unit. North Unit will also need to pay $25 per acre to COID for administering the program, making the total cost to North Unit $125 per acre. The transfer of water can’t come soon enough for North Unit farmers, who have endured three straight years of drought and regularly fallow around half their properties due to the scarcity of water. One North Unit farmer who is scaling back operations is dairy producer Jos Poland, who sells milk to regional dairy producers, including Ebarhard’s Dairy Products and Darigold. Poland says he is in the process of selling cows now because he can’t grow enough grass to feed them due to the water shortage. Buying hay has also become too expensive, he said. “I am not sure if I am doing the right thing. Ask me in five years if I am doing the right thing,” said Poland. “Other ranchers are cutting their herds, too. They just cannot afford to buy feed to get them through the winter.” Fitzpatrick said it’s not yet known how many acres will be transferred. That figure will be clearer by the start of the irrigation season, which begins Apr. 1. Mid-February is the target deadline for program enrollment. Mike Britton, executive manager for North Unit, said water marketing and transfers have not been used much in the Deschutes Basin, but he is eager to see how the program will work. “We’re hopeful for enough water to make a difference and validate the marketing and transfer process,” said Britton in an email. Original Article: [OPB by Michael Kohn](https://www.opb.org/news/nw/news/veles-water-weekly-report-water-transfer-program-coming-soon/)

**Phoenix among those voluntarily losing Colorado River water**
The city of Phoenix this week outlined how it will voluntarily contribute water to a regional plan to shore up the country’s largest reservoir that delivers Colorado River water to three states and Mexico.
The river cannot provide seven Western states the water they were promised a century ago because of less snow, warmer temperatures and water lost to evaporation. Water managers repeatedly have had to pivot to develop plans to sustain it for the long-term.

Phoenix, the nation’s fifth-largest city, is among entities in the river’s lower basin that are part of the "500+ Plan" meant to delay further mandatory shortages. All pieces of the plan haven’t been finalized, but farmers and Native American tribes are expected to play a big role.

The Colorado River serves more than 40 million people in Arizona, Nevada, New Mexico, Colorado, California, Wyoming, Utah and Mexico. Lake Mead and Lake Powell store the water and are used to gauge the river’s health.

The 500 + Plan will be implemented as Arizona, Nevada and Mexico take the first-ever mandatory cuts from the Colorado River and while water users decide what to do after current rules for managing the river expire in 2026.

**What's the 500+ Plan?**

The plan announced in December provides funding for states in the lower Colorado River basin — Arizona, Nevada and California — plus the U.S. Bureau of Reclamation to find ways to leave 500,000 acre feet in Lake Mead over the next two years.

The risk in not meeting the goal is the lake dropping further absent much precipitation, leading to more painful mandatory water cuts.

The plan is projected to boost the water level of Lake Mead, which has hit record lows, by about 16 feet (4.8 meters). The reservoir straddles the Nevada-Arizona border.

Water managers want to keep the lake from falling to 1,020 feet (311 meters) above sea level. That’s the point at which they believe that the reservoir, with just one more dry year, could hit 950 feet (289 meters) and no longer have the capacity to deliver water to Arizona, California and Mexico.

Nevada has an extra layer of water security with a pipeline it built years ago to draw water below that level.

**Who's contributing water?**

Water users crafted the 500+ Plan within months to create more certainty in the Colorado River supply.

The plan anticipates Arizona contributing 223,000 acre feet and California 215,000 acre feet. An acre-foot of water is enough to serve 2-3 households annually.

In Arizona, Phoenix and the neighboring cities of Glendale, Scottsdale and Tempe, irrigation districts, water agencies, state entities and others have said they’ll chip in.

The Metropolitan Water District in California will work through existing partnerships with irrigation districts and seek new ways to conserve water, said Colorado River resources manager Bill Hasencamp.

The district recently signed an agreement with the Quechan Tribe along the Arizona-California to pay farmers and the tribe not to plant crops in the hotter months when
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water use is highest. That could leave 6,000 acre feet of water in Lake Mead a year for two years, Hasencamp said.
"Yeah, it’s a small piece but an important piece of this plan that’s needed to make the Colorado River sustainable," Hasencamp said.
Nevada will contribute money because it doesn’t have water to give, said Southern Nevada Water Authority spokesman Bronson Mack. The Colorado River supplies southern Nevada with 90% of its water.
"We’re already pretty tight as it is with 300,000 acre feet," Mack said.
The Bureau of Reclamation is expected to contribute about 62,000 acre feet.
Native American tribes will be the biggest players in the plan because they tend to have larger and more secure rights to water that isn’t fully being used. The Gila River Indian Community and the Colorado River Indian Tribes have signed on to the 500+ Plan.
"We see this as a win-win for everybody because we have solutions, we can offer solutions, we can offer ways to save the river," said Colorado River Indian Tribes Chairwoman Amelia Flores. "I’m glad that others are looking at tribes in that way, that we can be an asset and not calling on us at the last minute."

Who’s funding the plan?
The states are required to put up $100 million, and the federal government will match that amount for a total of $200 million.
Phoenix will receive nearly $4.2 million for the 15,977 acre feet it is contributing, which works out to $260 an acre foot. The city will leave that water in Lake Mead rather than store it underground near Tucson as it had planned, said Cynthia Campbell, the city’s water resource management adviser.
Phoenix will use the money for rebate programs for residents to switch to low-flow toilets, smart irrigation control systems and improving the efficiency of cooling towers, Campbell said.
The Metropolitan Water District will pay up to $1.6 million to farmers on the Fort Yuma reservation and the Quechan Tribe to leave fields dry.
The tribe’s water counsel, Jay Weiner, said the tribe is gauging interest among farmers. "It’s really a piece of Quechan trying to be as entrepreneurial as possible, figuring out ways that it can continue to benefit from its water rights for the good of the tribe and its members," he said.

Original Article: Fox 10 News Phoenix by Felicia Fonseca

Rosemont gets approval to store CAP water in basins south of Tucson, over city’s objections

City councilman Steve Kozachik told Star Thursday that CAP violated the 2000 agreement signed to run the Pima Mine Road Recharge Project, and the city believes Rosemont Copper has made this recharge. He said legal action should be taken to prevent the use of charging sites.
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Tucson Mayor Regina Romero said through a spokesman that she would discuss the city’s next steps on this issue at a meeting on January 11th or 25th of the city council.

“Simply put, the city of Tucson opposes the use of our co-owned projects to promote projects that we strongly oppose,” Romero wrote to CAP on Wednesday.

“The city of Tucson, Pima County, Papago, Pasquayaki and other jurisdictions oppose the Rosemont mining project.

“We live here, and despite industry opposition claims, the Rosemont Mine Project reduces our groundwater supply, pollutes our soil and aquifers, and is a private foreign company. I strongly believe that it will benefit the main interests,” writes Romero.

The city’s assistant lawyer, Chris Avery, said if Rosemont Copper wanted to use the facility before the city ordered the use of CAP water last summer in 2022: I am. Rosemont couldn’t use it because it took full advantage of all the space available for the Pimama Inload project that CAP wasn’t using.

Original Article: Eminetra

Texas approves $41M for water infrastructure

The Texas Water Development Board (TWDB) yesterday approved financial assistance totaling $41,580,908 for water and stormwater infrastructure projects:

- $34,530,000 to El Paso County for a flood mitigation project
- $4,751,000 to the City of Corpus Christi (Nueces County) for stormwater system improvements
- $2,299,908 to the City of Comanche (Comanche County) for water system improvements

The TWDB is Texas’s state agency, charged with collecting and disseminating water-related data, assisting with regional water and flood planning, and preparing the state’s water and flood plans. TWDB also administers financial assistance programs for the construction of water infrastructure.

El Paso County received $34,530,000, consisting of $20,718,000 in financing and $13,812,000 in grant funding from TWDB’s Flood Infrastructure Fund (FIF).

The county will use the funds for planning, acquisition, design, and construction of a flood mitigation project: a detention basin to provide flooding benefits to areas served by the El Paso County Water Improvement District and parts of the City of Socorro.

The city of Corpus received $4,751,000, consisting of $3,561,000 in financing and $1,190,000 in loan forgiveness from the Clean Water State Revolving Fund.

The city will use the funds for planning and design of a stormwater system improvement project to enhance a 12-mile section of the Oso Creek channel and several miles of earthen channels that convey stormwater to Oso Creek. The project is anticipated to improve the capacity of the stormwater system and reduce stormwater pollution.
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The city of Camanche received $2,299,908, consisting of $1,506,000 in financing and $793,908 in loan forgiveness from the Drinking Water State Revolving Fund. The city will use the funds for planning, design, and construction of water system improvements, including replacing 10,000 linear feet of distribution lines and approximately 150 water service meters.
Original Article: Water World

GLOBAL WATER NEWS

No, There Will Not Be a War for Water
Some people falsely believe that the Afghanistan takeover by the Taliban during a drought increases the risk of violence over shared waters such as the Helmand and Kabul Rivers. Violent clashes over scarce resources have been predicted as “likely,” or even “certain” for 35 years, and despite such “water wars” never having happened, hypotheses about them keep cropping up around conflict-affected regions such as the Middle East and South Asia. In reality, conflicts are multidimensional with social, political, economic, and ecological drivers producing conflicts through their complex interrelations. Because of these multidimensional conflict drivers, the water war message is wrong-headed and needlessly scaremongering.

What Is the Contemporary ‘Water Wars’ Hypothesis and What’s Wrong With It?
Defense ministers, military generals, NGOs, UN Secretaries-General and environment-focused academics all repeat the misguided hypothesis that increasing resource scarcity leads to conflict. Since Al Gore’s Inconvenient Truth movie, the narrative keeps expanding to include climate-induced mass migration, climate disasters, and even climate wars. Indian geostrategist Brahma Chellaney has recently argued that water is the new oil and claims that water will be the centerpiece of power struggle in Asia. This year, tensions between Ethiopia, Sudan, and Egypt over filling the enormous Grand Ethiopian Renaissance Dam on the Nile River has also refueled water war theories. After the summer floods in Germany, Belgium, and the Netherlands, European Commissioner Frans Timmermans repeatedly predicted that there will be future wars over food and water unless there are 55 percent reductions in carbon dioxide emissions by 2030. Military analysts such as retired Dutch General Tom Middendorp, chairman of the International Military Council on Climate and Security, has repeatedly aligned himself with the water wars (and climate-induced mass migration) discourse. The Water, Peace, and Security Partnership was set up by the Netherlands Ministry of Foreign Affairs, the
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German Agency for International Cooperation and a consortium of six partners to forecast and understand water-related conflicts and organized violence. Climate change will intensify weather extremes, but extremes alone do not cause violent conflict. As Dr. Clionadh Raleigh of Sussex University said, “It’s just a simplistic, nonsense narrative that the climate makes people violent.” Violence is only one, rarely used coping strategy for stress and sudden change. Multiple factors have to interact in complex ways before they create an escalating crisis. And even then, as Professor Aaron Wolf’s extensive Oregon State University database shows, states have not gone to war over water only. As Naho Mirumachi has shown, a mix of conflict and cooperation is more likely.

**Water as a Pawn in Multidimensional Conflicts**

In Afghanistan, water stress is a prominent issue and water resources and infrastructure often fall victim to local and wider geopolitical conflict. Afghanistan shares the transboundary Harirud River with Turkmenistan and Iran, with which it shares a hostile relationship. The Afghan-India Friendship Dam has been targeted by the Taliban multiple times, including earlier this year. Such violence not only slowed down progress on the project, it also serves a strategic advantage: as dams are highly visible symbols of state presence and development, attacking them immediately captures the global attention. The reason to target the Friendship Dam appears to have been to attack the Indian reconstruction efforts in Afghanistan, rather than to initiate a water war. The attack on water infrastructure shows Taliban’s political alignment towards Pakistan and not India, challenging in a way the geo-political position of India in South Asia. In this case, water is used as a tactical leverage point to strangle India’s approach to becoming a leader in the region.

Such concerted violence on water infrastructure echoes the Turkish Atatürk mega dam construction works targeted in 1984 by the Kurdish insurrection fighters PKK. The Kurdish population in Southeast Turkey has been struggling for independence from Turkey for many decades, and many Kurds saw the dam project as a symbol of Turkish oppression and an invasion of their territory. Attacks on the dam during construction were not solely about the dam. The dam was a target in a much bigger chess game, fueled by a sense of marginalization, territory, identity, and Kurdish independence.

Despite all claims of imminent water war in Asia, water treaties have survived wars and military insurgency between arch-rivals for decades. The Indus Water Treaty between India and Pakistan has survived three major wars (in 1965, 1971, and 1999) between the countries. There has been controversy over dam construction, but the underlying issues in these cases were an escalation of the disputed territory and insurgency in the Kashmir valley. There have been instances where India has attempted to scare its neighbor by threatening to stop water from the eastern rivers. For instance, after the 2016 attack on a military base in Uri (Kashmir), Narendra Modi said, “Blood and Water cannot flow simultaneously,” implying that India would stop water flow on the Indus and other rivers.
shared with Pakistan. Fortunately, India did not follow through on the threat. In these and other incidents water was not the cause of the conflict between the two countries, but was used as leverage in the dispute over Kashmir or other insurgent activity. The river was a stake in a territorial power game.
Likewise, water is often involved but not the primary driver in disputes between India and China. For instance, the sharing of water data on the Brahmaputra River was drawn into a border dispute when China stopped sharing data after the 2017 military standoff in Doklam. (The Chinese army attempted to build a road through disputed territory in the Doklam plateau and Indian soldiers based nearby stopped the Chinese crew, resulting in the military standoff.) Following this event, the Chinese stopped providing the hydrological data used for flood forecasting by India. China agreed to resume sharing hydrological data only after Indian Prime Minister Narendra Modi and Chinese President Xi Jinping held discussions in April 2018 in Wuhan. Hydrological data sharing became the symbolic victim in the military and diplomatic standoff over territorial issues between India and China.

Brunei deploying rugged smart water management
The Sultanate of Brunei is deploying a smart water device network, with a focus on monitoring river water levels, wastewater pumping stations, and water quality.

In search of IoT solutions
The nation’s Ministry of Development, with a roadmap to digitize various services, commissioned an IoT solutions company named Anian to develop several use cases for smart water — which included sensors, connectivity, and data management dashboards. The initial need was to monitor water levels in Brunei’s rivers, as flooding is very frequent and often unpredictable. Other recurring water infrastructure problems in the country included the management of wastewater and pumping stations, which often broke down; tides and water on parking lots and highways; and the general quality of water.
The main challenge Anian faced was the difficulty of finding a consolidated solution that included rugged hardware. A partnership with IoThink Solutions and Actility provided the solution’s basic elements and all necessary technical support through a networking architecture known as LoRaWAN.

Flash flood detection
Flooding is the number one natural hazard in Brunei. With a hot and rainy climate, the country experiences frequent and intense flooding episodes that can be triggered within hours. The Department of Drainage and Sewerage under the Ministry of Development undertakes monitoring of the sewerage distribution network and river levels at various locations in Brunei Muara to help predict flooding and detect abnormalities in the sewerage system.
River level monitoring has until now been primarily based on telemetry technology or, in cases where this technology is not deployed or is inoperable, manual monitoring with significant mobilized manpower.

In order to create an effective system of preventive alerts on these hydrological events, Anian deployed ultrasonic sensors connected through a patented technique for Long Range, Wide Area Networking (LoRaWAN) to monitor the water level in flood-prone rivers. The solution combined rainfall volume monitoring with rain gauges/tipping buckets to measure the velocity of water currents.

**Protection of sewage pumping stations**

A significant portion of Brunei’s population lives in close proximity to rivers or in villages on stilts. Wastewater from the homes is treated and released into the rivers. When there are overflows in the pumping stations, the discharged water pollutes the rivers, creating a significant odor nuisance for the inhabitants.

This system is inefficient and has very negative financial risks. Pumps can shut down due to trash and debris, creating excessive vibration that leads to overheating and explosion. The financial impact of a pump break is exorbitant, as a pump costs between €50,000 and €100,000 ($56,000 and $113,000 USD).

Monitoring of facilities and equipment relied primarily on telemetry and SCADA technology at only a few locations, or no monitoring at all with only reactive maintenance.

The solution implemented by Anian allows the monitoring of wastewater pumping stations, via continuous measurement of pump vibrations, the use of floats and LoRaWAN ultrasonic sensors in wells to alert if the water surface rises within 50cm of the cover, smoke, or dangerous gasses including CO, H2S, or CO2.

Original Article: [Water World](https://www.water-world.com/how-satellites-can-dramatically-improve-ability-to-prepare-for-flooding)

**How satellites can dramatically improve ability to prepare for flooding**

When it comes to predicting flooding, it isn’t just the amount of rain that matters, but also where the excess rain can be stored – if the earth is already saturated the rain has nowhere to go, and flooding follows on.

Scientists are now taking advantage of the fact that saturated earth has a greater gravitational pull, and that satellites can monitor the changes in saturation from day to day. Prof Shin-Chan Han, from the University of Newcastle in Australia, and colleagues measure changes in the Earth’s gravity by monitoring micrometre changes in distance between the two Gravity Recovery and Climate Experiment Follow-On (GRACE-FO) satellites.

When the satellites approach an area with higher gravitational pull (such as a saturated groundwater reservoir) the lead satellite is tugged forward, increasing the gap between the satellites. Shortly afterwards the tail satellite is also pulled forward, shortening the distance between the satellites.
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By regularly measuring the change in distance between the satellites Han and his colleagues were able to demonstrate that the devastating floods experienced in eastern Australia in March 2021 were preceded by a rapid recharge of groundwater the week before the rains. Their findings, published in Earth and Space Science, have the potential to dramatically improve our ability to prepare for floods.

Original Article: The Guardian by Kate Ravilious

Upholding Australia’s water supply chain - and avocado farms

The Cooperative Research Centre for Developing Northern Australia (CRCNA) is partnering with Civic Ledger, in order to sustain fair access to water and maintain an efficient supply chain.

Working with traditional land owners, Civic Ledger uses blockchain solutions to provide transparency for water management. Founded in 2016 and headquartered in Brisbane, Civic Leger has teams across Asia and Europe, as well as the rest of the Australasian continent and will soon be opening in the USA.

As the world’s first blockchain-based platform for the management and trading of water, Water Ledger is a publicly verifiable system, used to advance water management and water trading.

Over the next ten years, the CRCNA will invest AUS$75mn of Commonwealth funds to support research collaborations. During this partnership, Civic Ledger will: “Test the paradigm of next generation water markets at scale by establishing the platform to enable the Mareeba-Dimbulah Water Supply Scheme, to move to its blockchain-enabled water market and trading platform - Water Ledger.”

A supply chain for water equity

A blockchain is a shared database which can verify transactions and streamlining, in addition to decreasing the possibility of error or fraud. Blockchain supports water markets with its ability to provide a verifiable record of exchange and ownership of a water allocation. Water Ledger provides a publicly verifiable system to support improved water management and water equity.

“The CRCNA and Civic Ledger are working together on the rollout of Water Ledger in the MDWSS as ‘a strategic research test-bed’ that has applicability across Northern Australia for real time continuous water accounting and grower-led trading”, said Anne Stünzner, CRCNA CEO. “Our aim is for water markets that implement transparent governance frameworks and support the sustainable economic development of Northern Australia.”

Original Article: Supply Chain Digital by Helen Adams

Harnessing the Potential of India-Nepal Partnerships in Hydropower

The bilateral relationship between neighbours India and Nepal encompasses not only common notions of culture and common geographical boundaries, but also shared freshwater resources.[1] There are a number of well-endowed rivers originating in the
Himalayas such as the four crucial tributaries of the Ganges: Mahakali, Karnali, Sapta Gandaki, and Sapta Kosi. These flow through the valleys and plains of Nepal, meandering into the flat sub-tropical plains of India, before finally joining the Bay of Bengal.[2] These rivers help irrigate the low-lying parts of Nepal, as well as the fertile Indo-Gangetic plains of India. They contribute approximately 45 percent of the annual flow of the Ganges and 70 percent of the dry-season flow, thereby making them the “lifeblood of the Indian fertile low land.”[3]

Consequently, these rivers create opportunities for collaboration through various bilateral institutional setups between the two nations. Appropriately, both countries are working to optimise the potential benefits and address prevailing problems through a joint bilateral apparatus. This includes the creation of a three-tier mechanism called the Joint Ministerial Commission for Water Resources (JMCWR), Joint Committee on Water Resources (JCWR), and Joint Standing Technical Committee (JSTC), for the implementation of agreements and treaties related to shared water resources, along with addressing water-induced problems of flooding and inundation. There is also an additional mechanism of the Joint Committee on Inundation and Flood Management (JCIFM) that looks into embankments and flood forecasting.[4] One of the primary concerns of this bilateral arrangement, and an area of mutual interest between the two countries, is the hydroelectric power sector. It is tasked with promoting the maximum utilisation of shared water resources through the development of common hydropower projects.[a]

The challenge lies in the maximum use of natural resources, which has not been possible for Nepal due to certain contraints, as will be explained later in this brief. In this scenario, provisions such as bilateral partnerships, especially with economically more viable neighbours such as India, can act as catalysts for Nepal to improve its hydropower setup. However, the India-Nepal partnership in this regard has met with little success, and this brief attempts to explain why. The brief offers a historical account of India and Nepal’s engagements in the hydropower sector, and makes a case for the two countries to shift from contention to cooperation.[5]


To bolster drinking water supply in capital, RO plants at 6 locations

Reverse osmosis (RO) water treatment plants are likely to be set up at six locations in the city, for which the Delhi Jal Board (DJB) has invited tenders. The locations identified are Okhla, Najafgarh, Chilla, Rohini, Nilothi and Pappankalan, according to a DJB official associated with the project. The Delhi government had announced last year that RO plants would be set up in the city to augment drinking water supply.
The combined capacity of the six plants will be 90 million gallons per day (MGD), the official said. Each plant will have different capacities — while the plants at Okhla and Rohini will have a capacity of 20 MGD each, the Nilothi and Pappankalan plants will have a capacity of 15 MGD each, and those at Chilla and Najafgarh will have capacities of 10 MGD each.

The official said the plants are not likely to take up much space, and will be set up at the DJB’s existing premises in these areas.

At the proposed RO plants, ground water will be extracted and purified to make it potable, another senior official said. Tube wells are likely to be used to extract the ground water, going by the tender documents. After purification, the water will be transported to areas facing a shortage in supply either through the DJB’s existing network of pumping stations and reservoirs, or by setting up new infrastructure. Waste water from the RO plant will be disposed into drains or will be taken to the nearest STP.

In a separate project, lakes are being constructed at some of the DJB’s STPs, and treated water from the STPs will be transferred to these artificial lakes, with the aim that the water stored in these lakes will replenish the ground water, the official said.

The tenders are in the pre-bid stage, and the targeted deadline to set up the plants is around a year. The agencies taking up the installation of the plants will also be in charge of operations and maintenance for seven years.

Original Article: The Indian Express

Annual water level decline reported in about 58% wells in 22 districts, says CGWB report

The groundwater crisis continues to deepen in the agrarian state of Haryana with annual water level decline reported in about 58 percent wells covering all 22 districts of the state.

“The annual analysis of water level showed groundwater level decline in 58 percent of wells monitored post monsoon (October month) from 2019-2020. This covers 62 percent of the area covering all districts in the state,” according to the latest report of the Central Ground Water Board.

The annual water level decline of 0-2m was recorded in 49 percent of wells and 46 percent of area in all districts of the state in one year while decline of 2-4m was recorded in 5 percent of wells and 8 percent of the state's area.

The groundwater level decline of more than 4m was recorded in four percent of wells and eight percent of area of the state at isolated patches in Kaithal, Karnal, Kurukshetra, Jind, Sirsa, Gurugram, Mewat, Jhajjar, Rewari, Panipat and Faridabad districts, the report stated.

As per the CGWB report, 330 wells monitored reported decline in water level between 0-2m, 31 wells from 2-4m and 25 wells more than 4m.
The rise in water level from 0-2m was observed in 238 wells, 2-4m in 31 wells and more than 4m in 14 wells in the state in post monsoon annual analysis. The rise in groundwater level of more than 4m was observed in only two percent of wells and two percent of area of the state at isolated patches in Panipat, Faridabad and Palwal districts.

The report further pointed out that the decadal analysis from January 2011-2021 also showed water level decline in 58 percent of wells which covers about 66 percent area of the state falling in 22 districts.

The decadal groundwater level decline of more than 4m was observed in 10 percent wells and 14 percent of the area of state covering parts of Kurukshetra, Kaithal, Karnal, Panipat, Sonipat, Bhiwani, Charkhi Dadri, Mahendragarh, Rewari and Gurugram districts. The decadal water level fluctuations also observed a rise in 42 percent of wells in the state.

However, water level rise of more than 4m in a decade was observed in only one percent wells in the state at isolated patches in Sirsa, Kaithal and Sonipat districts.

As of March 2021, there were 1331 groundwater observation wells in the state, according to the report.

Notably, Haryana Water Resources Authority along with Irrigation, Agriculture, Horticulture, Forest and Fisheries departments and other concerned departments is working towards preparing an action plan to deal with the problem of depleting groundwater level in the state.

Original Article: The Daily Pioneer by Nishu Mahajan

Brazil hydro reservoirs at highest level since 2016, allaying rationing fears

Reservoirs at hydroelectric dams in southeast and center-west Brazil could reach their highest levels since 2016 in January due to abundant rainfall, low demand growth and measures to conserve water in lakes, national grid operator ONS said on Friday.

It estimated that the region’s reservoirs, among the country’s largest, will end January at 40% of capacity, compared to a previous estimate of 37% and a previous high of 44.4% for the month in 2016.

In September the reservoirs were at 17% of capacity, the lowest level for last year, raising fears that energy rationing would be needed and prompting the government to take steps to save water.

In the last three years, storage levels in the southeast and center-west reservoirs has fluctuated at about 20% of capacity on average at this time of the year, a risky level given that around 65% of Brazil’s generation is hydroelectric.

Last year, when the country faced the worst drought in at least 90 years, the region's reservoirs fell to 23.3% of capacity in January.

The good level of rainfall this rainy season, combined with the activation of some thermoelectric generators and low growth in energy demand, has allowed the recovery
VELES WATER WEEKLY REPORT
of the hydroelectric reservoirs and lakes, according to Luiz Barroso, president of
the PSR consultancy.
The ONS predicted on Friday that hydroelectric plants in the region will receive 105%
more rain than the historical average for January, compared to last week's estimate of
96%.
Original Article: Nasdaq by Leticia Fucuchima/ Reuters

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