Veles Water Weekly Report

October 13th 2021

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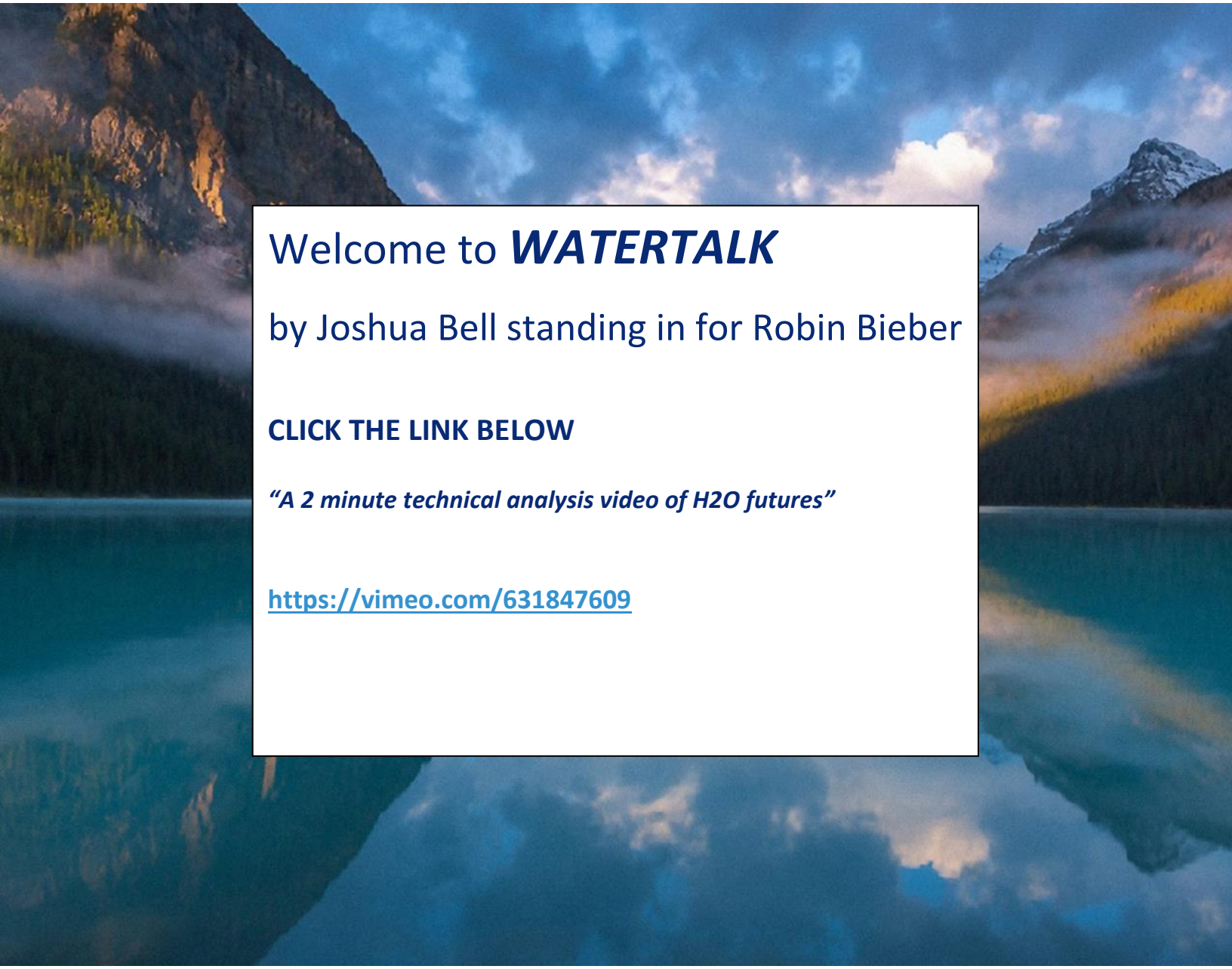
VelesWater

WATER FUTURES MARKET ANALYSIS



Welcome to ***WATERTALK***

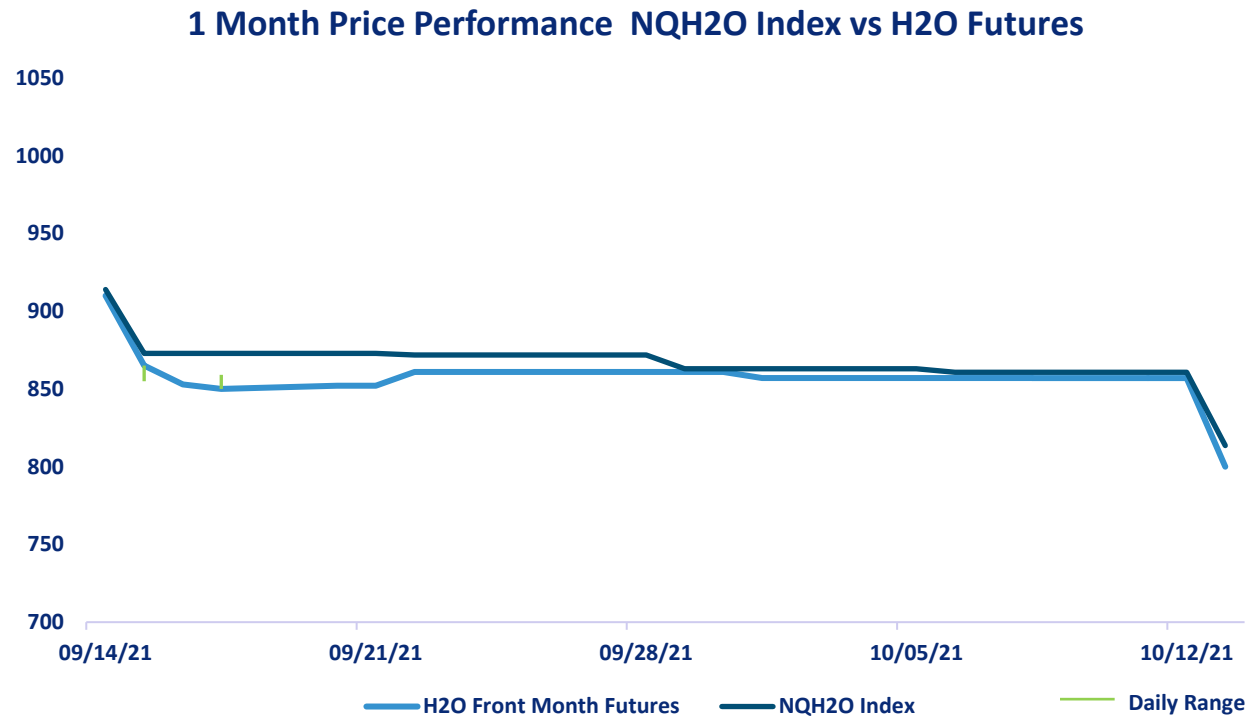
by Joshua Bell standing in for Robin Bieber

CLICK THE LINK BELOW

"A 2 minute technical analysis video of H2O futures"

https://vimeo.com/631847609

NQH2O INDEX PRICE vs H2O FUTURES PRICE



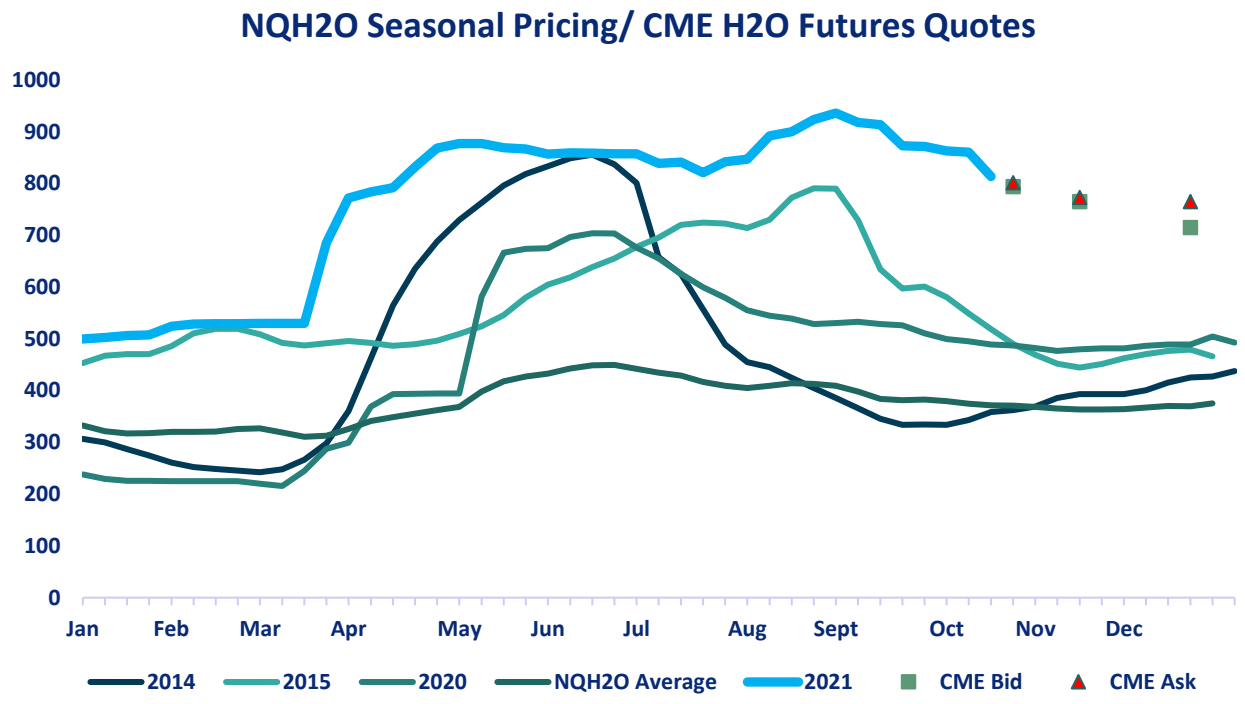
Price Chart Based upon Daily Close

The new index level out yesterday Oct 13th was $813.60, down $47.09 or 5.47%. Throughout the week the futures have closed at a discount to the index of $3.69 - $13.60. The futures have closed at a low of $800 and a high of $857.
NQH2O is up 62.78% YTD.

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

October	794@801
November	765@773
December	715@765
March 22	735@845
June 22	875@995

NQH2O INDEX HISTORY



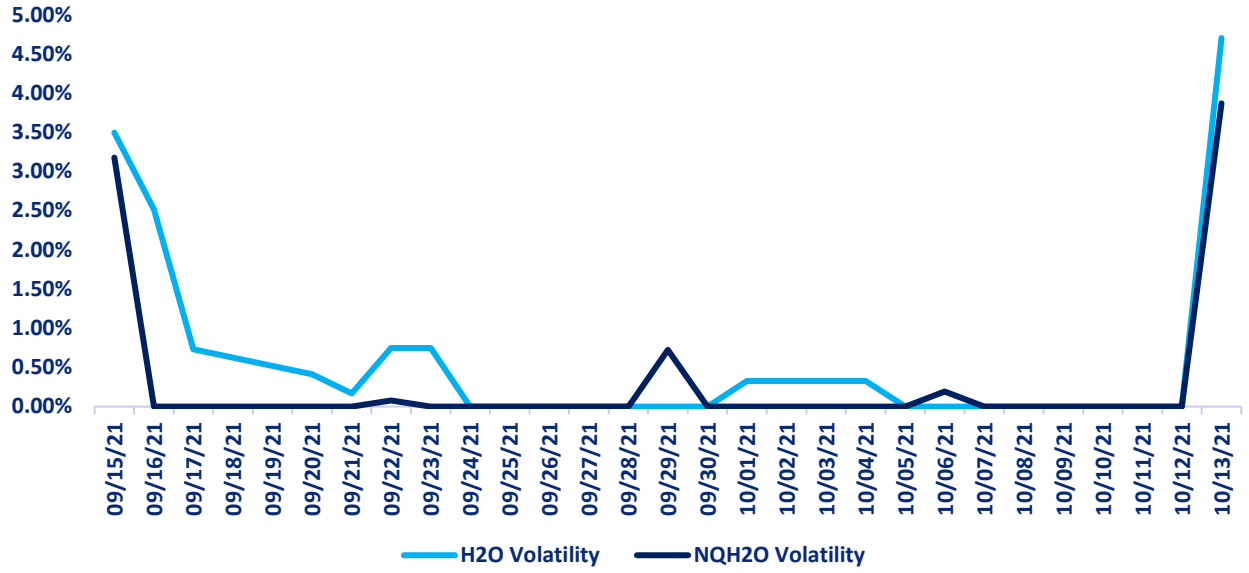
The graph above lays out the Nasdaq Veles water index by year, showing 2014, 2015 2020, 2021 plus an average price of the last eight years. In very dry years, prices clearly rise through the spring, peaking in May to July (with the exception of 2015) as demand for water from farmers peaks. Prices then 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 light blue. 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.

(**Reference: 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 October future volatility high has been 4.70% on October 13th and the low of 0% for the rest of the week.

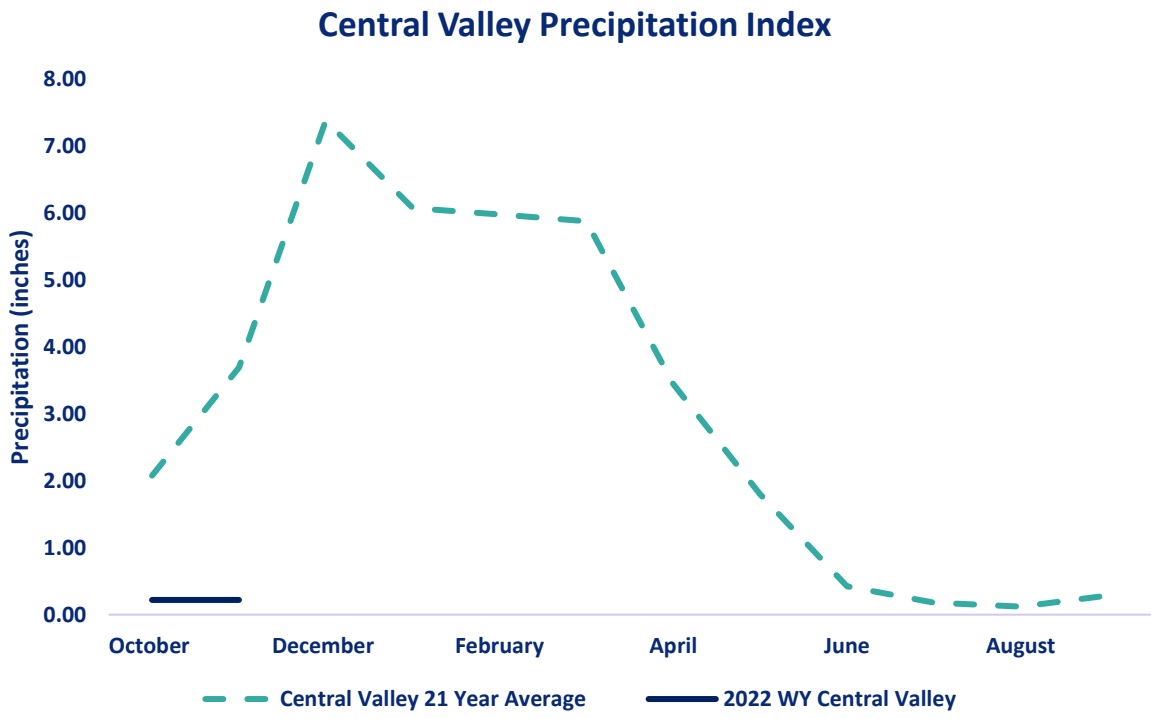
ASSET	1 YEAR (%)	2 MONTH (%)	1 MONTH (%)	1 WEEK (%)
NQH2O INDEX	34.20%	7.08%	5.07%	5.199%
H2O FUTURES	N/A	8.88%	6.87%	6.07%

For the week ending on the 13th October the two-month futures volatility is at a premium of 1.79% to the index, a reversal of 2.71% from the previous week. The one-month futures volatility is at a premium of 1.80% to the index, up 0.65% from last week. The one-week futures volatility is at a premium of 0.87% to the index, a reversal of 1.20%. These volatility moves are reflecting the sharp move down this 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.*

VELES WATER WEEKLY REPORT

CENTRAL VALLEY PRECIPITATION REPORT



Central Valley average is calculated using data from 19 weather stations in the Central Valley, California.
Data as of136/10/2021

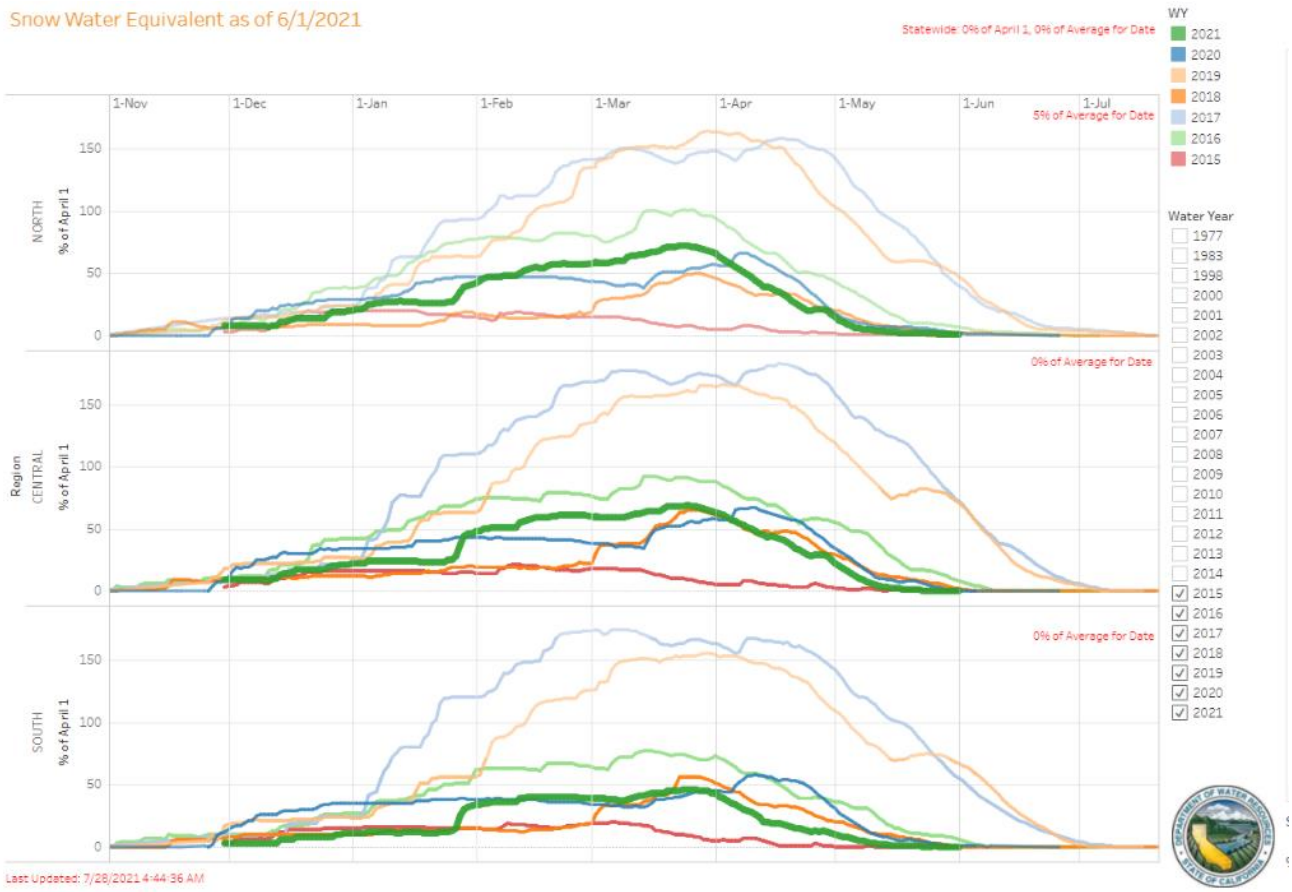
STATION	MTD (INCHES)	WEEK ON WEEK CHANGE (INCHES)	% OF 20 YEAR AVERAGE MTD	2022 WYTD VS 2021 WYTD %	2022 WY VS 20 YEAR AVERAGE TO DATE %
SAN JOAQUIN 5 STATION (5SI)	0.42	0.42	20.01%	1	53
TULARE 6 STATION (6SI)	0.08	0.08	6.62%	0	19
NORTHERN SIERRA 8 STATION (8SI)	0.16	0.16	5.47%	0	15
CENTRAL VALLEY TOTAL	0.66	0.66	10.70%	0	29

RESERVOIR STORAGE

RESERVOIR	STORAGE (AF)	% CAPACITY	LAST YEAR % CAPACITY	HISTORIC ANNUAL AVERAGE CAPACITY %
TRINITY LAKE	667,377	27	54	41
SHASTA LAKE	1,018,296	22	47	38
LAKE OROVILLE	792,287	22	45	37
SAN LUIS RES	221,327	11	47	22

VELES WATER WEEKLY REPORT

SNOWPACK WATER CONTENT



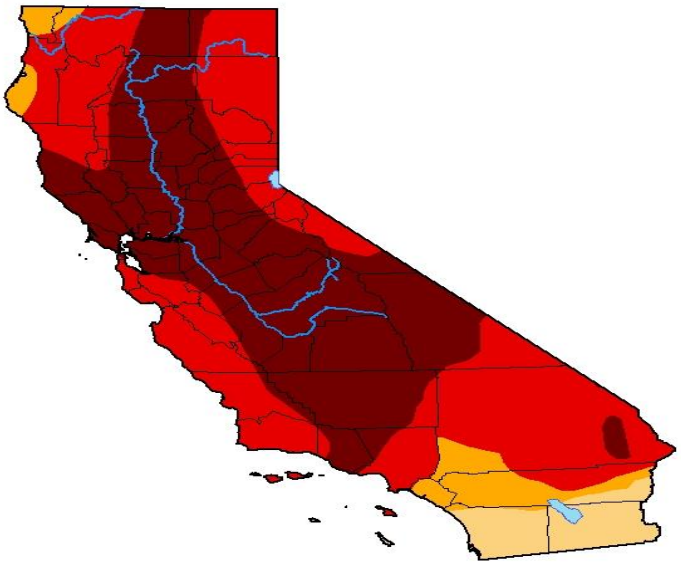
REGION	*SNOWPACK WATER EQUIVALENT (INCHES)	WEEK ON WEEK CHANGE %	% OF AVERAGE LAST YEAR	% OF 20 YEAR HISTORICAL AVERAGE	% OF HISTORICAL **APRIL 1ST BENCHMARK
NORTHERN SIERRA	0	0.00%	0	0	0
CENTRAL SIERRA	0	0.00%	0	0	0
SOUTHERN SIERRA	0	0.00%	0	0	0
STATEWIDE	0	0.00%	0	0	0

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

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

VELES WATER WEEKLY REPORT

DROUGHT MONITOR



October 5, 2021
(Released Thursday, Oct. 7, 2021)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	100.00	93.93	87.88	45.66
Last Week 09-28-2021	0.00	100.00	100.00	93.93	87.88	45.66
3 Months Ago 07-06-2021	0.00	100.00	100.00	94.73	85.44	33.32
Start of Calendar Year 12-29-2020	0.00	100.00	95.17	74.34	33.75	1.19
Start of Water Year 09-28-2021	0.00	100.00	100.00	93.93	87.88	45.66
One Year Ago 10-06-2020	15.40	84.60	67.54	35.61	12.74	0.00

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

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

Author:
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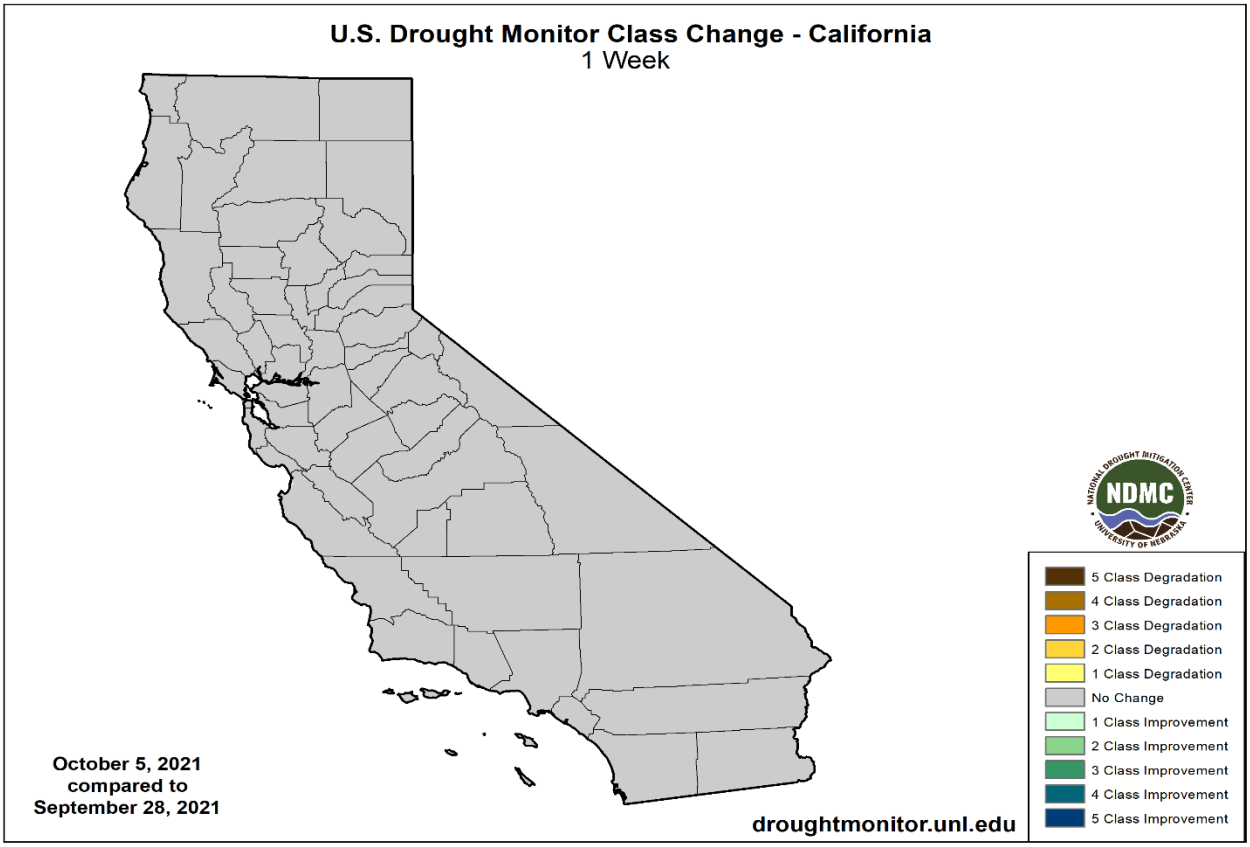
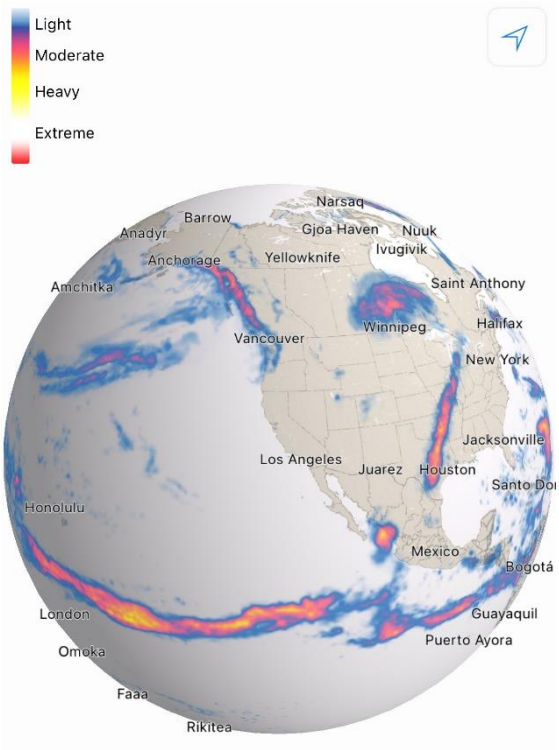
droughtmonitor.unl.edu



The US Drought Monitor release their statistics with a 1-week lag to this report. Over the past week there has been no change in drought condition in California.

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



Ref. Dark Sky

The current satellite picture shows a dry western region of the US.

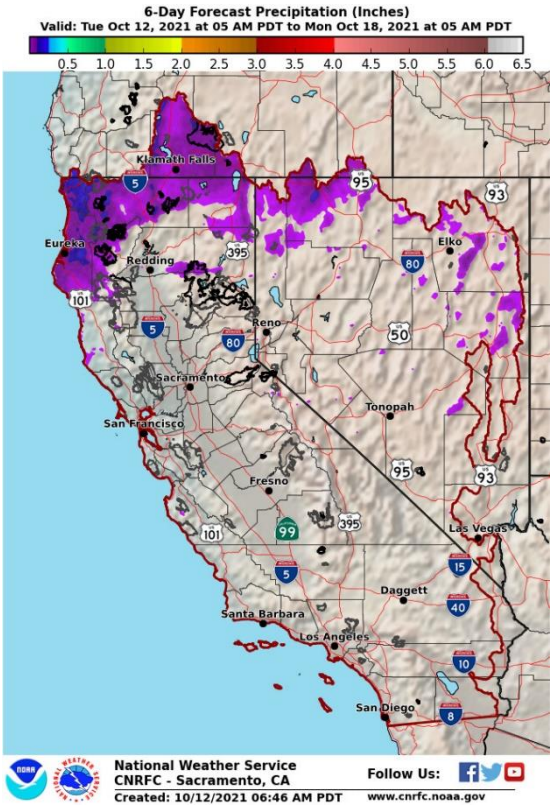
Monsoonal effects have brought moisture to Eastern Arizona and West Texas and this moisture can now be seen having moved North Eastwards with the Northerly portion hitting as high as Washington DC and New York. Most of this moisture flow has been related to a cyclone over Mexico.

Further frontal activity over the NW Pacific is headed towards Northern CA with the prospect of some further precipitation coming to this area.

Our long-term models are still showing the potential for greater precipitation to reach the SW and Western US this winter.

10 Day Outlook

As an upper low moves NE out of AZ into UT, a few lingering showers are noted in SE NV. Activity should wind down through the morning. A quick-moving weak front and shortwave aloft are expected to bring light showers to far northern CA/NV tonight into Wed night, with total amounts around 0.1" or less and freezing levels 6000-8000 ft lowering to 5000-6000 ft. Expect dry conditions and ridging across the region Thu-Sat, followed by a weak system and light precip across portions of far northern CA Sat night into Sun.



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

WESTERN WEATHER DISCUSSION

As the 2020-21 water year ended, several places set records for driest years ever recorded. In northern California, Redding ended up with 14.24 inches, breaking the previous record low of 19.38 inches in 1990-91 and a normal of 33.52 inches. Red Bluff recorded 9.48 inches compared to the previous record of 10.98 inches in 1975-76 and a normal of 23.12 inches. The Sacramento Executive Airport recorded only 6.61 inches of precipitation for the water year, breaking the record from 1976-77 of 6.62 inches, with normal being 18.14 inches. Rains in the Pacific Northwest and into the Four Corners regions were the only areas with above-normal precipitation for the week. The conditions brought with them cooler than normal temperatures with departures mainly 3-6 degrees below normal, with some even cooler readings in those areas that had the most rain.

Warmer than normal conditions dominated the northern Rocky Mountains and into northern Wyoming where temperatures were 3-6 degrees above normal. Some improvements to the extreme drought were made over portions of northwest Colorado into eastern Utah. Extreme drought was also improved over western New Mexico while moderate drought was improved in central New Mexico. Exceptional drought was improved over northeast Washington into northern Idaho while extreme drought was expanded over southern Montana into northern Wyoming with severe and extreme drought expanding over western Montana. Areas of southwest and southern Colorado had moderate and severe drought conditions expand.

Reference: Brad Rippey, U.S. Department of Agriculture
Richard Heim, NOAA/NCEI

WATER NEWS

CALIFORNIA WATER NEWS

Conserving water can cut our bills — and help future generations

Extended droughts broken up by rainy years are part of a natural cycle here in California. Our state is once again in another dry period, with areas of Northern California already experiencing a significant impact. It is not a question of if, but when the Coachella Valley faces a similar fate.

Thanks to decades of targeted projects and careful planning, Mission Springs Water District will have enough water to serve our 40,000 customers in and around Desert Hot Springs.

MSWD relies on groundwater for 100% of our award-winning water supply. Protecting this treasured resource is vital for multiple reasons. Not only does the Mission Creek Subbasin serve our customers, it also sits at the headwaters of the entire Coachella Valley Groundwater Basin, which provides drinking water for 400,000 people in all nine desert cities and surrounding unincorporated areas.

For more than 25 years, MSWD has demonstrated its commitment to water quality through active participation in the Groundwater Guardian program. As one of the earliest members of this organization, we have teamed up to actively engage with our customers to better educate them about the importance of protecting this resource. By promoting conservation, we can leave more water in the ground to meet future needs.

Original Article: Dessert Sun by Arden Wallum

Wintry weather is coming to California

California is about to get a breath of fresh air — literally.

Cooler weather is set to sweep across much of the state over the weekend, bringing light rain to Southern California, the first significant snowfall of the season to the Sierra Nevada, and a collective sigh of relief to Californians who just endured the hottest September on record. In anticipation of snow-slicked roads, Caltrans on Thursday closed three Sierra Nevada mountain passes, with plans to reevaluate conditions on Saturday.

California's reprieve from hot, dry weather may last longer than the weekend. October temperature and precipitation outlook maps from the National Oceanic and Atmospheric Administration show that California has an equal chance of being warmer or cooler than normal — and of being drier or wetter than normal. Though that may not sound particularly promising, it's actually an improvement from past months, when outlook maps predicted the Golden State would be warmer and drier than normal.

California's drought, however, is expected to persist. And that's not the only challenge facing the state: A stunning Los Angeles Times investigation found that California is

severely undercounting the number of people who die each year from extreme heat. State data shows 599 Californians died from heat exposure between 2010 and 2019, but the true toll is likely six times higher, according to the Times — claiming the lives of about 3,900 residents.

Since 2013, California has made progress on only six of its own 40 recommendations to prepare for extreme heat, the Times found. It also doesn't monitor heat-related deaths and illnesses in real time.

- Edith B. de Guzman, a UCLA researcher: "If we don't know which communities are dying or showing up at the hospital disproportionately, we cannot have an informed response, and we end up losing people. Our hands are tied if we get the data three or five years later."

California is also ill-prepared when it comes to wildfire evacuation plans, experts told the Washington Post — as evidenced in August, when South Lake Tahoe residents fleeing the Caldor Fire were caught in traffic so knotted some vehicles moved just 30 feet in two hours.

Speaking of evacuations, new ones were ordered Wednesday as the KNP Complex Fire continued to terrorize Sequoia and Kings Canyon National Parks. Along with the Windy Fire in Sequoia National Forest, the two blazes have potentially killed hundreds of ancient sequoias.

Original Article: CalMatters by Emily Hoeven

California Water Commission public workshops to explore well-managed groundwater trading program

The California Water Commission, in support of Water Resilience Portfolio Action 3.6, will hold public workshops to explore ways that the State can support in-basin, locally led groundwater trading programs that ensure protections for communities, small- and medium-size farms, and the environment.

Groundwater trading programs are one of the tools that Groundwater Sustainability Agencies can use to help manage pumping within their basins as they work to comply with the Sustainable Groundwater Management Act. Well-managed groundwater trading is based on sound water accounting, careful groundwater allocations, strong stakeholder engagement, and trading rules that avoid negative impacts. The Commission will gather information and test assumptions at the workshops regarding opportunities and concerns around groundwater trading; potential impacts to ecosystems, farms, and communities; and an appropriate state role in groundwater trading. The Commission hopes to hear from diverse participants about how groundwater trading could impact or benefit them.

The Commission will use the information gathered at these workshops to help formulate a policy paper with a set of conclusions around how to shape well-managed groundwater trading programs with appropriate safeguards for vulnerable water users. The Commission's work will outline next steps the State could take to advance well-

managed groundwater trading. The draft paper will be available for public comment before it is finalized in early 2022.
Original Article: OC Breeze/ California Water Commission

Lake Shasta landslide knocks out water to hundreds in Jones Valley

A landslide along the shore of Lake Shasta, likely caused by the rapidly falling lake level, has knocked out water service to hundreds of Jones Valley area residents.
Meanwhile, Shasta County Public Works Department officials are trying to repair water lines and pumps broken by the landslide, but they have hit supply ordering delays and shortages caused by the COVID-19 pandemic.
"We have a massive landslide, 5 acres in size and taking out the pump station" the county uses to draw water out of Lake Shasta to serve residents in the Jones Valley area, said Pat Minturn, county public works director.
The land above the pump station began to slump in September and work in the area was interrupted by the Fawn Fire, which burned in the area for more than a week, Minturn said.
By this week, the hillside above the lake had slid so much it broke pipes and knocked out the pumps Wednesday afternoon, forcing most of the residents to lose drinking water provided by the County Service Area, he said.
Original Article: Record Searchlight by Damon Arthur

'Extreme year': Past 12 months among the driest ever in California history

The current ongoing two-year dry period in California, punctuated by the third-driest water year on record for the Central Sierra, is part of California's overall arid fate so far in the 21st century, according to the state Department of Water Resources.
The Golden State's hydrology now increasingly resembles conditions in the Colorado River Basin this century, where multiple, consecutive, drier-than-average years are mixed with an occasional wet year. California's last wet water year was 2016-2017, the second-wettest on record.
The 2020-2021 water year that ended Thursday was an extreme 12 months in terms of warm temperatures and lack of precipitation, leading to the second-driest water year on record based on statewide runoff, the California Department of Water Resources said in a 12-page report titled "Water Year 2021: An Extreme Year."
Precipitation monitors showed the Central Sierra ended the water year, which began Oct. 1, 2020, with 18.8 inches. That's the third-driest on record for the region, Craig Shoemaker, climate program manager for the National Weather Service in Sacramento, said Friday. Central Sierra precipitation over the past water year — which began Oct. 1, 2020 and ended Thursday, Sept. 30 — was 46.7% of average.
The past 12 months were so dry that Sonora received just 15.73 inches of precipitation, 47.9% of normal, and it ranked as the fourth-driest water year on record for Sonora, Shoemaker said.

The 2020-2021 water year total is less than the 19 inches precipitation the Central Sierra received in 2014-15, the second-driest water year for the region on record.

State emergency proclamations for drought came out in April, May, and July, with 50 of the state's 58 counties, including Calaveras and Tuolumne counties, declaring drought emergencies.

Also in Tuolumne County, 35 wells on about 15 properties had dried up or were failing as of Friday, another indicator of how the dry water year and the current drought's effects are being felt in the Mother Lode. Fifteen of those wells are completely dry or failed, and the remaining 20 wells are described as "struggling" or not producing adequately, Dore Bietz, the county Office of Emergency Services coordinator, said Friday. Eight families have requested emergency assistance, and four families are currently receiving bottled water, Bietz said Friday.

Original Article: Union Democrat by Guy McGarthy

Are 2 More Dry Years Ahead For California?

Water use in Manteca increased 3 percent overall or 13.6 million gallons last month compared to the depth of the last drought in September of 2017.

That's good news given the city has added more than 8,000 residents since Jan. 1, 2017 for a 10 percent population gain.

The bad news it might not be enough.

Despite a light dusting of snow Thursday along the high Sierra crest at the upper reaches of the Stanislaus River watershed critical to urban and agricultural users in South San Joaquin County, hydrologists are indicating a number of weather models don't look promising.

Councilman Charlie Halford noted at Tuesday's council meeting that experts at a League of California Cities gathering are predicting the current weather year that started Oct. 1 as well as the upcoming weather year have a high probability of being dry years.

That raises the specter that South San Joaquin Irrigation District in light of moves by the Department of Water Resources to curtail water rights will face water cutbacks this water year. Several months ago the outlook was promising that conserved water in Tri-Dam Project reservoirs even if the new year ends up being the third consecutive dry year that the SSJID could get through Sept. 30, 2022 without having to impose mandatory water cutbacks if urban and farm customers were judicious with water use.

Halford noted there is growing talk among cities to move toward banning "non-essential grass areas" — front lawns in new housing developments — and possibly in backyards as well.

It would follow the lead of Las Vegas that has put in place a front yard grass ban on new homes going forward while the city replaces ornamental grass throughout the city in medians and such with drought resistant landscaping.

Original Article: Manteca Bulletin by Dennis Wyatt

'A change of seasons' brings rain, chill and even snow to parts of California

After a seemingly interminable spate of record-breaking heat, worsening drought and frequent wildfires, portions of California will experience a noticeable shift in the form of wintery weather, the National Weather Service said.

A cooling system is expected to sweep across much of the state, delivering rain from San Diego to Los Angeles and snow in areas farther north. Already, the California Department of Transportation has announced the closure of multiple mountain passes in the Sierra ahead of a winter storm.

"It's kind of like the change of seasons — it's going to feel like that," said Joe Sirard, a meteorologist with the National Weather Service in Oxnard.

Residents in Southern California will see little sun Thursday as a cloudy cold front moves in from the west. Most maximum temperatures across the coasts and valleys will be 5 to 10 degrees below normal, Sirard said, with the Los Angeles area dipping into the low 60s by the end of the work week.

Patchy rain is expected to fall from San Diego to Orange County on Thursday, and by the early hours of Friday morning, light rain will start sweeping through southern L.A. County and into the eastern valleys of Ventura County.

Rainfall amounts in the L.A. area likely won't top a quarter of an inch, though, and those hoping for a repeat of Monday's lightning show will be underwhelmed as thunderstorms are not expected, forecasters said.

Shortly after noon Thursday, intermittent drizzle began in San Clemente.

"Uh-oh," one man told his friend as they walked out of the Fisherman's Restaurant on the San Clemente Pier. "Look at what we have!"

The rain started slowly but picked up for a spell, prompting some beachgoers to zip up their jackets. The brief moisture didn't last long, though, as the sun slowly peeked out behind gray clouds and tiny water droplets decorating car windshields were the only remnants of rain.

While many may welcome even the slightest hint of moisture, it's not all good news. Some experts are concerned that winds and rain over the Orange County oil spill could contribute to choppy oceans and smear-spreading gusts, which could hamper cleanup efforts and make the oil slick grow.

"How big the spread is kind of depends on the forces of nature that we don't have a lot of control over," Deborah Sivas, director of the Environmental Law Clinic at Stanford Law School, told The Times.

Crews are scrambling to clear chunks of sticky crude from the coastline and prevent further damage to valuable wetlands and vulnerable wildlife.

Original Article: LA Times by Hayley Smith

UC Merced leads innovative effort to secure water for agriculture and ecosystems

UC Merced's largest research grant in its 16-year history aims to improve agricultural and environmental water resilience. The new $10 million collaborative focuses on water

banking, trading and improvements in data-driven management practices to arrive at a climate-resilient future in water-scarce regions of the United States.

The U.S. Department of Agriculture announced it is funding the wide-ranging effort from multiple institutions across three states through its National Institute of Food and Agriculture's Agriculture and Food Research Initiative on Sustainable Agricultural Systems. The coalition of researchers is led by UC Merced, joined by experts from UC Berkeley, UC Davis, UC Agriculture and Natural Resources, Utah State University, the New Mexico Water Resources Research Institute at New Mexico State University, the Public Policy Institute of California, Environmental Defense Fund, and the U.S. Geological Survey's Southwestern Climate Hub.

"There are a lot of challenges in balancing the needs of agriculture and ecosystems, and climate change and drought are only exacerbating difficult decisions about how to sustain water resources," lead project director professor Joshua Viers said. "But our team of advisors, educators and scientists are eager to enable data-driven decision-making for securing a climate resilient future for our water-stressed regions."

The partners in the USDA-funded collaboration — Securing a Climate Resilient Water Future for Agriculture and Ecosystems through Innovations in Measurement, Management and Markets or SWIM — will focus on developing more robust, data-driven information systems for decision-makers such as land and water managers. SWIM is designed to provide objective measures of supply and demand, and incorporate drought forecasting and climate change trends.

The research and extension team, by working with local decision-makers, will improve the accuracy of measurement in water budgets, evaluate novel management strategies such as on-farm aquifer recharge, and evaluate water trading and markets to improve sustainable surface and groundwater use.

The SWIM project will work across disciplines and stakeholders, integrating research, extension and education in three testbeds with unique water policies and systems: Cache Valley, Utah; Mesilla Valley, New Mexico; and the San Joaquin Valley. All of them grow orchard crops and alfalfa, and all are in a drought. Like California, Utah is experiencing an unprecedented drought, where 99 percent of the state is in extreme or exceptional drought. And, like California, the physical and cultural geography of New Mexico is extremely diverse. Exploring all innovative avenues of water management is necessary for sustaining a future for agriculture and surrounding communities while balancing ecosystem needs across the west, Viers said.

SWIM's leadership plans such activities as workshops and field days to actively engage stakeholders, including the extension-grower networks of each state's university system, as well as land, water and ecosystem managers.

Original Article: University of California by Lorena Anderson

New protections for California's aquifers are reshaping the state's Central Valley

California's agricultural empire is facing a shakeup, as a state law comes into effect that will limit many farmers' access to water.

The seven-year-old law is supposed to stop the over-pumping from depleted aquifers, and some farmers — the largest users of that water — concede the limits are overdue.

The state grows roughly 40% of the country's vegetables, fruit and nuts. But it's also famously prone to drought, and in those dry years, when farms run short of water from rivers and reservoirs, they turn on powerful pumps and draw well water from aquifers.

The limits on that water use will force many farmers to scrap practices that relied on unfettered access to that shrinking underground reservoir. "It's unsustainable to continue over-drafting the aquifer the way we are," said Rick Cosyns, a farmer near the town of Madera, just north of Fresno. "It's just a race to the bottom." (Cosyns was interviewed in August. He died unexpectedly on Sept. 7.)

This year's drought hit hard and fast. With rivers running low, there's little "surface water" available for agriculture. As a result, farmers' pumps ran hard this summer. Big pipes that emerge from the ground alongside fields and orchards delivered powerful gushers of water. State-wide, farmers to pumped an estimated six to seven million additional acre-feet of water this year, above what they normally use. (An acre-foot of water is 325,851 gallons.)

Original Article: NPR by Dan Charles

What Water Restrictions Mean for California's Businesses

Start your rain dances now, Californians. The most extensive severe drought in the US progressed into its second “water year,” or one year of recorded rainfall, on Oct. 1. It was the second-driest water year on record, with CA reservoir capacity dropping from 93% last fall to 60% of the historical average currently.

Throughout this drought—which started last year and progressed into an official “state of emergency” in 50 of California’s 58 counties by May—the state has only recommended its residents reduce water usage by 15%.

But if that guidance doesn’t do the trick (and it hasn’t so far—Californians reduced their water usage just 1.8% in the three weeks following the request), CA Governor Gavin Newsom could bring in the stick: a statewide mandate on water usage. During the last big drought in 2015, former CA Governor Jerry Brown mandated a 25% reduction in water usage, and enforced it via fines.

Depending on where someone is located in the Golden State, they may already be under mandated water restrictions at the county and city level. For instance, the city of Santa Clara mandated a community-wide 20% reduction in water use, and Marin County introduced water restrictions with the goal of reducing use by 40%. Both of those are next door to California wine country, where 23 major fires encompassing 1.5 million acres have burned in the last six years.

Btw: Northern California counties are struggling more during this drought than southern ones, because SoCal poured $12 billion into drought preparations—such as expanding reservoirs—after the drought of 1987–1991.

For individuals, mandates mean letting the lawn brown a bit, turning off the faucet while brushing your teeth, and—this may shock non-CA residents—not flushing the toilet for number one.

But for businesses, the changes needed to meet water use reductions will be a bit of a heavier lift…

Original Article: Morning Brew by Jamie Wilde

US WATER NEWS

Our Need For Water Is Tapping Ancient Underground Wells. How Long Can They Last?

Communities that rely on the Colorado River are facing a water crisis. Lake Mead, the river's largest reservoir, has fallen to levels not seen since it was created by the construction of the Hoover Dam roughly a century ago.

Arizona and Nevada are facing their first-ever mandated water cuts, while water is being released from other reservoirs to keep the Colorado River's hydropower plants running.

If even the mighty Colorado and its reservoirs are not immune to the heat and drought worsened by climate change, where will the West get its water?

There's one hidden answer: underground.

As rising temperatures and drought dry up rivers and melt mountain glaciers, people are increasingly dependent on the water under their feet. Groundwater resources currently supply drinking water to nearly half the world's population and roughly 40 percent of water used for irrigation globally.

What many people don't realize is how old – and how vulnerable – much of that water is.

Most water stored underground has been there for decades, and much of it has sat for hundreds, thousands, or even millions of years. Older groundwater tends to reside deep underground, where it is less easily affected by surface conditions such as drought and pollution.

As shallower wells dry out under the pressure of urban development, population growth, and climate change, old groundwater is becoming increasingly important.

Original Article: Science Alert by Marrisa Grunes et al

Going west, water issues gain importance

With water, you either have it or you don't. Roughly half of the United States is in some form of drought designation. The Colorado River is at its lowest level in years. Other river flows have been compromised because of ongoing drought conditions.

In the area of the Ogallala Aquifer—about 174,000 square miles under parts of Colorado, Kansas, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming—water is a hotly contested debate in many circles.

Earl Lewis, chief engineer for the Kansas Department of Agriculture, Division of Water Resources, told attendees at the Aug. 16 Kansas Water Congress summer meeting in Garden City, Kansas, that when it comes to water, people need to speak plainly, clearly and respect other's opinions. There will always be issues regarding resolution and water rights.

"That's the issue we have a lot of times," he said. "We don't really push these things to the forefront and speak plainly about what we want. We're talking about the law—do we want to talk about protecting private property rights, first in time first in right, because—is that good policy?"

Some of the issues don't end up being easy questions. In many segments of agriculture, sustainability is a buzzword. In water, not so much.

"Sustainability has typically been a bad word on the Ogallala to say," Lewis said. "We will get to sustainability. It will happen. Right? There will be sustainability in the Ogallala. Is there going to be water left when it happens?"

Lewis believes if the Ogallala is depleted, it could mean the last users will be the final users.

"But is that the situation we want?" he said. "Can we let that happen? Do you think that's a good water policy? Do you think its something different?"

Farmers, according to Lewis, are "very good at adapting to change" and find a way to make money.

Original Article: High Plaines Journal by Kylene Scott

Can agriculture use less water?

It is true that growing food is an important and often underappreciated business. Our human survival is dependent upon the successful growth of food. In Arizona the agricultural industry plays an even bigger role in our politics and policy due to our recent history. Cowboys and ranchers brought commerce and people to the state, paving the way for growth and development. We carry a romantic view of the yeoman farmer who helped build the state.

Despite the storied history and outsize impact of agriculture, this industry must be scrutinized. Currently, the Arizona GDP is about $300 billion and agriculture contributes less than 1% to that figure. Agriculture employs about 1% of Arizona workers while consuming 36% of our land and about 80% of our water. The thirsty and water intensive land uses that may have helped our state grow and flourish historically are now out of

step with our disappearing water resources brought by drought, overuse, and climate change.

Should Arizona allow thirsty alfalfa and cotton to be grown at all? Multiple mega-dairies and farms have recently located to Arizona where they can grow alfalfa and raise dairy cows without much regulation or thought to their water use (Almarai, Riverview Dairy, and others). These farms have lowered groundwater tables and dried small neighboring wells, forcing people to relocate. The water they are using is not renewable and once gone will never be replaced in our human lifetimes.

Original Article: AZ Capitol Times by Lynda Person

Trump-Era Water Opinions In The Air As Biden Considers New Plan

Following nearly two years of litigation regarding Trump-era water policy, the federal government has until Oct. 14 to come up a plan to balance competing needs for the precious resource.

A minute order from District Judge Dale A. Drozd from the United States District Court for the Eastern District of California extended by two weeks the due date for the status update that was originally expected to be delivered Sept. 30.

On Sept. 30, Ernest Conant, regional director of the Department of the Interior's Region 10, penned a letter to officials with the U.S. Fish and Wildlife Service and National Marine Fisheries Service to begin reevaluating the environmental impact of water allocations from the Sacramento-San Joaquin Delta.

The California Attorney General's office had filed a number of lawsuits against the Trump administration following the opinions which had changed — among other things — what environmental factors would be considered when deciding when and how much water should move through California waterways.

Trump water policy largely moved away from calendar-based factors to "real-time" decision-making, said Michael Hellmair in an interview earlier this year. Hellmair is a biologist with FishBio, an environmental research and consulting firm with offices in Oakdale, Chico and Santa Cruz.

Original Article: The Business Journal by Edward Smith

Experts: No short-term answers to problem of drought, water shortages

State and federal officials told a Senate panel this week that there may be long-term solutions to the historic drought gripping the West, and the water shortages that come with it, but that the short-term outlook remains grim.

The hearing comes against the backdrop of a 20-year-long drought has left about 90% of the West affected. Sen. Mark Kelly, D-Ariz., said tree-ring and soil evidence indicates that the region may be going through the worst drought in 1,200 years – certainly the worst in the 100 years or so that records have been kept.

"Arizona is on the front lines of this megadrought," said Kelly, who chaired the Senate Energy and Natural Resources subcommittee hearing.

When water levels at Lake Mead and Lake Powell fell to historic lows in August, it triggered a multistate water conservation plan that will take effect next year. Under that plan, Nevada will give up 21,000 acre-feet of water that it would otherwise pull from Lake Mead, Mexico will give up 80,000 acre-feet and Arizona will give up 512,000 acre-feet, or 18% of its total.

Kelly, who called Lake Mead and Lake Powell "the poster children for Western drought," said Arizona is "prepared for these initial cutbacks" after years of planning and conservation efforts.

But he and others at the hearing worried about what will happen when the situation gets worse -- which they all agreed it will.

"The likelihood of deeper cuts in the future is high," said Tom Buschatzke, the director of the Arizona Department of Water Resources. The first goal, he said, is to prevent further reductions in the levels at Lake Mead.

"Additional actions to protect Lake Mead fall into two categories: First, mandatory cuts or, second, additional conservation," Buschatzke said. "Arizona is working toward achieving additional conservation instead of greater mandatory cuts, but that is a heavy lift."

The first round of cuts to Arizona's water supply will likely not be felt by most people in the state, Kelly said. Buschatzke said almost all of next year's reductions will come from Central Arizona Project allocations, with tribes, towns, private water companies, industrial users and others being affected.

Farmers would take the biggest hit, but the state's drought contingency plan will offset many of the cuts with water from other sources or with financial compensation. But some farmers could still be forced to leave as much as 30% to 40% of their fields fallow if the situation does not improve, Buschatzke said.

"Moving into the future, which is going to be very different for them … they're not going to be able to farm the way they have farmed historically and it's a real paradigm shift to the agriculture community," he said.

The drought has been aggravated by climate change, witnesses said, which has led to warmer, drier conditions that have reduced the runoff from Rocky Mountain snowmelt that would normally recharge rivers and aquifers in the region.

Kelly pointed to the $8.3 billion for water projects that is included in the massive infrastructure bill that recently passed the Senate and is awaiting action in the House, and asked what kind of long-term relief that might bring.

Original Article: Arizona Daily Sun by Ulysse Bex

Inside Clean Energy: Drought is Causing U.S. Hydropower to Have a Rough Year. Is This a Sign of a Long-Term Shift?

When something reliable begins to look shaky, we should take notice. That's what's happening for hydroelectric power in much of the West, where severe drought has led to low water levels in the rivers and reservoirs that feed the power systems.

VELES WATER WEEKLY REPORT

The Energy Information Administration is projecting a 13.9 percent decrease in hydroelectric generation this year compared to 2020, part of a larger picture in which renewable energy—which includes hydropower—is not growing as fast as scientists say is necessary to avoid the worst effects of climate change.

I wanted to know whether the drop in hydropower was a sign of a long-term shift that could be harmful to the transition to clean energy.

Before I get to what I found, here are some specifics:

- Water levels in Lake Powell, on the Utah-Arizona border, have fallen so low that the federal Bureau of Reclamation has warned that it may not be able to operate the power plant at Glen Canyon Dam, which holds back the Colorado River to form the Lake, starting as soon as 2022. The lake hit its lowest level on record this summer amid the continuing drought in the Colorado River Basin. The power plant, with generating capacity of about 1,320 megawatts, is an important part of the regional grid.
- California officials took the Edward Hyatt hydroelectric plant offline in August because of low water levels on Lake Oroville. The plant has a generating capacity of about 645 megawatts. “This is just one of many unprecedented impacts we are experiencing in California as a result of our climate-induced drought,” said Karla Nemeth, California Department of Water Resources director, in a statement.
- Washington, the country’s leader in hydropower, has seen an 11 percent drop in electricity generated from hydro this year, through July, compared to the same period last year, according to EIA. That’s a significant decrease, but the state is faring better than others in the West, such as California, where hydro generation is down 38 percent.

Hydropower, which is generated by water spinning the blades of a turbine, made up 7.3 percent of the electricity generated in the United States last year, a figure that ranks just behind wind and ahead of solar, among the leading sources of renewable energy. And five states (Washington, Idaho, Vermont, Oregon and South Dakota) generated at least half of their electricity from hydroelectric dams last year.

A drop in hydropower is harmful for the climate because fossil fuel power plants are likely to pick up much of the slack. But hydropower has its own environmental issues. The construction of dams led to flooding and destruction of ecosystems, and there is a debate among environmentalists about the extent to which hydropower should be called “clean energy.”

The nation’s fleet of hydroelectric dams includes the oldest operating power plant in the United States (Whiting dam in Wisconsin, built in 1891) and the largest power plant of any technology in the United States in terms of generating capacity (Grand Coulee Dam in Washington, with capacity of about 6,800 megawatts).

While the decrease in hydropower this year may be alarming, it is within the bounds of what’s happened in the recent past. If the EIA forecast pans out, the 13.9 percent

decrease in hydro generation this year would be less than the 14.4 percent decrease in 2007, and close to the 13.5 percent decrease in 2012.
Original Article: Inside Climate News by Dan Gearino

Water flows to some farmers cut off from irrigation due to drought

After more than six weeks without water deliveries, North Unit Irrigation District and Arnold Irrigation District have started sending late-season water to their patrons.

The two districts, both starved for water since Wickiup Reservoir emptied in August, have access to water for about two weeks until the end of the irrigation season. North Unit Irrigation District irrigates 59,000 of acres of farmland in Jefferson County, where farmers have had to leave some fields fallow because of drought.

Arnold Irrigation District serves about 4,300 acres in south Bend.

Water is available because Central Oregon Irrigation District, a senior water rights holder with rights dating to 1900, shut down operations early this year in order to get an early start on its Redmond to Smith Rock piping project, according to District Manager Craig Horrell.

The live flow became available on Oct. 1.

North Unit Irrigation District, a junior water rights holder with rights from 1916, is eligible to divert live flow water when a senior rights holder declines to take it. The district is now diverting approximately 600 cubic feet per second from the Deschutes River, according to data from the Oregon Water Resources Department.

Arnold Irrigation District, which has water rights dating back to 1905, has been diverting around 72 cubic feet per second since Oct. 1.

The water diverted by North Unit Irrigation District was initially stored in Haystack Reservoir, said district General Manager Josh Bailey. Some patrons received water as early as Wednesday.

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This is not the first time this year that Central Oregon Irrigation District has made water available for junior water rights holders. In June, as part of its drought management strategy, the district began sharing 100 cubic feet per second of water with junior irrigation districts, including North Unit, Arnold and Lone Pine.

Original Article: The Bulletin by Michael Kohn

Water: More precious than gold

To ranchers and farmers in the Lahontan Valley, water is more precious than gold in providing an agricultural lifeline to the thousands of people who call this area home. Rusty Jardine, general manager and legal counsel for the Truckee-Carson Irrigation District in Fallon, presented an overview of the Newlands Project and how reclamation and the laws that govern its operation have made Fallon the Oasis of Nevada. Jardine presented the third lecture last week from the Churchill County Museum’s seven-part series on water.

The fourth lecture held Tuesday focused on the Derby Dam fish screens, and the fifth lecture on Oct. 12 features two speakers. Darcy Phillips, executive director of the River Wranglers, will discuss "In and Out of the Classroom: Learning About the Carson River Watershed" with information on the watershed, pollution, water quality and water conservation.

Brenda Hunt, manager of the Watershed Program for the Carson Water Subconservancy, will present "Watershed Literacy in Action: I am Carson Watershed." All presentations are free and open to the public beginning at 6 p.m.

TCID hired Jardine in 2010 to become general manager after he served for years as an attorney in the Elko court system and the Eleventh Judicial District Court in Pershing County where he worked more with the Humboldt Decree that regulated that body of water.

Jardine said TCID supplies only untreated water for agricultural use, and the Carson and Truckee rivers create a supply. As with the previous lecture on the origins of the Newlands Project around the turn of the 20th century, Jardine briefly gave a history of the Newlands Project and how it fits in with the communities. TCID, though, was formed in 1918 to work with the Bureau of Reclamation (former called Reclamation Service) to assume eventual control of the Newlands Project.

"Our core mission was to provide for a drainage system," Jardine said. "The engineers who created this project were brilliant. It was a marvelous engineering feat." Jardine said TCID has 2,500 users and operates with a $7 million budget. Although much of the water flows to the farmers and ranchers, Jardine said TCID also uses the water to generate electricity at three power stations its owns. He said the agency learns from its history, especially when re-examining 2015, which parallels this year for water storage and usage along with drought data.

Overall, Jardine said in real terms, TCID and the reclamation projects haven't been in existence that long. He said the number of congressional acts provided people a system to homestead and gain access to land for private ownership. Lake Tahoe, he said, reaches an average depth of 1,000 feet with its clear water. The reclamation project, therefore, provides for a series of dams to either hold or divert water, a system of canals and the Lahontan Dam holds back water that flows in the Carson River for the agriculture producers.

Original Article: Nevada Appeal by Steve Ranson

Assessing Western Drought Conditions – New Mexico Pecan Producers Beating the Odds with Irrigation Innovation

New Mexico's diverse agriculture industry provides over $1.3 billion in dairy production by value; $102 million in onion production by value - 10% of the nation's onion crop by value; $50 million in chili pepper production by value - 78% of the nation's chili pepper crop by value; and numerous other crops and livestock products. As with the majority of the Mountain West, New Mexico has suffered from this season's extensive drought. Ranchers are culling cattle and farmers are fallowing land to accommodate the lack of precipitation.

Pecan growers, though, have adapted particularly well in these conditions. New Mexico grows 35% of U.S. pecans. In fact, with over 32,000 acres of pecans, Doña Ana County, in the state's southern region of the Mesilla Valley, is the nation's largest pecan-producing county. It's also a high-desert environment that has been plagued by significant dry years, so farmers have become adept at conserving precious water resources.

Pecan production in New Mexico is a story of scientific advancements and successful university research combined with a desire to maintain optimal yields and high nut quality through significantly dry years. In the desert southwest fewer than 10 inches of rain fall in a typical year and most of the 60 to 72 inches of water required annually by mature pecan orchards must be applied through irrigation. This irrigation water is primarily supplied by the Elephant Butte Irrigation District, which typically allots water throughout the growing season. This year, however, the reservoir that feeds the district fell to just 4% of its carrying capacity and water allotments were curtailed in early June. Pecan growers are experienced in high-efficiency irrigation and were ready to supplement their surface water with groundwater. Extensive research at New Mexico State University has created techniques that allow farmers to maintain proper soil moisture. Many orchards are flood irrigated, but farmers are varying their methods for efficiency and water savings, moving to sprinklers, micro-sprays, subsurface irrigation through drip tape or drip irrigation. Drip irrigation allows precise application of water to plant roots. Small amounts of water are applied frequently to replace water withdrawn by the plant or lost by evaporation or deep seepage. Soil moisture in the area around the plant is thus maintained at a uniform level throughout the growing period. This increases growth and production potential because plants are not subjected to wet and dry cycles that normally occur with other irrigation methods. Drip irrigation simplifies irrigation procedures and minimizes distribution and evaporation losses. Less of the total soil area is wet with drip than with sprinkler and furrow systems, significantly reducing water required for irrigation. The irrigation system can be controlled automatically with a time clock and/or soil moisture sensors and automatic valves, thereby maintaining optimal soil moisture.

Original Article: New Mexico Farm and Livestock Bureau Dalene Hodnett

Colorado River drought conditions spur calls for better water infrastructure

Experts in government, agriculture, water management and the environment stressed during a U.S. Senate hearing on Wednesday the danger that droughts fueled by climate change pose in the West, including the Colorado River Basin.

During a hearing before an Energy and Natural Resources Committee panel, witnesses said long-term solutions and an investment in water infrastructure are needed to combat the effects of climate change.

"Water has always been a limited resource in the West," Sen. Mark Kelly, an Arizona Democrat who chaired the hearing of the Water and Power Subcommittee, said. "We have this old saying in Arizona that 'whiskey is for drinking, water is for fighting.'"

He said that the issue is a priority for him because Arizona is on the front lines of a major drought, which can increase the risk of wildfires in the West.

Tanya Trujillo, the assistant secretary for water and science at the Department of the Interior, said that "water supply is below average."

She said the federal government should continue to make investments in water infrastructure, and new technology such as water recycling and desalination systems that remove salt from salt water.

Kelly asked her how the Interior Department will use the $8.4 billion provided for the West in an infrastructure bill passed by the Senate.

Trujillo said that by replacing aging water infrastructure, water will be prevented from escaping, and that the bill also invests in technology that can capture water.

"We will experience unavoidable reductions in farm water supplies and hydropower generation, ecosystem degradation, and urban areas will need to conserve water," she said, adding that Interior and its state and local partners "have planned for this by being proactive and fully using the tools we have."

We will experience unavoidable reductions in farm water supplies and hydropower generation, ecosystem degradation, and urban areas will need to conserve water.

Original Article: Colorado News Online by Ariana Figueroa

U.S. Senate hearings: Investments can soften blow of climate change, but needs are great and urgent

U.S. senators on Wednesday promoted a federal hurricane system's performance in New Orleans during Hurricane Ida, but noted that other regions experienced devastation that is likely to worsen as climate change produces more intense and frequent storms.

The U.S. Army Corps of Engineers installed the Hurricane and Storm Damage Risk Reduction System in response to Hurricane Katrina in 2005, and Ida was the $14.5 billion system's "first big test," Senate Environment and Public Works Chairman Thomas E. Carper, (D-Del.), said.

Carper and ranking Republican Shelley Moore Capito of West Virginia said the system of levees and flood walls passed the test with flying colors — at least in the New Orleans area.

Col. Stephen Murphy, the commander of the Corps' New Orleans District, agreed with the senators' assessment.

Before Katrina, the patchwork of hurricane prevention infrastructure was "a system in name only," Murphy said. The federally funded system upgrades kept the damage from Ida from being much worse, he said.

"While we couldn't be more proud of the performance of the greater New Orleans area's Hurricane Storm Damage Risk Reduction System and how it validated the massive national investment of $14.5 billion, other parts of the state were not as fortunate," Murphy said.

"Where there was federal investment in levees and flood walls, though, the system performed as designed."

Congress has recently appropriated increased funding to the Corps for disaster response, Capito said, highlighting the $5.7 billion Congress provided to the Corps in a funding stopgap measure signed into law last week.

Original Article: NC Policy Watch by Jacob Fischler and Ariana Figueroa

The future of water in the U.S. West is uncertain, so planning and preparedness are critical

Water authorities in the Western U.S. don't know what the future will bring, but they are working collaboratively and with scientific rigor to make sure they're prepared for anything.

In a thirsty Western United States that has become increasingly vulnerable to extreme weather events, rampant wildfires and years of unprecedented drought, those at the helm of the region's water agencies are accelerating their plans to grapple with climate change.

"The Western United States — especially the 40 million people who use the Colorado River — we're in the bullseye of climate change," says Cynthia Campbell, water resource management advisor for the City of Phoenix. "This is not a conceptual conversation anymore. We're in full-on adaptation."

With that reality comes the need to plan around the future of water for the people and wildlife who call the Colorado River Basin home.

But, says Carly Jerla, an operations research analyst for the United States Bureau of Reclamation's Lower Colorado Region, "you can't just plan for one future."

As climate change casts its shadow over water resources in the Western U.S., water authorities must navigate uncertainty in the form of the many possible futures in front of them. Those futures almost certainly hold more of what climate change has already brought — rising temperatures, changes in precipitation, shifts in snowpack, longer and more severe droughts, more frequent flooding — plus people's responses to those

changes. Taken together, these fateful forecasts go into climate projections: models that explore an array of possible future climate conditions or scenarios.

Today, planning agencies are working together to diversify the technology they're using and integrate scientific research into local and regional adaptation strategies in an effort to be rigorous in their analysis of the uncertainty.

Adapting to climate change "shouldn't be scatter-shot," Campbell says. "It can actually be more scientific."

Original Article: Resilience by Sharon Udasin

Ohio State to lead $18 million project to improve Lake Erie water quality

The Ohio State University will be the lead partner on a new five-year, multimillion-dollar pilot watershed project in northwestern Ohio designed to demonstrate that agricultural conservation practices—if used on 70% of the farmland in a watershed, and evaluated on a watershed scale—can help meet Lake Erie's water quality goals.

The Regional Conservation Partnership Program, part of the U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service, is providing $6.8 million in funding for the project.

A further $4 million is being made available to the project by the state of Ohio through the H2Ohio water quality initiative, which the project will complement.

Key to the project are investments by other partners that bring the project's total funding to more than $18 million.

The new project "targets the ultimate goal of preserving Lake Erie while supporting agricultural vitality and environmental sustainability," said Cathann A. Kress, Ohio State's vice president for agricultural administration and dean of the College of Food, Agricultural, and Environmental Sciences (CFAES).

As part of Ohio State's wider efforts to improve water quality, the project "pulls together local, state and federal partnerships while leveraging CFAES' water quality expertise through Ohio State University Extension, our research at Stone Laboratory and our work with precision agriculture to benefit Ohioans," Kress said.

Ohio State's partners on the project include four agricultural businesses—The Mosaic Company, Nutrien Ag Solutions, Heritage Cooperative and Haselman Ag; agricultural organizations; nongovernmental groups; the Ohio Department of Agriculture; the Ohio Department of Natural Resources; federal agencies; and four other Ohio universities—Heidelberg University, Bowling Green State University, Kent State University and the University of Toledo.

Lake Erie's water quality goals focus on reducing nutrient runoff from agricultural fields in the lake's watershed, especially phosphorus runoff, so as to reduce phosphorus levels entering the lake by 40%, resulting in reduced harmful algal blooms.

"While other efforts have supported conservation practices across the Lake Erie basin and demonstrated improvements at the field scale, there's a need to demonstrate how

these practices can move the needle at a watershed scale," said Jay Martin, the project's director and an ecological engineering professor with CFAES.

Without that evidence, "we don't know what type or level of conservation practices or support are needed to achieve Lake Erie's water quality goals," said Martin, who is also a research lead with Ohio State's Sustainability Institute, which helped support the project's proposal.

Original Article: OSU News by Kurt Knebusch

Policy could be key in dealing with the West's historic drought

The historic drought that the West is currently experiencing is changing how people think about water. There have been labor-intensive ideas to help solve or at least ease the drought. But what about potential water policy changes? Of the potential policy changes, there's one favored by economists: water markets.

"Economists love markets, of course, because it allows us to create value," said Jason Shogren, an economist and professor at the University of Wyoming (UW).

He thinks a water market would really help with supply problems.

"It's just that water is so essential to everything, there's no substitute [for] it. That makes it almost a very inelastic demand," he said. "So, if you need water, you need water. We all need water. Right?"

According to Shogren, in a water market, people who own rights to water, like farmers, can buy more as needed, say, for example, if they're growing a really thirsty crop. Or, they can sell their right to the water to others who need it, like cities. But, Shogren added, it can be difficult to convince people that creating a water market is the right move because a lot of people view water as a basic right.

"We'll [economists] make the case for a water market saying it's just a commodity like anything else. It's not a fundamental sacred right to you," he said.

He said a market would create a fair "going rate" for an acre-foot of water without having to create restrictions on the people using it.

"What markets do well is ration things to people who value them more. But if you don't want to use markets to do the rationing, then you've got to put in quantity constraints," said Shogren.

The challenge is finding the right price.

"It becomes more difficult to think about prices for natural resources, like, what is the right price for a gallon of water?" he asked. "What is the right price for an ecosystem service? What's the right price to protect an endangered species that live in that water?"

Even if you could figure out a fair rate, you have to make sure you can get water to everyone who needs it, not just those who have a lot of money.

"So there's the classic trade-off between efficiency, which is making the economic pie as big as possible, and equity, who shares and what share do you get of that economic pie," Shogren said. "So markets themselves shouldn't be considered the king."

He said you have to take specific action to make the market more equitable, maybe by creating something like subsidized low-income water. But then you have to make sure that's not abused.

"As long as you can prevent that, then you can be both equitable and you can allocate resources more efficiently," he added.

Shogren admits a market between states would be difficult to set up because laws and regulations over water ownership are different from state to state. But, water markets are already in small scale use in a couple of places and have been shown to be effective at distributing water.

But you can't have a water market if you don't have access to water to distribute. Especially in the west, where a majority of the precipitation falls during the winter as snow, capturing that moisture and saving it for later is really important. That's where reservoirs and dams come in. According to Dr. Tom Minckley, a professor at UW who studies water in the West, dams and reservoirs are basically water bank accounts.

Original Article: Wyoming Public Media by Ivy Engel

Piper Trust's $5 million 'surprise grant' will fund research sustainability project to develop tools for measuring Arizona's water supply

A few weeks ago, Arizona State University's Julie Ann Wrigley Global Futures Laboratory received a pleasant surprise — a $5 million surprise.

The generous gift was one of four "surprise grants" totalling $7.1 million courtesy of the Virginia G. Piper Charitable Trust, which has bestowed on the university more than $60 million since 1994.

The bulk of the latest grant money went to enable ASU to develop solutions for the state to thrive and grow through water security and climate resilience. Researchers will use the investment to develop new tools, analytics and data visualizations to measure, monitor and manage water in the region by giving decision-makers more accurate information.

Led by the Julie Ann Wrigley Global Futures Laboratory, the new research project includes the Kyl Center for Water Policy at the Morrison Institute for Public Policy and the Decision Center for a Desert City. The three entities will convene researchers, policymakers and business leaders to understand and explore solutions as Arizona's water supply keeps dropping.

Original Article: ASU News by Marshall Terrill

Hydropower Decline Adds Strain to Power Grids in Drought

After water levels at a California dam fell to historic lows this summer, the main hydropower plant it feeds was shut down. At the Hoover Dam in Nevada — one of the country's biggest hydropower generators — production is down by 25%. If extreme drought persists, federal officials say a dam in Arizona could stop producing electricity in coming years.

Severe drought across the West drained reservoirs this year, slashing hydropower production and further stressing the region's power grids. And as extreme weather becomes more common with climate change, grid operators are adapting to swings in hydropower generation.

"The challenge is finding the right resource, or mix of resources, that can provide the same energy and power outputs as hydro," said Lindsay Buckley, a spokesperson for the California Energy Commission.

U.S. hydropower generation is expected to decline 14% this year compared with 2020, according to a recent federal forecast. The projected drops are concentrated in Western states that rely more heavily on hydropower, with California's production expected to fall by nearly half.

The reductions complicate grid operations since hydropower is a relatively flexible renewable energy source that can be easily turned up or down, experts say, such as in the evenings when the sun goes down and solar energy generation drops.

"Hydro is a big part of the plan for making the whole system work together," said Severin Borenstein, a renewable energy expert at the University of California, Berkeley and board member of the California Independent System Operator, which manages the state's electric grid.

Borenstein noted that hydropower is important as the state works to build out its electricity storage options, including by installing batteries that can dispatch energy when it is needed.

Ben Kujala of the Northwest Power and Conservation Council, which handles power planning for the Columbia River basin, also noted that grid operators have adapted how they deploy hydropower in recent years to ensure that it complements solar and wind energy.

Power grids linking Western regions also offer some relief. While California can face multi-year stretches of dry weather, the Pacific Northwest usually gets enough precipitation in the winter to recover and produce hydropower to export.

Original Article: Bloomberg by Michael Phillis / AP

Economic forum hears about importance of water supplies

Adequate water supplies are essential to the Antelope Valley and its future, an issue the Antelope Valley-East Kern Water Agency is working to ensure.

"Water is a very vital issue and it's very important for the growth of the region. We take that responsibility … very seriously," AVEK General Manager Dwayne Chisam said during the Antelope Valley Economic Development and Growth Enterprise Semi-Annual Fall Forum, Wednesday.

AVEK is water wholesaler and supplies water to other providers, such as Los Angeles County Waterworks and Quartz Hill Water District. Its own supplies come from a

combination of groundwater and water from the State Water Project, delivered through the California Aqueduct.

The pumping water from the underlying water basin is subject to limits set by a 2015 judgment.

With that, about 56% of AVEK's supply is through groundwater pumped from local wells, 30% is from the State Water Project, and the remainder from the runoff behind the Littlerock Dam and recycled water supplies, Chisam said.

This year, the drought has caused AVEK's allocation from the State Water Project to drop to only 5% of its total allowed.

"One of the reasons this drought is particularly disturbing versus other droughts is the fact that even with a normal snowpack, we weren't able to get the kind of runoff that we have anticipated over the last 70, 80 years," Chisam said.

Much of the Sierra snowpack the state relies on for water was absorbed into the burn areas this year, rather than running off into rivers and reservoirs.

"For 2022, it looks even worse," Chisam said, with the potential for the State Water Project allocation to drop to zero. "That has a pretty significant impact."

To maximize its water resources, AVEK has established water banks, in which water is stored underground. Water from the State Water Project is stored during years when the supply is greater than needed, to be used during dry years.

At this point, the agency's water banks contain 70,000 acre-feet of water, enough to meet two to three years' demand.

Original Article: AV Press by Allsion Gatlin

GLOBAL WATER NEWS

Fresh Storm Forecast for Flood-Hit Thailand Adds to Growth Risks

Thailand is bracing for a fresh tropical storm after weeks of heavy rainfall inundated large swathes of its cropland, undermining efforts to revive the pandemic-hit economy by easing Covid restrictions and a gradual tourism reopening.

Tropical storm Lionrock is expected to bring more rain to the northeastern region next week, while a strong monsoon is expected to cause heavy downpour in southern Thailand, according to the Thai Meteorological Department. Flood warnings have been issued for several provinces and districts, many of which are still under water from the effects of two other storms that swept the region in recent weeks.

While the flooding this year isn't as severe as the one in 2011 that affected an area 50 times larger, the worsening situation may impact a nascent recovery in the economy that's already facing risks from soaring energy prices and a weaker baht. The flooding, which has largely spared factories, comes weeks ahead of the planned quarantine waiver for foreign tourists in key provinces including Bangkok and Chiang Mai. The

flooding may cut gross domestic product by at least 0.2 percentage point this year and more if the upcoming storm unleashes more havoc, said Nattaporn Triratanasirikul, an economist at Kasikornbank Pcl's research unit.

"The final quarter will be very challenging as local demand remains weak and we don't expect much contribution from tourism even after the reopening," Nattaporn said.

Original Article: Bloomberg by Randy Thanthong-Knight and Suttinee Yuvejwattana

Portugal: Low exposure to ecological shocks, Mozambique Angola at great risk

Portugal is one of the countries with the least exposure to ecological shocks, but Mozambique and Angola are at great risk, according to the Ecological Threat Report published by the Australian-based Institute of Economics and Peace.

In the report, which analysed 178 countries and territories, Portugal is in 28th position in the "Ecological Threat Report" (ETR), threatened above all by the potential rise in temperatures and water shortages.

Mozambique (171st position) and Angola (169th position) have among the ten highest scores on the ETR, which looks at factors such as the risk of water scarcity or water supply, rapid population growth, temperature instability and natural disasters.

The authors of the second edition of the report concluded that there is a cyclical relationship between ecological degradation and conflict such as terrorism and civil war. Eleven of the 15 countries with the worst ETR scores are currently classified as in conflict, and the remaining four are at great risk of peace disruption.

"It is a vicious cycle where resource degradation leads to conflict, and the resulting conflict leads to further resource degradation. Breaking the cycle requires improving ecological resource management and socio-economic resilience," according to the Institute for Economics and Peace (IEP) paper.

Afghanistan has the highest overall score in the report, which reflects the country's vulnerability, which could be exacerbated by climate change.

Brazil is ranked 40th in the ETR index, Equatorial Guinea 91st, Guinea-Bissau 105th and East Timor 127th. Guinea-Bissau and Cabo Verde are mentioned in the report but are not in the table.

North America and Europe are the two regions with the lowest average level of ecological threats. At the same time, South Asia, Sub-Saharan Africa and the Middle East and North Africa are the regions with the highest average level.

The IEP estimates that by 2050, 4.7 billion people will reside in countries with high and extreme ecological threats, representing 48.7% of the world's total population.

The report identifies three groups of 30 countries under greater ecological pressure, namely the Sahel-Horn of Africa corridor, between Mauritania and Somalia, the Southern Africa corridor, between Angola and Madagascar, and the Middle East and Central Asia corridor, between Syria and Pakistan.

Angola is mainly exposed to the risk of food shortages, while Equatorial Guinea and Guinea-Bissau are in danger of suffering from water shortages.

Original Article: Macau Business by Lusa

Govt Launches Heli-Borne Survey Technology For Groundwater Mapping In Arid Regions

To solve the acute water crisis and help in efficient groundwater management, state-of-the-art heli-borne survey technology was launched on Tuesday, October 5. Jitendra Singh, Union Minister of State for Water Resources, launched the initiative in Rajasthan's Jodhpur. As per an official release, the technology has been developed by the Centre for Scientific and Industrial Research (CSIR) and the National Geophysical Research Institute (NGRI) Hyderabad.

Several ministers attended the flagging-off ceremony. a helicopter. Gajendra Singh Shekhawat, Union Jal Shakti Minister, recently approved the survey to create a high-resolution aquifer map to increase groundwater resources in arid areas of northwestern Rajasthan, Gujarat, Haryana, and Punjab. The survey results from a collaboration between the Central Groundwater Board, the Jal Shakti Ministry, and the National Geophysical Research Institute in Hyderabad. Heli-borne geophysical mapping will provide high-resolution 3D images of the subsurface up to 500 metres below ground level and map potential groundwater sources.

The CSIR's water technologies, which range from source identification to water purification, will assist millions of people across the country and will help in achieving PM Modi's "Har Ghar Nal Se Jal" and "doubling farmers' income" objectives, said Jitendra Singh.

Original Article: The Logical Indian by Sweta Routh

Climate refugee crisis beckons in India if water scarcity continues: 'Waterman' Rajendra Singh

Fortunately, Indians are not called climatic refugees right now but in the next seven years if the water scarcity in India continues to persist then, Indians will also face a similar situation, he warned.He questioned what will Indias future be like if water banks are emptying because of excessive pumping of groundwater.Already, migration due to water scarcity is taking place and everywhere migration is going on from villages to cities and we should actually call it displacement of people.

ndia can face a climate refugee crisis in the next seven years if water scarcity continues to persist in the country, renowned water conservationist Rajendra Singh said.

“Climate refugee'' means increasing large-scale migration and cross-border mass movements of people partly caused by such weather-related disasters.

Speaking at the India Today Conclave 2021, water conservationist Singh, who is also known as the ''Waterman of India'' said the country cannot become 'paanidaar' (water self-sufficient) till a balance between discharge and recharge is maintained.

''And forming this balance between discharge and recharge of water is possible only through community driven decentralised management,'' he said. Singh said people are already moving from their villages to cities due to water scarcity.

''Europe is seeing climate refugees from many African countries. Fortunately, Indians are not called climatic refugees right now but in the next seven years if the water scarcity in India continues to persist then, Indians will also face a similar situation,'' he warned.

He questioned what will India's future be like if water banks are emptying because of excessive pumping of groundwater.

''Already, migration due to water scarcity is taking place and everywhere migration is going on from villages to cities and we should actually call it displacement of people. Now, the situation is such that there is such water scarcity that people are leaving villages and are not able to return.'' ''In India, migration due to water scarcity is happening. Cities have water. In agriculture, till skill development and efficient use of water under water literacy movement is not started in the country till then India cannot end water scarcity,'' he said.

Bharat Lal, Additional Secretary (Water), Department of Drinking Water and Sanitation, Ministry of Jal Shakti, said the government has launched Jal Jeevan Mission and is working towards recharge, supply and reuse and maintenance of water in the country.

''Under the Jal Jeevan mission, communities are involved and our aim is that in due course water, sanitation and hygiene enlightened villages and schools are made. Women led water committees are being made and civil society is being involved to spread awareness,'' he said.

Singh said the water crisis is a ''women's crisis'' and the government has formed 3.8 lakh women committees but that is only on paper.

Original Article: Devdiscourse

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