BAY AREA WATER SUPPLY AND CONSERVATION AGENCY BOARD OF DIRECTORS MEETING

April 7, 2017

Correspondence and media coverage of interest between March 24, 2017 and April 7, 2017

Correspondence

Date:	April 4, 2017
From:	Charles Perl, Deputy Chief Financial Officer, SFPUC
To:	Nicole Sandkulla, CEO/General Manager, BAWSCA
Subject:	Wholesale Water Rates, Effective Fiscal Year 2017-18

Date:	March 28, 2017
From:	Nicole Sandkulla, CEO/General Manager, BAWSCA
To:	San Francisco Public Utilities Commission
Subject:	Statement by Nicole Sandkulla, Chief Executive Officer of BAWSCA, Before the
	San Francisco Public Utilities Commission on the State Water Board's Recirculated Draft
	Substitute Environmental Document

Media Coverage

Drought

Date: Source: Article:	April 7, 2017 Office of Governor Brown Press Release: Governor Brown Lifts Drought Emergency, Retains Prohibition on Wasteful Practices
Date:	April 7, 2017
Source:	DWR and SWRCB
Article:	Press Release: State Releases Plan to Make Water Conservation a Way of Life
Date:	March 31, 2017
Source:	USA Today
Article:	Huge snowpack, blooming desert mark retreat of California drought
Date:	March 31, 2017
Source:	Capital Press
Article:	Huge snowpack prompts California officials to revisit drought status
Date:	March 30, 2017
Source:	NPR
Article:	With Drought Emergency Over, Californians Debate Lifting Water Restrictions
Date:	March 29, 2017
Source:	The Mercury News
Article:	What drought? Sierra Nevada snowpack at 164 percent of normal

Conservation:

Date:	April 4, 2017
Source:	Sacramento Bee
Article:	Drought may be nearly over, but Californians are still saving water
Date:	April 4, 2017
Source:	KHTS
Article:	California Announces Water Conservation More Than Doubled in February

SWRCB's Draft SED

Date:	March 17, 2017
Source:	San Francisco Chronicle
Article:	San Francisco pitches plan for future of California rivers

Water Supply Management:

Date:	April 5, 2017
Source:	Wall Street Journal
Article:	California's Wasted Winter Rains

Date:April 5, 2017Source:Inside PhilanthropyArticle:Dry Land: A New Grantmaker Seeks to Fix How the West Manages Water

Date: March 24, 2017

Source:Sacramento BeeArticle:Opposing sides in California water wars forced together in groundwater agencies

Water Supply Conditions

Date:	April 5, 2017
Source:	SF Gate
Article:	Northern Sierra is now only 5 inches from wettest water year on record

Date:April 4, 2017Source:The Folsom TelegraphArticle:Survey says – April snowpack nearly twice average

Date:April 4, 2017Source:KCRA SacramentoArticle:Fly above the Sierra to see what's in store for CA reservoirs

Date:April 3, 2017Source:Tahoe Daily TribuneArticle:California snowpack healthy again, but warming looms large



April 4, 2017

Ms. Nicole Sandkulla General Manager - Bay Area Water Supply & Conservation Agency 155 Bovet Road, Suite 650 San Mateo, CA 94402

Re: Wholesale Water Rates, Effective Fiscal Year 2017-18

Dear Ms. Sandkulla:

The San Francisco Public Utilities Commission (SFPUC) has scheduled a Public Hearing to consider the adoption of Fiscal Year 2017-18 Wholesale Water Rates of \$4.10 per Ccf, representing no increase from the current rate for treated wholesale water effective July 1, 2017, as follows:

> May 9, 2017, 1:30 pm San Francisco City Hall 1 Dr. Carlton B. Goodlett Place, Room 400 San Francisco, CA 94102

Fiscal Year 2017-18 Billing

As in prior years, the following charges, unrelated to the Wholesale Revenue Requirement, will also be reflected in the Wholesale Customer bills effective bill effective July 1, 2017:

- BAWSCA Bond Surcharge: Resulting from the February 2013 prepayment of the Pre-2009 Assets a surcharge representing repayment of BAWSCA issued bonds is included in the monthly bill. The amounts of the surcharge are proportionate to water consumption and have been adjusted accordingly. The SFPUC bills and collects the surcharge on BAWSCA's behalf, and remits these amounts to the trustee to pay debt service. Please refer to the attached letter dated March 17, 2017 regarding the BAWSCA Fiscal Year 2017-18 Bond Surcharge Schedule for further details.
- Late Fees: To mitigate cash flow challenges resulting from late payments, the SFPUC applies late payment penalties as specified in Schedule W-44 which reads "Any charge or fee not paid within 30 days shall be subject to a late payment penalty equal to one-half of one percent (1/2%) for each 30 days or fraction thereof on the amount owed. This late payment penalty shall also apply to wholesale customers." The SFPUC encourages Wholesale customers to sign up

Edwin M. Lee Mayor

Anson Moran President

Ike Kwon Vice President

Ann Moller Caen Commissioner

Francesca Vietor Commissioner

Vince Courtney Commissioner

Harlan L. Kelly, Jr. General Manager



for electronic billing and payment services to facilitate timely payment of bills and to avoid late fees. SFPUC would be happy to consider changing your meter read date to facilitate your internal approval processes.

Untreated Wholesale Water Rate Discount Factor

The Fiscal Year 2017-18 Untreated Wholesale Water Rate Discount Factor for customers receiving untreated water is \$0.43 per Ccf. The discount factor is equal to the total projected unit cost for the Harry Tracy Water Treatment Plan (HTWTP). The proposed untreated water discount factor is calculated by dividing the relevant cost by total wholesale water deliveries. Please refer to the attached Calculation of Untreated Wholesale Water Rate Discount Factor for further details.

Enclosures

The following information supporting the proposed Fiscal Year 2017-18 rate change is attached:

- Attachment N-1: Balancing Account/Rate Setting Calculation: A table illustrating the change in the Wholesale Revenue Requirement and how the wholesale rate was calculated
- Attachment N-2: Wholesale Revenue Requirement Schedules: A series of schedules showing the projected expenses included in the Wholesale Revenue Requirement for the proposed rate year, along with supporting materials
- Attachment N-3: Schedule of Projected Water Sales, Wholesale Revenue Requirements and Wholesale Rates: A schedule showing projected Wholesale Customer water sales and rates for the proposed rate year and the following four fiscal years
- Calculation of Untreated Wholesale Water Rate Discount Factor
- Schedule W-25: Wholesale Use with Long-Term Contract Proposed Fiscal Year 2017-18 Wholesale Customer water rates
- SFPUC Procedures to Enroll for Electronic Billing and Payment
- Fiscal Year 2017-18 BAWSCA Bond Surcharge letter and schedule showing the bond surcharge for each member agency

Future Rate Considerations

On March 28, 2017, the SFPUC approved revised new Debt Service Coverage Policy that may impact future wholesale water rates by increasing debt service coverage requirements. The FY 2017-18 Wholesale Water Rate of \$4.10/Ccf does not include the potential impact of the change in this policy. The SFPUC will work with BAWSCA to implement the new policy. If you have any questions, please contact me at 415-487-5262, or Amy Javelosa-Rio, Rate Administrator at 415-487-5207.

Sincerely,

Charles Perl Deputy Chief Financial Officer Financial Services

Enclosures

cc: Harlan L. Kelly, Jr. (w/ enclosures) Michael Carlin (w/ enclosures) Steve Ritchie (w/ enclosures) Eric Sandler (w/ enclosures) Joshua Milstein (w/ enclosures)



Statement by Nicole Sandkulla, Chief Executive Officer of BAWSCA, Before the San Francisco Public Utilities Commission on the State Water Board's Recirculated Draft Substitute Environmental Document

March 28, 2017

Last week, BAWSCA submitted comments to the State Water Resources Control Board (State Board) regarding its <u>Recirculated Draft Substitute Environmental Document in Support of</u> <u>Potential Changes to the Water Quality Control Plan for the San Francisco Bay-</u> <u>Sacramento/San Joaquin Delta Estuary: San Joaquin River Flows and Southern Delta Water</u> <u>Quality</u> (SED). BAWSCA collaborated closely with the SFPUC and its member agencies in preparing its comments to the State Board.

BAWSCA supports the objective of the Board's Bay Delta Plan to protect water quality for humans, fish, and other wildlife, and the voluntary settlement discussions among all parties.

The State Board's proposed plan, however, involves major water-supply risks for the San Francisco Regional Water System and its water users, which is why BAWSCA cannot support the Board's present proposal.

Specifically, the State Board proposal could cause a substantial reduction of water from the Tuolumne River to the Bay Area for the 1.8 million residents, 40,000 businesses, and thousands of community organizations in Alameda, San Mateo, and Santa Clara counties whose water interests BAWSCA represents. These impacts are detailed in BAWSCA's comment letter.

The SFPUC has submitted a much better plan for the Bay Delta.

The SFPUC's plan takes advantage of specific Tuolumne River studies funded by the SFPUC and others since the early 1990's. In addition to proposed releases from Don Pedro Reservoir designed to improve habitat conditions in the Tuolumne River, the SFPUC's proposal includes measures to improve existing physical habitat, reduce the detrimental effects of non-native predators on salmonids, and reduce the negative impact of current hatchery practices on the river's salmon population.

With the State Board's proposed Bay Delta Plan and activities of others, the San Francisco Regional Water System faces significant risks to overall water supply reliability like never before. San Francisco has a perpetual legal and contractual requirement to deliver 184 million gallons of water a day to BAWSCA's member agencies. The SFPUC must meet this requirement. As stated by President Moran at the January 10, 2017 Commission meeting, "we would be obligated to make whatever investments we would have to make to make sure that the service area was served."

BAWSCA will continue to work closely with the SFPUC on these matters given our agencies' significant reliance on the Regional Water System and this region's need for a reliable supply of high quality water at a fair price, today and in the future.

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Governor Brown Lifts Drought Emergency, Retains Prohibition on Wasteful Practices

SACRAMENTO – Following unprecedented water conservation and plentiful winter rain and snow, Governor Edmund G. Brown Jr. today ended the drought state of emergency in most of California, while maintaining water reporting requirements and prohibitions on wasteful practices, such as watering during or right after rainfall.

"This drought emergency is over, but the next drought could be around the corner," said Governor Brown. "Conservation must remain a way of life."

Executive Order B-40-17 lifts the drought emergency in all California counties except Fresno, Kings, Tulare and Tuolumne, where emergency drinking water projects will continue to help address diminished groundwater supplies. Today's order also rescinds two emergency proclamations from January and April 2014 and four drought-related executive orders issued in 2014 and 2015.

Executive Order B-40-17 builds on actions taken in <u>Executive Order B-37-16</u>, which remains in effect, to continue making water conservation a way of life in California:

- The State Water Resources Control Board will maintain urban water use reporting requirements and prohibitions on wasteful practices such as watering during or after rainfall, hosing off sidewalks and irrigating ornamental turf on public street medians.
- The state will continue its work to coordinate a statewide response on the unprecedented bark beetle outbreak in drought-stressed forests that has killed millions of trees across California.

In a related action, state agencies today issued a plan to continue to make conservation a way of life in California, as directed by Governor Brown in May 2016. The framework requires new legislation to establish long-term water conservation measures and improved planning for more frequent and severe droughts.

Although the severely dry conditions that afflicted much of the state starting in the winter of 2011-12 are gone, damage from the drought will linger for years in many areas. The drought reduced farm production in some regions, killed an estimated 100 million trees, harmed wildlife and disrupted drinking water supplies for many rural communities. The consequences of millions of dead trees and the diminished groundwater basins will continue to challenge areas of the state for years.

The full text of today's executive order can be found here.

California's Drought Response

The drought that spanned water years 2012 through 2016 included the driest four-year statewide precipitation on record (2012-2015) and the smallest Sierra-Cascades snowpack on record (2015, with 5 percent of average). It was marked by extraordinary heat: 2014, 2015 and 2016 were California's first, second and third warmest year in terms of statewide average temperatures.

The state responded to the emergency with actions and investments that also advanced the California Water Action Plan, the Administration's five-year blueprint for more reliable, resilient water systems to prepare for climate change and population growth. To advance the priorities of the Water Action Plan and respond to drought, the voters passed a comprehensive water bond, the Legislature appropriated and accelerated funding and state agencies accelerated grants and loans to water projects.

California also enacted the historic Sustainable Groundwater Management Act, took action to improve measurement and management of water, retrofitted tens of thousands of inefficient toilets, replaced lawns with water-wise landscaping and provided safe drinking water to impacted communities.

Californians also responded to the drought with tremendous levels of water conservation, including a nearly 25 percent average reduction in urban water use across the state.

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Governor Edmund G. Brown Jr. State Capitol Building Sacramento, CA 95814

Click here to view the Press Release in an website



State Releases Plan to Make Water Conservation a Way of Life

FOR IMMEDIATE RELEASE April 7, 2017

Contacts: Ted Thomas, DWR | (916) 653-9712 Ted.Thomas@water.ca.gov

George Kostyrko, SWRCB | (916) 341-7365 George.Kostyrko@waterboards.ca.gov

SACRAMENTO – As Governor Edmund G. Brown Jr. ended the drought state of emergency in most of California today, state agencies released a long-term plan to better prepare the state for future droughts and make conservation a California way of life.

Building on the successes and lessons learned from California's five-year drought, the plan establishes a framework for long-term efficient water use that reflects the state's diverse climate, landscape and demographic conditions. Achieving the plan's goals will help all of California better prepare for longer and more severe droughts caused by climate change, as directed by the Governor's May Executive Order.

"This framework is about converting Californians' response to the drought into an abiding ethic," said California Department of Water Resources Acting Director Bill Croyle. "Technically, the drought is over, but this framework extends and expands our dry-year habits. Careful, sparing use of water from backyards to businesses and farm fields will help us endure the next inevitable drought."

California's climate is the most variable in the nation and naturally swings between flood and drought. Climate change is increasing average temperatures, shrinking the Sierra Nevada snowpack, and creating more extreme droughts and storm events. California's recent historic drought included the driest four-year period, the warmest three years and the smallest Sierra snowpack in state history, while this winter's storms created one of the highest precipitation totals in the last 150 years.

Recognizing these long-term risks, the plan seeks to move the state from the temporary, emergency conservation measures in effect during the drought to a more durable approach that will ensure all communities are improving water use efficiency and extending their supplies. These measures will help achieve a top priority in the Governor's Water Action Plan – to "make conservation a California way of life."

"California's farmers and ranchers practice conservation every day," said California Department of Food and Agriculture Secretary Karen Ross. "They are prepared to continue in that spirit in adherence to groundwater regulations and the adoption of more efficient irrigation systems."

After Governor Brown called for a 25 percent reduction in urban water use in 2015, Californians rose to the challenge and saved 24 percent during the 12 months the mandate was in place.

Even after the strict standards were lifted last May, Californians continued to save water, with cumulative savings staying above 20 percent. This plan builds on that success to establish long-term conservation measures.

Central to the plan is a requirement that the state's 410 urban water suppliers meet new water use targets. Suppliers would calculate their unique water efficiency targets based on a common methodology that takes into account the diverse climatic, demographic and land-use characteristics of each agency's service area. Urban water suppliers would set new targets by 2021 with a full compliance deadline of 2025.

"Californians stepped up big time during the drought," said Felicia Marcus, chair of the State Water Resources Control Board. "This plan allows us to build on that success and prepare for the longer and more frequent droughts we know are coming under climate change, in a way that is equitable and cost-effective. Efficiency is the cheapest and smartest way to extend our water resources."

The plan involved extensive stakeholder outreach and engagement, with more than 20 public meetings held around the state. In order to implement the key actions of this plan, the agencies will continue to solicit stakeholder and public input.

Other key elements of the plan include:

• Bans on wasteful practices, such as hosing sidewalks and watering lawns after rain.

• Technical assistance, financial incentives and standards to guide water suppliers' efforts to detect and repair leaks.

• Requiring urban water suppliers to prepare water shortage contingency plans, including a drought risk assessment every five years.

• Requiring more agricultural water suppliers to submit plans that quantify measures to increase water use efficiency and develop adequate drought plans.

• Monthly reporting by urban water suppliers on water usage, conservation achieved and enforcement efforts

• Improved drought planning for small water suppliers and rural communities.

Some of the actions described in the report will require new legislation and expanded state authority, while others can be implemented under existing authorities. All aim to achieve the four main objectives of the Governor's Executive Order B-37-16: use water more wisely, eliminate water waste, strengthen local drought resilience, and improve agricultural water use efficiency and drought planning.

The plan, Making Water Conservation a California Way of Life, Implementing Executive Order B-37-16, was prepared by the Department of Water Resources, the State Water Resources Control Board, the Public Utilities Commission, Department of Food and Agriculture and the Energy Commission. For more information on the development of the plan visit www.water.ca.gov/wateruseefficiency/conservation/.

Huge snowpack, blooming desert mark retreat of California drought

USA Today | March 31, 2017 | Doug Stanglin

The signs that California is emerging from its brutal five-year drought are everywhere, from a whopping snowpack in the Sierra Nevada to a spectacular "super bloom" that is turning some deserts into rare and dazzling displays of color.

The snowpack along the 400-mile mountain range, which stretches north to south along the Nevada border, is critical to California's water supply. On average, it provides about 30% of the state's water needs as it melts in the spring and early summer, the state Department of Water Resources noted.

In its latest snow survey completed Thursday, the department found the snowpack for the entire Sierra Nevada was at 164% of average for this time of year. The northern region was at 147%, the central at 175% and the southern at 164%.

"The difference is visually stunning, but it's the pattern of West Coast weather," state snow survey chief Frank Gehrke said, according to <u>the Los Angeles Times</u>. "The winter weather in California is feast or famine. We have very dry years followed by extremely wet years."

The snow was so deep this year at around 9,000 feet in the central Sierras that <u>a CNN crew</u> was not able to return to the spot they reached two years ago.

In Yosemite National Park, a kiosk at the top of Tioga Pass that was easily accessible two years ago is now completely covered in snow. "Except for the flagpole and the antenna, you would not know that there is a building there," said Gehrke, <u>according to KTLA</u>.



Frank Gehrke, right, chief of the California Cooperative Snow Surveys Program for the Department of Water Resources, lifts the survey tube out of the snowpack depth during the manual snow survey at Phillips Station, March 30, 2017, near Echo Summit, Calif. (Photo: Rich Pedroncelli, AP)

At Phillips Station near Lake Tahoe, the latest measurement found the snow depth was eight feet, with water content at 183% of normal. That marked a sharp contrast from conditions two years

ago, at the height of the drought, when Gov. Jerry Brown visited the same location and found no measurable snow.

The governor later ordered residents to sharply curtail their use of water at home. As hundreds of domestic wells ran dry, many people in rural farming communities and some Californians elsewhere had to drink bottled water and bathe from buckets.

While parts of California seldom fully escape the threat of drought each year, the latest <u>U.S.</u> <u>Drought Monitor</u> map shows severe drought clinging to a far southern sliver of the state, near Arizona, and an area of "moderate" drought from west of Santa Barbara to east of San Bernardino, including Los Angeles.

Thanks to a parade of moisture-laden snow and rain storms this winter, only about 8% of the state is now in a drought, a huge dropoff from the 82% at the beginning of the year.

One delightful sign of the retreating drought is a tourist boom in some desert towns from a rare "super bloom" of flowers. Towns like Borrego Springs, 85 miles northeast of San Diego, report record crowds and traffic from tourists eager to see the colorful carpet that only shows up every decade or so.

The show is expected to go on through May, as different flowers bloom at different elevations.

On the downside, the huge snow buildup prompted Los Angeles Major Eric Garcetti last week to declare a state of emergency for the region over concerns of that the melting in the eastern Sierra Nevada would threaten homes in rural areas of Owens Valley hundreds of miles north of the city.

The flood issue is frequently a tense one for Los Angeles, which surreptitiously bought rights to water in the valley and channeled it south more than a century ago. The emergency declaration cleared the way for the Department of Water and Power to spend up to \$50 million to respond to any damage to public health and safety and to protect infrastructure and the environment.

"Although the record pace of the snowpack accumulation fell off significantly in March, California enters the snowmelt season with a large snowpack that will result in high water in many rivers through the spring," Michael Anderson, the state climatologist, <u>said</u> this week.

Huge snowpack prompts California officials to revisit drought status

State officials will have an announcement about California's drought status within the next week, as the latest manual snow survey in the Sierra Nevada found a snow-water equivalent that's 183 percent of normal.

Capital Press | March 31, 2017 | Tom Heardon

SACRAMENTO — Is California about to formally declare an end to its five-year drought?

After abundant winter rainfall and snow accumulation, state officials plan an announcement about California's "drought status" within the next week, said Doug Carlson, spokesman for the state Department of Water Resources.

Exactly when the statement will come is still unknown, as is when and if the State Water Project will increase its current allocation of 60 percent of its 29 member water agencies' requested supplies, Carlson said.

But the DWR's manual snow survey on March 30, which found a season-high snow-water equivalent of 46.1 inches in the Sierra Nevada near Lake Tahoe, makes the state's rebound from drought all the more evident, officials say.

"I think that the winter season has certainly been encouraging, and one might be justifiably optimistic about what our availability for water distribution will be later in the year," Carlson said. "Certainly it's a better picture than we've seen the last five years. I think anybody can take heart in that."

The manual survey at Phillips Station, about 90 miles east of Sacramento, was 183 percent of the late March and early April average for the site, which is 25.2 inches. Snow accumulation has increased each month since January, when just 6 inches of snow-water equivalent was found.

The survey came as electronic measurements showed that water content in the northern Sierra was 40.8 inches on March 30, 147 percent of the multi-decade average for the date, according to the DWR. The central Sierra's 50.5 inches is 175 percent of average, while the 43.9 inches in the southern Sierra is 164 percent of average, the agency reports.

The big snowmelt will result in high water in many rivers through the spring, state climatologist Michael Anderson said.

"The snowpack at Phillips today was almost 8 feet deep," Carlson said. "That is a tremendous contrast for anybody to recognize what kind of a year it has been. Two years ago ... there was literally no snow there."

Northern California legislators and water district officials have urged Gov. Jerry Brown to declare that the drought is over, citing the winter's deluges and heavy snowpack. The governor's executive orders mandating continued, long-term water savings were appropriate, "but this power should not be abused," state Sen. Jim Nielsen, R-Gerber, said in February.

State water regulators have so far been hesitant, noting that some Central Valley communities still depend on trucked and bottled water and that groundwater — the source of at least one-

third of the supplies Californians use — will need more than one wet winter to be replenished in many areas.

But this year's snowpack ranks in the upper quarter of historic snowpacks and is providing "great reservoir recovery," said Frank Gehrke, the DWR's snow surveys chief.

"The storm track shifted away from California during March, but we still have a very substantial snowpack, particularly in the higher elevations in the central and southern Sierra," Gehrke told reporters after conducting his latest survey. "This is an extremely good year from the snowpack standpoint."

With Drought Emergency Over, Californians Debate Lifting Water Restrictions NPR | March 30, 2017 | Kirk Siegler

As California water officials confirmed Thursday that the snowpack in the Sierra Nevada remains well above average, pressure was mounting on the state to lift emergency water restrictions that have been in place for two years.

The snowpack across the mountains is now 164 percent of average, a closely watched marker in the nation's most populous state — and biggest economy — where one-third of all the drinking water comes from snow-fed reservoirs.

Two years ago, Gov. Jerry Brown stood in a barren, snow-less meadow near Lake Tahoe and ordered a mandatory 25 percent cut in urban water use. State regulators also followed with a series of tough conservation and enforcement measures against water wasters. Most users in the state met — and in some cases exceeded — the targets, and today, according to the federal government's drought monitor, only about 8 percent of California remains in severe drought.

"This is not an emergency," says Rob Hunter, general manager of the Municipal Water District of Orange County, which secures water for more than 2 million people in the suburbs.

Hunter says his agency is losing credibility with customers who are being told to keep cutting back even when the reservoirs are full and the Sierra Nevada is blanketed in white.

"We're still in a drought," Hunter says. "To be truthful, Southern California is almost always in some form of drought, but it's not an emergency."

Earlier this year, Hunter's agency passed a resolution that declared the drought emergency over, and have since been calling on the state to do the same. Hunter says his county is using on average 20 percent less water than it did at the start of the drought. Overall, water consumption mirrors the rates of the 1980s, even though Orange County has added a million people.

Gov. Brown indicated recently that the emergency order may get rescinded as early as next month. But nothing is final.

"You can't stay at Defcon 1 forever, but you can figure out how to maintain sort of sensible vigilance," says Felicia Marcus, chairperson of the California Water Resources Control Board.

Marcus, whose board enforces the drought restrictions, wants to see some of them made permanent, like the requirement that utilities publicly report their conservation targets monthly and the tougher penalties against water wasters.

The debate over whether the restrictions should stay or go is leading to some soul-searching among Californians, especially amid predictions that with climate change, droughts could be more severe and prolonged.

"I don't think they should lift it," said Nicole Garcia, while hiking with her dog this week near Pasadena. Los Angeles County boasts a maze of open space trails that offer a respite from the grit and smog of L.A.

Garcia marveled at how green and lush the mountains were. Nearby, a creek was running for the first time in years, as was a waterfall farther up Eaton Canyon.

Still, she worried that lifting the order could cause complacency.

"Californians aren't that respectful of water," Garcia says. "They kind of waste a lot of it."

That's a common stereotype in Southern California particularly, where imported water has long been used to make the arid land look more tropical in places. During the latest drought, xeriscape lawns replaced green turf, and, more generally, water use was slashed by more than 30 percent in some cities at the height of the crisis.

Gene Schugg, a hiker from Orange County, said the restrictions were good because they made people care about the crisis.

"But it is time to lift; we do have a lot," Schugg says. "But what about our water rates; will they come back down?"

That's one thing that no one is counting on, in an arid region where drought always looms right around the corner and the population keeps rising.

What drought? Sierra Nevada snowpack at 164 percent of normal

The Mercury News | March 29, 2017 | Paul Rogers

The biggest blizzards are over. But as state water officials head into the Sierra Nevada on Thursday for the annual April 1 snowpack reading — the most important of the year for planning summer water supplies — California still has a huge amount of snow covering its highest mountain peaks, an avalanche that has buried the state's punishing drought.

On Tuesday, the statewide Sierra snowpack stood at 164 percent of its historic average, a massive accumulation of new water. It's the largest snowpack since 2011, when it was 171 percent of normal on April 1.

"In some of the Southern Sierra elevations, it's kind of amazing," said Frank Gehrke, chief of the snow survey program for the state Department of Water Resources in Sacramento. "There's 30 to 50 feet of snow in some areas."

At the height of the drought two years ago, the April 1 snowpack was 5 percent of its historic average, exposing a vast range of rock and dirt that normally would be covered with deep snow.

What happened?

In January, atmospheric river storms barreled in from the Pacific Ocean, no longer blocked by the high-pressure "Ridiculously Resilient Ridge" that had diverted so many storms during the height of the drought. Pounded relentlessly, the Sierra received so much snow that Interstate 80 and Highway 50 were regularly closed under enormous drifts. On some days, even ski resorts had to close because chairlifts and parking lots were hopelessly buried, and the power was out. In one storm on Jan. 8, wind gusts reached 174 miles per hour on the peaks atop Alpine Meadows ski resort near Lake Tahoe.

"It's been a crazy year," said Michael Reitzell, president of the California Ski Industry Association.

Those storms tapered off, and warmer conditions have brought less snow in March. Even so, more snow is forecast for Thursday, and the size of this winter's snow surplus has been exceeded only three times since 1970 — in 2011, 1995 and 1983.

Squaw Valley ski resort, which has received 54 feet of snow so far this year, plans to stay open until July 4. Further south, the town of Mammoth Lakes in Mono County called in the National Guard earlier this month to help it remove some of the 44 feet of snow that has piled up along its streets and businesses.

"During the drought most of the snow was gone by June," said Roger Bales, director of the Sierra Nevada Research Institute at UC Merced. "I'm thinking that this year there will be snow well into July and August, particularly at higher elevations."

Meanwhile, since October, Lake Tahoe, which is 22 miles long, has risen 5 feet.

Every year, the Sierra snowpack accounts for roughly a third of California's water supplies. A vast "frozen reservoir" that stretches 400 miles from Lassen County in the north to Tehachapi Pass in Kern County, the snow steadily melts in the spring and summer, flowing down rivers and into reservoirs, also replenishing depleted groundwater.

This year, however, many of those reservoirs are already full or near full. That's making dam operators nervous. While only a year or two ago they were looking at dangerously low water levels, today they are emptying reservoirs to provide space to capture the billions of gallons of water from melting snow in the weeks and months ahead. Without that space, one or two warm rain storms could increase the melting rate, filling reservoirs to the top and causing uncontrolled releases and floods in cities and towns downstream.

"There is always a balancing act that dam owners have to play," said Andrea Pook, a spokeswoman for the East Bay Municipal Utility District, which provides drinking water to 1.4 million in Alameda and Contra Costa counties.

For the past 60 days, the district has fully opened the outlet pipes at its largest reservoir, Camanche Lake, in the foothills 10 miles east of Stockton, lowering the reservoir level by about 13 feet since Feb. 24. It is now 75 percent full, but given the huge snowpack in the watershed of the Mokulumne River above it, the reservoir should be 100 percent full by this summer, Pook said.

"We have to make sure we have sufficient water storage for our customers, but also make sure we do our best to minimize impacts on flooding," she said. "The timing is critical. We make decisions daily about how to handle it."

Overall, the state's 46 largest reservoirs are 111 percent of their historic average. Every major city in California has seen large amounts of rainfall this winter, with San Francisco and Oakland at 144 percent of the historic average for the end of March, San Jose at 123 percent, Sacramento at 189, Fresno at 143 and Los Angeles at 141.

Additionally, 92 percent of California is no longer in drought conditions, according to the U.S. Drought Monitor, a weekly report by the NOAA, the U.S. Department of Agriculture and the University of Nebraska.

So when is Gov. Jerry Brown going to rescind or amend the drought emergency order he signed in January 2014? He hasn't said, although sources say it could be in mid-April.

At a press conference Feb. 24, a journalist asked Brown if he was getting ready to lift the drought emergency.

"Yes is the answer," he said. "But not yet. Not until the end of the rainy season."

Drought may be nearly over, but Californians are still saving water

Sacramento Bee | April 4, 2017 | Dale Kasler

Californians are still conserving substantial amounts of water even as Gov. Jerry Brown appears ready to rescind or relax his drought declaration.

The State Water Resources Board announced Tuesday that urban Californians reduced water usage by 25.1 percent in February, compared with the state's baseline year of 2013.

The February conservation results were substantially better than a year ago, when mandatory restrictions were in place for much of California but the savings rate was only 11.9 percent.

"Even with a banner year for winter precipitation, Californians have continued to practice sensible conservation, with a significant drop in water use in the South Coast," said board Chairwoman Felicia Marcus in a prepared statement.

The overall savings rate has been 22.5 percent since mandatory conservation took effect in June 2015, even though the state water board significantly relaxed the rules last summer. Under the old rules, municipal water districts had to cut usage by an average of 25 percent compared with 2013; districts with exceptionally heavy water consumption, including most in the Sacramento region, had to slash consumption by as much as 36 percent.

The new system imposes no mandatory conservation on districts that can show they have enough water available to withstand three straight years of drought conditions. The vast majority of the state's 411 urban districts, including those in Sacramento, said they could meet that test.

One of the wettest winters on record has increased pressure on Brown from local officials to declare the drought over. Frank Gehrke, the state Department of Water Resources official who oversees the Sierra Nevada snowpack survey, said last week the governor could make an announcement about the state of the drought this week.

Gehrke spoke to reporters at Phillips Station, the spot near Echo Summit where he recorded 94 inches of snow, or 183 percent of average. That was the same spot where Gehrke stood next to Brown in April 2015, with the ground completely bare, and Brown issued his mandatory conservation order.

Even if the drought is declared over, the state water board and other agencies are working on a long-term plan to permanently ban practices that are deemed wasteful, such as excessively watering lawns. The plan is called "Making Water Conservation a California Way of Life."

California Announces Water Conservation More Than Doubled In February

KHTS | April 4, 2017 | Caleb Lunetta Officials say residents conserved twice the amount of water in February 2017 than they did in February 2016, despite the landmark year for winter precipitation.

The statewide water savings exceeded 25 percent for the month of February, according to a press release from the California State Water Board.

The 25.1 percent savings was more than double than the 11.9 percent savings from February 2016.

The cumulative statewide savings from June 2015 through February 2017 remains at 22.5 percent, compared with the same months in 2013. Since June 2015, 2.6 million acre-feet of water has been saved – enough water to supply more than 13 million people – exceeding a third of the state's population – for a year, according to the press release.

"Even with a banner year for winter precipitation, Californians have continued to practice sensible conservation, with a significant drop in water use in the South Coast," said State Water Board Chair Felicia Marcus. "Though our water picture is significantly improved in most of California, we have to maintain our drought memory and shift to planning and action to prepare for the long term. From transitioning to California-friendly landscapes and smart irrigation systems, to reducing leaks and increasing use of recycled water and other measures – we need to keep in motion to face a future with longer and more severe droughts under climate change."

In November, the State Water Board, had released a draft plan for water conservation throughout the state. The plan's fundamental premise is that efficient water use helps all of California better prepare for longer and more severe droughts caused by climate change, according to the press release.

A final plan is expected to be released soon.

San Francisco pitches plan for future of California rivers

San Francisco Chronicle | March 17, 2017 | Kurtis Alexander

For decades, San Francisco has been blissfully removed from California's water wars. The city's pristine reservoirs in and around Yosemite National Park have been not only plentiful but also largely outside the reach of regulators.

But plans by the state to mandate an increase in the amount of water flowing down rivers between the Sierra and San Francisco Bay — a bid to prevent the collapse of some of California's most precious wetlands — has drawn the city into the fray.

Worried about having to relinquish too much reservoir water and saddle Bay Area customers with restrictions on their taps, San Francisco officials plan to unveil a counterproposal Friday that they say restores river habitat and helps fish while maintaining water for cities and farms.

The proposal, shared with The Chronicle, calls for forfeiting city water supplies on the Tuolumne River, but only when deemed necessary to protect salmon and steelhead. It also calls for rehabilitating parts of the 149-mile river for the benefit of wildlife. The plan already has sparked an unusual alliance between San Francisco and the Central Valley agricultural communities along the Tuolumne.

Michael Frantz owner of Frantz Wholesale Nursery looks over their irrigation holding pond that has been filled to capacity by the Tuolumne River in Hickman, Ca. on Thurs. March 16, 2017. Frantz is a member of the board of directors on the Turlock Irrigation District that opposes the state's proposal to keep more water flowing in the Tuolumne River and other California rivers to help the fish and their natural habitat but he and his district support an alternative plan that preserves water for agriculture while still protecting fish.

The pitch, however, has yet to face the scrutiny of state regulators and environmental groups, which have long been critical of San Francisco's system of dams and diversions.

The goal of the state, in what is being called the Bay Delta Plan, is to give a boost to the freshwater-deprived Sacramento-San Joaquin River Delta and San Francisco Bay by bringing California rivers closer to their natural, free-flowing state. The effort is beginning on the San Joaquin River and its tributaries, which include the Tuolumne.

The stakes are huge. Several fish, including chinook salmon and steelhead, have struggled as the delta's vast network of lakes, marshes and canals has lost water. The decline in fish has caused birds, seals and whales to go hungry in the bay and beyond.

At the same time, cities such as San Francisco that have worked hard to conserve water fear that further cuts to their supply could be catastrophic. Another dry period akin to recent droughts, water-agency officials say, could bring rationing and as many as 120,000 lost jobs a year across the agency's service area from San Francisco to San Jose.

Seeking a middle ground in what has become the state's latest water showdown, Gov. Jerry Brown brought in President Bill Clinton's former interior secretary Bruce Babbitt. He has been meeting in private with San Francisco officials and others with interest in the rivers.

"You can bring in a lot of the key parties and you can get to some more creative outcomes than a strictly regulatory approach," said Ellen Hanak, director of the Public Policy Institute of California's

Water Policy Center, who has supported the collaborative approach, but remains dubious of its success.

The city's proposal, which emerged from the talks, may get consideration from state regulators as soon as Friday, when public comments on the Bay Delta Plan are due. The State Water Resources Control Board plans to finalize a policy for the San Joaquin River and its tributaries by the end of the year.

San Francisco's proposal differs from the state's draft plan in that it doesn't call upon cities and farms to leave a steady amount of water in the Tuolumne River, but rather varying quantities based on when the fish need it.

Though the pitch is heavy on numbers, the idea is that the city can maximize the amount of water it keeps in storage at its high Sierra reservoirs, including Yosemite's Hetch Hetchy Reservoir, while releasing enough water on the Tuolumne to allow fish to swim up from the bay, spawn and return.

"This is not just putting water down the river and hoping for the best," said Michael Carlin, deputy general manager of the San Francisco Public Utilities Commission. "You're putting water down the river for a purpose."

The city water agency, which serves 2.6 million customers across the Bay Area, maintains that it has the experience and science to effectively manage river flows without state input.

The proposal also calls for the city and other water agencies to invest millions more to improve salmon and steelhead habitat through actions such as enhancing gravel beds where the fish spawn, removing predators like striped bass and restoring native vegetation along the river.

The Turlock Irrigation District and Modesto Irrigation District, big agricultural water agencies that also draw from the Tuolumne, appear to be lining up behind San Francisco's proposal. Although the districts sometimes have clashed with the city over the river water, they share concern about losing supplies and recognize San Francisco's political clout.

"The proposal is very close to the approach and science that Modesto and Turlock support," said Michael Frantz, a board member on the Turlock Irrigation District and a nursery owner. "Our entire communities, both municipal water systems and our farmers, are relying on this water that the state board wants to move to the fish."

A handful of public meetings held in the Central Valley in recent months have drawn standingroom-only crowds fiercely opposed to the Bay Delta Plan.

As part of the effort to rescue the delta ecosystem, the state is calling for 30 to 50 percent of the water that naturally flows in the San Joaquin River and its tributaries to remain in the rivers. At least 40 percent would have to stay between February and June, the most critical period for fish.

The rivers now run at 20 percent or less at times, because of the heavy draws by cities and farms. This often leaves the delta low on water or with too much salinity coming from the ocean. Scientists say a lack of freshwater in the West Coast's largest estuary could spell extinction for several fish species, a die-off that would reverberate up the food chain.

California's Wasted Winter Rains

The drought is over but the greens keep sending the water out to sea.

Wall Street Journal | April 5, 2017

Reservoirs and rivers are overflowing as storms have pounded California this winter, and after years of drought that should be good news. The problem is that misguided environmentalism is wasting the water windfall and failing to store it for a non-rainy day.

Hydrologic records indicate that this year could be the wettest on record in California. Statewide snowpack measures 160% of average. Precipitation in Palm Springs exceeds the historic norm by more than 50%. Lo, the desert is actually blooming. Most of the major reservoirs in the north are full, and some are releasing hundreds of billions of gallons of water to prevent flooding and make room for the melting snowpack this spring.

While farmers and communities downstream can capture some of the discharges, millions of acre-feet will invariably flow into the ocean due to lack of storage capacity and rules to protect endangered fish species. One problem is that while the state population has increased 70% since 1979, storage hasn't expanded. Water districts in southern California have developed small local reservoirs and groundwater basins, but what's most needed is storage in the north where most of the rain and snow falls.

The Public Policy Institute of California estimates that five proposed reservoirs could add four million acre-feet of storage capacity at a cost of \$9 billion. Yet environmentalists have opposed every significant surface storage project for three decades. The state is even razing four hydroelectric dams on the Klamath River that green groups complain impede fish migration.

Ah, the fish. Regulations intended to protect smelt and salmon have limited pumping at the Sacramento-San Joaquin River Delta. As a result, some seven million acre-feet of water that was once available for Central Valley farmers and Southern California is flushed into San Francisco Bay each year.

Meanwhile, a 60-mile dry riverbed on the San Joaquin River that hasn't borne fish since the 1940s is being restored at a cost of \$1.7 billion to farmers and state and federal taxpayers. The river restoration is expected to divert an additional 170,000 acre-feet each year, but it could be more since the Chinook salmon that environmentalists want to revive require cool temperatures—meaning more water—to spawn and survive. Government biologists are spending millions of dollars to truck (literally) salmon around the valley while trying to calibrate optimal temperatures and water flows. Yes, these salmon have chauffeurs.

Last September the State Water Resources Control Board proposed limiting the amount of water that farmers and cities in the north could use from three tributaries that feed into the San Joaquin River in order to boost the Central Valley's fall-run Chinook salmon population, which numbers 750,000. The plan would reduce water available to farmers and cities by 250,000 acrefeet on average annually and 500,000 acrefeet during dry years. If all goes according to plan, the salmon population could increase by 1,103.

The affected communities including the Bay Area are represented by Democrats and enjoy senior water rights. So they've been less vulnerable to regulatory cutbacks that have parched farmers in the south. While the state board's plan would cause more farmland to be removed

from production, the main casualties would be low-income and Hispanic communities like Merced that rely on groundwater recharged by the tributaries.

What's especially ironic is that all of the water diversions intended to benefit the environment may be causing irreparable environmental damage. Communities and farmers have drilled deeper wells and pumped more groundwater to compensate for reduced imports from the delta, leading to severe land subsidence.

A recent report by the California Department of Water Resources found that the San Joaquin Valley is sinking at a rate of nearly two inches per month in some areas. Land around Corcoran dropped 22 inches between May 2015 and September 2016, complicating engineering work on the state's bullet train. Subsidence has also reduced the carrying capacity of the California Aqueduct, which delivers water to Southern California, by 20%.

California has an arid climate, and parched times will return, which is all the more reason to take advantage of the wet years. That greens and politicians won't do so suggests they almost wish for permanent drought.

Dry Land: A New Grantmaker Seeks to Fix How the West Manages Water

Inside Philanthropy | April 5, 2017 | Tate Williams

For decades, foundations have worked to improve access to clean water and sanitation in the developing world. These days, water philanthropy has a new target country: the United States. And while funder-backed efforts to ensure clean drinking water in Flint, Michigan, have captured much attention, the biggest philanthropic action on water issues has been in the parched West.

During the driest days of the California drought, a funder-backed initiative emerged as an influential voice trying to reshape the way the state manages its water.

This organization, the California Water Foundation, had some wins, including the passage of a \$7 billion water bond that it backed, and some of the most comprehensive water policy legislation the state has ever seen. Its executive director, water resource management expert Lester Snow became a consistent voice in the state's conversation over how to fix its fragmented and outdated approach to water.

Now the California Water Foundation is taking its show on the road, coming out as a standalone philanthropy called the Water Foundation, which will attempt to extend its reach into the larger American West.

Aside from the geographic focus, the main difference is that the organization will no longer be an initiative under the Resources Legacy Fund, a prominent nonprofit that conducts donor-driven programs. Lester Snow will also no longer lead the effort, which will now be led by former Jerry Brown administration official Wade Crowfoot.

Many of the people and philanthropic forces that created and supported California Water Foundation are and will likely continue the effort in its new form. It was initially pulled together by the Pisces, S.D. Bechtel, Jr., and Packard foundations. The new entity's board of directors includes chair David Beckman, who is also president of the Pisces Foundation, and Lauren Dachs of Bechtel serving as vice-chair.

There's also a lot of overlap with the relatively new Water Funder Initiative, formed by some of the same foundations behind the Water Foundation, with which it shares common goals. The WFI's role, however, is to guide investments, while the Water Foundation will be more hands-on, making grants and driving specific priorities.

These efforts are also tied together by the main principles backing them. Mainly, they're all looking to create more integrated, modern approaches to water management. That is, they seek to tie together supply and quality issues, and break down silos that characterize the cobbled-together water management strategies the country has developed over decades.

So some of its priorities include making sure drinking water is clean and safe, protecting groundwater supplies, drought contingency plans, water conservation in cities, and restoring ecosystems. You can see how it takes a kind of a bird's eye view of the issues.

As far as tactics, working with and influencing government is a big one, considering its past spearheading of groundwater policy in California, and the fact that key staffers are former state employees and legislative staff. And it favors public outreach and building diverse coalitions. But the funder is also big on innovation, including backing experiments in water management and marketing software to influence consumer behavior.

Opposing sides in California water wars forced together in groundwater agencies Sacramento Bee | March 24, 2017 | Susan Sward

To understand politics in California, look down in an irrigation ditch, and where you see water, see gold. – George Ballis, the late Fresno activist director of National Land for People

With all the downpours and flooding across California this winter, it might seem that the pressure to begin managing the state's precious groundwater supply would ease up a bit.

Instead, the state is pushing to quicken the pace of implementing groundwater regulations.

"To protect critical water infrastructure, we need to think about what we can do at a faster pace" than the long-term deadlines now in groundwater law, said Jeanine Jones, a Department of Water Resources manager, citing new aerial images pinpointing severe over-pumping.

At the same time, the process of forming local agencies to manage groundwater basins is fueling anxiety among farmers and environmentalists alike.

For all, there is uncertainty – in part because state law now requires all users to work together for the first time on the groundwater issue when many may have been on opposing sides in previous water disputes. Some view these new agencies as an opportunity for disadvantaged communities and small farmers to have a voice in decision-making; others worry that the agencies will be dominated by the same powerful agriculture interests that have held sway in the state for so long.

Currently, the Sustainable Groundwater Management Act of 2014 requires local agencies to submit a plan by 2020 or 2022, depending on the severity of a region's problem, and to achieve sustainable management within the next 20 years. The intent is to end nearly a century of overpumping that caused thousands of wells to dry up and contributed to damaging subsidence. That sinking ground made necessary \$100 million in repairs to the state and federal water projects that distribute water to millions of people and millions of acres of farmland.

Whether the law's goal – to facilitate a more uniform and sustainable groundwater approach without over-pumping – is achieved is a matter of enormous importance for all Californians, many of whom rarely think beyond their own faucets when it comes to water: Groundwater accounts for about 60 percent of the state's supply in drought years and about 40 percent in average years. This is in a state with 39 million people and farmland so rich that it produces a quarter of the nation's food.

Some critics complain that the groundwater overdraft problem is so great that the state should be moving much more rapidly to curb pumping – particularly in areas hardest hit by subsidence. State officials say the problem is almost a century old, and the new law represents a major shift in how water is managed – one requiring years to deal with the complexities involved.

Recently the critics got some powerful ammunition for their argument when NASA released highly detailed, aerial images of the San Joaquin Valley and other areas most walloped by the over-draft of groundwater. The pictures showed that the rate of subsidence in some spots exceeded the rate anticipated by experts.

In crucial over-draft areas "you can either limit construction of new wells next to critical infrastructure or you can control pumping there," DWR's Jones told me. Local agencies formed under the groundwater management law "are going to have to take a hard look at their land use and what is supportable."

One of DWR's big concerns is the damage that subsidence is doing to its canals and flood control infrastructure. After the local agencies are formed in areas of critical over-draft, Jones said DWR will ask them how they plan to cope with the problem.

One area is near the Kings County town of Avenal, where subsidence has damaged the State Water Project canal so much that it will cut how much water can be sent south when water flows are high.

While DWR is tracking subsidence rates, farmers and other local interests are meeting to comply with one of the first deadlines mandated by the groundwater management act.

All 127 water basins designated by the state have until June 30 to create local agencies that will draft their plans for sustainability. "If no local agency is formed in an area or agencies fail to comply with the law, the basin is referred to the State Water Resources Control Board for follow-up action," Jones said.

So far, that local agency creation process has been a bit bumpy.

"There is a concern from all the stakeholders about how they may be affected," the water board's Sam Boland-Brien told me. "Farmers are voicing the same concerns as the environmental justice groups representing small, disadvantaged communities. All interests – from large municipalities to individual landowners – want their needs taken into account."

Boland-Brien, who oversees the water board's enforcement of the groundwater law, added, "Ultimately, successful implementation of the plans will be dependent on the active engagement of all the groundwater users."

Danny Merkley, lobbyist for the California Farm Bureau, which opposed the law, said since its passage DWR "has done a phenomenal job listening to all the stakeholders and working to move forward with agricultural and environmental interests in the same room."

Merkley, a fourth-generation farmer in the Sacramento Valley, said the farmers he represents "want their concerns heard because they have to rely on groundwater as their savings account – especially when their deliveries from the state and federal water projects are cut back. Many of these farmers come from families who have worked their land for generations."

Some environmental justice organizations worry that DWR may prove to be incapable of making tough regulatory calls when a local agency's makeup isn't inclusive enough or if a plan falls short of sustainability goals.

The groundwater management law "is a huge opportunity and also a very huge threat," said Kristin Dobbin, a coordinator for the Visalia-based Community Water Center, which works with 30 small communities in Fresno, Kern, Kings and Tulare counties.

"It's certainly a huge opportunity for small, disadvantaged communities and small farmers to come together and demand a place at the table" of these newly created local agencies where groundwater decisions will be made, she told me. "But I also think there's a possibility of institutionalizing the same inequitable system that has ruled unofficially for the last century where the more powerful players monopolize the groundwater."

Jennifer Clary of Clean Water Action California says the need for community involvement in the local agency formation process is often being ignored "and by ignoring that, we are left with the same parties who got us into this overdraft problem in the first place."

Roberta Jaffe, who owns a small winery with her husband in northern Santa Barbara County, praises DWR for helping her on issues related to the law. But she said her efforts to be part of her area's formation of a local agency have been rebuffed by local officials. "On the local level, elected officials and people in power are somewhat beholden to agribusiness," she told me, "and you have to look at the tremendous power agribusiness has had for a long time.

"We are having to fight to have our voices heard," Jaffe told me. "For this law to be successful, there has to be a power structure and cultural change in how we look at water in California. We have to have a stewardship of water for a sustainable future."

It would be naive, of course, to expect that this groundwater statute might upend the current world of water in California, where the most powerful interests carry the biggest clout, but it can be hoped that the law will be a vehicle that gives all stakeholders – including the small ones – a real voice in decisions.

Northern Sierra is now only 5 inches from wettest water year on record SF Gate | April 5, 2017 | Amy Graff



Only 5 more inches.

That's the amount of precipitation the northern stretch of the Sierra Nevada needs between now and September 30 to become the wettest water year on record.

The Eight-Station Index, a measure of precipitation in the northern Sierra that helps determine the status of Northern California's water supply, currently stands at 83.5 inches.

It's only another storm or two away from the current record of 88.5 that was hit in the 1982–83 season.

If the top half of the mountain range receives enough snow and rain in coming weeks to become the new champion, it's nearly impossible to overstate the magnitude of this milestone as the state moves out of a five-year drought that left reservoirs empty, groundwater depleted, farm fields parched and rivers dry. A record-breaking season for the northern Sierra wouldn't mean a definite end to the drought throughout the state; ground water supplies and some Southern California reservoirs are still low. But it would be yet another indication that the state's overall water supply is vastly improving.

The Department of Water Resources calculates the Eight-Station Index by measuring the total liquid from rain and melted snow daily from eight stations between Mount Shasta to the north and Pacific House (60 miles east of Sacramento) to the south.

"The [station locations] range in elevations and represent each of the major watersheds including the Sacramento, Feather, Yuba, and American," David Rizzardo, DWR's chief of snow survey and water supply forecasting, explained. "They have good spatial coverage and are thus likely to measure a storm as it comes to the northern part of the state no matter how far north or south within the northern Sierra."

The index is an average of those eight stations and is a good indicator of the overall health of the snowpack, reservoir levels and runoff in the Northern Sierra as well as the water supply for the northern Central Valley.

"From a hydrologic perspective for the Sacramento Valley and Northern Sierra, the eight stations are a simple metric we can refer to when evaluating how wet or dry a given year or period of years are," he said. (A metric the index doesn't encompass is groundwater, a water source experts are still trying to figure out how to accurately measure.)

California is edging towards a historic amount of rainfall for a winter. Heavy rains have draped the drought-stricken Golden State in one of the wettest winters in recent memory. The precipitation has swollen rivers and reservoirs, leading to flooding in certain areas of the state. The wet weather has also cascaded the Sierra Nevada mountains with twice as much snow as usual.

The current index total of 83.5 inches puts the 2016–17 season at the fourth wettest. The third wettest was 1981–82 at 84.8 inches, the second was 1994–95 at 85.4 inches, and the first was 1982–83 at 88.5.

Keep in mind that the index goes back to 1920, providing nearly 100 years worth of data, and other records could have occurred before it was established. By comparison, San Francisco data goes back to 1849 and with this season's most current data, the city is seeing its 22nd wettest season.

This year's Eight-Station Index is remarkably high because Northern California was slammed with ceaseless storms, many of them fueled by weather systems known as atmospheric rivers.

"Typically in any given year, Northern California receives five to seven and we've received double that this year," said Mike Kochasic, a meteorologist with the National Weather Service office in Sacramento. "When you get these long thin streams of moisture coming in from the tropics, you get a lot more precipitation."

Even if another atmospheric river doesn't develop in coming weeks, this season could easily claim the top spot. An average April sees about four inches and May two inches, and the index records two inches of precipitation on average in the summer.

Rizzardo points out that this season, precipitation has exceeded average levels for most months, except November, and if the trend continues, it will undoubtedly become the wettest in nearly the past 100 years. "The odds are in our favor," Rizzardo said.

In fact, this record could be broken as early as the end of the upcoming weekend.

The next storm forecast for the Sierra is expected to bring anywhere from two to six inches between Thursday and Sunday, with the heaviest precipitation on Friday.

"The actual amount of precipitation that is forecast over the next week seems to jump back and forth right now between a really wet scenario, over 5 inches of precipitation, to lower amounts, 2 inches," Rizzardo said.

He added: "But one inch of snow is not one inch of precipitation. Snow is not 100 percent moisture....it is a crystalline structure with both moisture and air. So we'll see.""

Survey says - April snowpack nearly twice average

The Folsom Telegraph | April 4, 2017 | Bill Sullivan,

Officials from the Department of Water Resources returned to El Dorado County last Thursday, March 30, to conduct the first Sierra snowpack survey of the spring season.

The results of this latest trek to Phillips Station revealed impressive numbers for runoff and water supply to valley reservoirs. The latest news is promising for local agriculture and recreation enthusiasts alike, as it appears there will be plenty of water flowing into Folsom Lake with the change in the seasons.

"This is an extremely good year from the snowpack standpoint," said Frank Gehrke, chief of the California Cooperative Snow Surveys Program. "The storm track shifted away from California during March but we still have a very substantial snowpack."

According to Gehrke, the 2017 snowpack ranks in the upper quarter of historic snowpacks, and is expected to provide "great reservoir recovery."

Last week's survey recorded a snow depth of 94.4 inches and water content of 46.1 inches. The readings are 183 percent of then April long term average.

The Phillips Station numbers combine with the central Sierra average, which measured at 175 percent of April's average. The northern Sierra remains at 147 percent of average, while the southern Sierra is slightly little higher at 164 percent of average.

The April 1 snow survey is the most important measuring time of the year, according the Gehrke. After April 1, the majority of large producing storms don't come into our region and the Sierra doesn't see much additional snow accumulations.

"On or about April 1, all of the snow courses within California are measured, so it's the most comprehensive snapshot of what's going on for the entire season," said Gehrke.

The Department of Water Resources is expected to further address the status of the California drought this week and announce whether conversation regulations will continue to remain in place for the months ahead.

Locally, the city of Folsom is already working with residents to prepare for the warmer months ahead. This Thursday, April 6, the city's Water Conservation Team will host the first in a series of workshops.

Thursday's event will focus on lawn care and irrigation for the Folsom climate at the Folsom Community Center, 52 Natoma Street in Folsom at 6:30pm. There is no cost for to attend, but space is limited and they are asking attendees to reserve their seat by calling 916-355-7252 or email <u>waterconservation@folsom.ca.us</u>.

Fly above the Sierra to see what's in store for CA reservoirs

PG&E snow survey reveals big numbers, progress for California water storage KCRA Sacramento | April 4, 2017 | Brian Hickey

NEVADA COUNTY, Calif. (KCRA) —

As the turbine screams to life on a Bell 407 helicopter, PG&E snow surveyors ready their measuring equipment for their monthly check of the Sierra snowpack.

Surveyors use the helicopter to access remote areas along the Sierra crest, buried in an abovenormal snowpack.

Each month, PG&E sends its staff hydrographer into the backcountry to survey the snow and its water content.

It's this critical information that helps the utility company plan how it will use that water to generate hydroelectric power in the summer.

"Today, we are out snow surveying the Meadow Lake snow course," PG&E spokesperson Brandi Merlo said. "It's really the best way for PG&E to know how much water we have in, basically, our second reservoir."

The snowpack is viewed as a reservoir for it's ability to hold and release water over time.

Many reservoirs are already full to the brim and are dumping water to stay ahead of the runoff.

"The snowpack is our largest reservoir. Right now, all of our reservoirs are spilling," PG&E hydrographer Chris Sanderson said. "We can't hold anymore, so this snowpack is basically just holding that water back."

The data collected on this trip is added to the California Department of Water Resources cooperative snow survey. Each month, 200 survey sites are checked across the Sierra by various agencies, and PG&E handles 60 of those surveys.

"We are all interested for different reasons," Merlo said. "We are interested for hydroelectric power. We are just one part of that, providing that information to DWR."

That information will help the utility manage the water, releasing it when on-demand hydroelectric power is needed.

"Hydroelectric power is basically power on demand, so we can ramp up or down, but if we see too much water passing through, we can't utilize that for power," Merlo said.

The results of the survey look promising for the summer ahead.

At the Meadow Lake snow course, there was 16 feet of snow on the ground, which will yield 7 feet of water when it melts.

The results put this year's snowpack at 160 percent of average.

The warm winter also saw a lot of rain.

Incoming storms could put precipitation totals into record territory.

"If we get five more inches of rain, we will have the wettest year on record," Sanderson said. "I'm sure we will get it."

California snowpack healthy again, but warming looms large

Tahoe Daily Tribune | April 3, 2017 | Ryan Hoffman

When Gov. Jerry Brown of California walked out onto the Phillips Station snow course near Lake Tahoe on April 1, 2015, for the annual end-of-winter snow survey, he stepped only on bare ground. This year, surveyors were greeted with a much more welcome sight: a sizable snowpack that accumulated over the winter thanks to a spate of storms that nearly wiped out the deep, devastating drought that has plagued California over the past five years.

With the snowpack now at more than 160 percent of normal statewide levels, officials are facing the opposite issue, with potential for flooding as snowmelt runs into streams and reservoirs already swollen with winter rains.

While California is no stranger to such boom-and-bust water years, the state is facing the potential for significant hydrological changes over the next few decades as global temperatures continue to rise with the accumulation of heat-trapping greenhouse gases in the atmosphere.

The resulting changes in California's climate will mean that more winter precipitation falls as rain rather than snow, and that what snow there is will melt earlier in the season, reducing the amount of meltwater available to top up reservoirs in the hot, dry summer months.

A recent study also suggests, somewhat counterintuitively, that an earlier snowmelt may also mean slower snowmelt, with possible implications for streamflow and reservoir storage. The finding, detailed in the journal Nature Climate Change, points to the complicated interactions that scientists and water managers in California are facing as they try to make the state's water system more resilient to climate change.

The Difference One Winter Makes

Around the beginning of California's wet season in late fall, three-quarters of the state was mired in drought, with 40 percent in the two highest categories recognized by the U.S. Drought Monitor.

But repeated winter storms, particularly the moisture-heavy ones known as atmospheric rivers, dumped plenty of rain and snow on the state, which now has only 8 percent of its area in drought. December through February was the second wettest such period in the past 122 years, and the end-of-winter snowpack ranked in the top quarter, according to the California Department of Water Resources. The April 1, 2015, snowpack, by contrast, was the lowest on record, and likely the lowest in the past 500 years.

During the drought, climate scientists have been investigating how global warming might alter the potential for drought in California. The clearest link is that warmer temperatures will exacerbate already dry conditions because they cause more evaporation. In this way, warming likely made this most recent drought worse, with California recording two record-warm winters in a row (as well as its warmest and second warmest years overall).

Less clear is the impact that warming may have on the state's precipitation patterns. The drought was ushered in by a persistent area of high pressure that deflected storms away from California; from 2012 to 2015, the state effectively missed out on a year's worth of rain, according to one study. But research into whether climate change may impact the potential for such a pattern to crop up more often in the future hasn't found any clear answers.

Slower Snowmelt

Climate scientists do expect, though, that warming temperatures will make more of winter's precipitation fall as rain, rather than snow, and will cause the snowpack to contract to higher mountain elevations. What snow there is will also likely melt earlier in the season because of warmer winter and spring temperatures. Both of these factors mean that less snow will be available to keep reservoirs fed during the peak demand months of the summer.

That earlier snowmelt will likely happen more slowly, though, according to the new study, published in February. The deeper snowpacks usually found at higher elevations tend to last into the late spring and early summer, when a higher sun angle means more energy available to melt snows and so those snows melt faster. The shallower snowpacks at lower elevations, however, tend to melt out earlier in the season when there is less solar energy and so they melt more slowly.

With warming expected to mean more shallow snowpacks at ever higher elevations, the snowpack overall will likely melt out earlier in the future and do so at slower rates.

Slower melting has implications for stream flow and reservoirs. Higher snowmelt rates mean there is more water available than vegetation and soils are able to soak up, with the excess running into streams, rivers and reservoirs.

But "when snow melts more slowly, that water lingers in the soil giving plants and the atmosphere more opportunity to take up that moisture, resulting in less streamflow," Keith Musselman, lead author of the study and a postdoctoral researcher at the National Center for Atmospheric Research, said in an email.

The work "is a big step forward in understanding how temperature affects our snow water resources, but there remains much to be learned," Adrian Harpold, a hydrologist at the University of Nevada, Reno, said in an email. Harpold wasn't involved with this study, but has found this trend in slower melt rates in observations and has collaborated with Musselman in the past.

The earlier, slower snowmelt could also alter flood risks. Right now, prolonged sunny periods in spring and summer tend to cause pulses of melting that can raise flood risks. But if the overall snowmelt rate is lower, it "may take some of the sting out of the snowmelt pulses when they do come," Michael Dettinger, a research hydrologist with the U.S. Geological Survey who also wasn't involved with the study, said in an email.

But, the earlier snowmelt combined with more winter rain could make winter floods more common, Musselman said.

"While the background melt rate may be slower in a warmer world, hydrologists and flood managers can't let their guard down," he said. "We should be paying close attention to how extreme events may change."