OCWA Orange County Water Association ESTABLISHED 1957

Water Matters

News for the Orange County Water Community

Second Quarter 2023

This Drought is Dead – Long Live the Drought!

By JAY LUND *and* ANDREW L. RYPEL, *California WaterBlog*

Floods and droughts are not opposites and can occur simultaneously. This occurs often in California and is especially well-illustrated this year.

Floods, droughts, and water scarcity are different. Floods are too much water at a place and time, and we would often pay to reduce the water present at that location and moment. Droughts and water scarcity represent too little water at a place and time, meaning we would often pay to increase its availability. We highlight these differences because people tend to view such conditions through an unrealistic zero-sum lens. This essay uses this year's experience to examine how floods, drought, and water scarcity differ, can occur in the same year, and how droughts might end, but leave legacies.

April 2023
DWR Snow Survey

This California drought is largely over. Even though there is another month left in California's wet season, the 2020-2022 California drought is largely over. Precipitation in all major basins of California exceeds averages for the entire water year. Snowpacks are well above April 1 averages (usually about the maximum for the year). Most reservoirs have more than average volumes stored for this time of year, and many are in flood operations. Only a few very large reservoirs (relative to their average inflows) remain below historical averages (such as Trinity at 50% and New Melones at 90% of their averages).

Precipitation has been especially high in central California, which somehow attracted more atmospheric rivers than northern California this year. The San Joaquin and Tulare basin precipitation indices exceeded annual averages in early March and late February, compared with just a few days ago for the Sacramento Valley's Northern Sierra index. This will be a wet year, with Central California basins sometimes exceeding 2x average annual precipitation. Lake Tulare is forming once again.

Soil moisture is abundantly replenished, snowpack is abundant, reservoir storage is almost completely replenished. That leaves groundwater.

This drought has a long tail. Groundwater will take longer to recover in much of California. In the southern Central Valley, many basins did not recover from the additional pumping of the 2012-2016 drought before the 2020-2022 drought, when further depletion occurred.

Despite this being a wet water year statewide, it also will be a year of water scarcity, arising from a chronic shortage of water/excesses in water demands. Water is usually scarce in most of California, meaning that people would pay to have additional water available. The degree of water scarcity varies with location and time. Scarcity is greater in drier years, and in regions with more water demands. In wet years, water will remain scarce because people are still willing to pay for water. Increasingly, some of this value for water is to replenish aquifers to both comply with the Sustainable Groundwater Management Act (ending overdraft) and to prepare for future droughts – even in wet years.

Continued on Page 4

Webinar

Capturing and Managing Water from Large Storms

Topic: Capturing and Managing Water from Large Storms

Speaker: Jay R. Lund, Vice-Director, Center for Watershed Sciences
Distinguished Professor of Civil and Environmental Engineering

When: Friday, April 21, 12 pm to 1pm

Where: Virtual (via Zoom)–Link to virtual seminar to be sent upon RSVP

Cost: FREE **Register:** Online

The Pure Beer Home Brew
TASTING EVENT
Was Everything We Expected it Would Be!

It was an evening everyone eagerly looked forward to, an event where our profession and our passions could mash, a unique opportunity to brew some interest and get to know one another — 'worts' and all! And it was all that, *and more!*

Our exciting evening of exquisite taste was facilitated by four local home brewers who used **advanced treated water** to craft some magnificent brews. Among the evening's offerings guests sampled six different specialties: **Hazelnut Amber**, **Hoppy Brown Ale**, **Lager**, **Cider**, **Selzer**, and a **Hazy Double IPA**.

Special thanks for the evening go to our four master brewers: **Martin Dix**, **Adam Nazaroff**, **Daniel Roberts** and **Eric Strickland**.

And we are especially indebted to our host for the evening: **T.E. Roberts, Inc.**

Special thanks to our evening's Sponsors, without whom our evening would not have been possible. Our **Brew Master** sponsor, **TE Roberts**, and our **Amber Ale** sponsors, **Black & Veatch** and **United Water Works**.

TE Roberts INCORPORATED
GENERAL ENGINEERING CONTRACTOR

UNITED WATER WORKS INC.

BLACK & VEATCH
Building a world of difference

April 19: Industry Insight Simulcast

West Basin's Custom-Engineered Filtration System

Presenters: Kevin Cullen *and* Melene Agakanian

Our presentation will be virtual yet simulcast to those attending in-person at Dave & Busters

Our April presentation will cover the conception, design, and construction of a new 6MGD custom-engineered membrane filtration system at West Basin Municipal Water District's JMM Carson Facility.

Designed by Hazen & Sawyer, this in-depth look at an innovative project promises to be a captivating experience in how a custom engineered system is implemented. From initial discussions through startup and construction, the process was a challenging, collaborative effort. From the thought and experimentation that went into incorporating different microfiltration modules into one encompassing unit, the presentation will guide us through the lessons learned from the design, including the difficulties encountered during construction and the steps required for startup.

Plan now to join us April 19 to experience the many developments learned throughout this multifaceted project. Make your reservations today!

About Our Speakers

Kevin Cullen
Engineer III,
West Basin Municipal Water District

Kevin Cullen is an Engineer III with West Basin Municipal Water District. He has served as an engineer for West Basin for over six years. In this time, he has managed roughly $60 million in capital improvement projects.

Melene Agakanian
Assistant Engineer II,
Hazen and Sawyer

Melene Agakanian has over three years of experience working on a wide range of water treatment and environmental projects. She has been involved in multiple recycled water/reuse projects, including developing concept level designs for IPR facilities, with future DPR applications, in Southern California.

Melene continues to work on reuse projects, along with drinking water treatment projects in the state of California.

We are Proud to Recognize Our Corporate Sponsors for the April 2023 Webinar

LINKTURE CONSULTING ENGINEERS
Ninyo & Moore Geotechnical & Environmental Sciences Consultants
moulton niguel water district
PSE

Wednesday, April 19, 2023

In-Person at Dave & Busters, or Online ZOOM

In-Person Member: $30 • Non-Member: $45
Online Member: FREE • Non-Member: $10

In-Person Sign-In: 11:30, Lunch: 12, Presentation 12:30
Online Simulcast begins at 12:30 (webinar opens at 12)

Cancellations received AFTER Tuesday, April 18 CANNOT be refunded.

Visit the OCWA website to make reservations:
www.ocwater.org

RSVP IS A FINANCIAL COMMITMENT. NO-SHOWS WILL BE BILLED.

An Overview of PFAS from a Legal Perspective

Atkinson, Andelson, Loya, Ruud & Romo

Water users of all types – domestic household, municipal or industrial, agricultural – are all impacted by contaminated water supplies. Water quality standards vary for the intended use of the water, whether it be for drinking water or irrigating crops.

Even though the PFAS contamination issues typically originate with groundwater supplies, diminished reliance on groundwater could increase the need for surface water supplies, which places further strain on the water rights and water supply systems. As such, water quality and water rights are inextricably intertwined with surface water and groundwater.

The legal impact of PFAS contamination is explored in greater detail in the article PFAS Overview *on the AALRR website.*

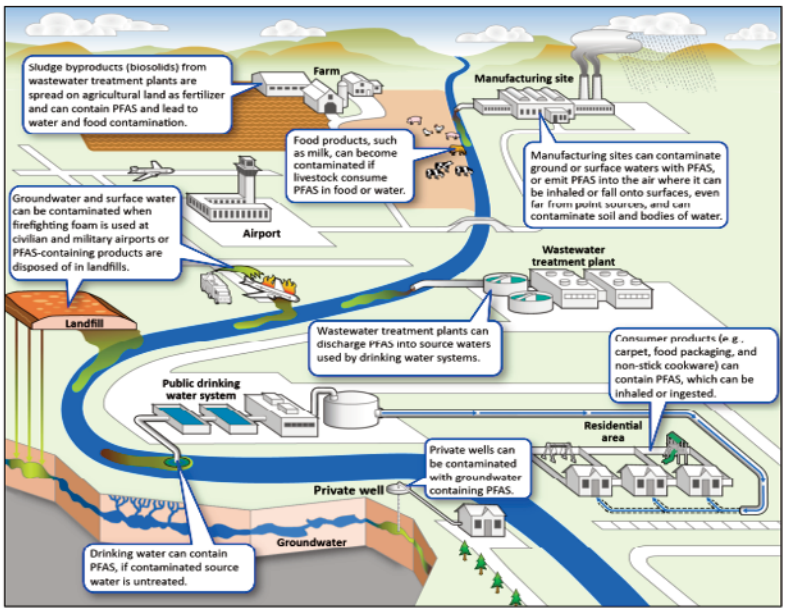


Figure 1: Possible routes for PFAS release into the environment (https://www.gao.gov/assets/gao-22-105088.pdf). This figure does not include all potential sources of PFAS releases, such as air emission and transport, uptake into plants, and permitted industrial discharges. (Source: Government Accountability Office.)

As the Drought Recedes, Now is the Time to Plan for the Next Drought

Continued from Page 1

Water scarcity is essentially permanent in California, given our high and diverse water demands for agricultural, environmental, and urban water use relative to the usually drier amounts of water available. Efforts to capture additional water for surface water reservoirs and groundwater are conceptually attractive, but are now usually uneconomical, as their capital and other costs usually exceed what water users would be willing to pay.

Much of the American west is suffering from a chronic shortage of water, which worsens during drought years. The Lower Colorado River basin uses about three million acre-ft of water each year than the river's inflow, which has almost steadily decreased Colorado River reservoir storage each year since 1983 (Lund 2023). In Utah, the Great Salt Lake is shrinking from upstream diversions. Aquifers in Arizona also are being depleted from overuse.

There is a great need to develop a more integrated science-based approaches to adaptive ecosystem management. Ecosystem demands are difficult because they involve interacting water and habitat management over time. This cannot be completely worked out before it needs to be implemented, which will entail unavoidable controversy over time.

Conclusions

- **California's water system serves diverse and conflicting purposes and is subject to extraordinary hydrologic variability.** It is a great place to study and work on water problems. The 2023 wet season in California illustrates many dilemmas, paradoxes, and challenges of water management with a highly variably hydrology.
- **The 2020 – 2022 California drought is mostly over**, but leaves a legacy of depleted groundwater and ecological health. Repayment of drought-depleted groundwater will require additional agricultural fallowing in future years (even wetter years) to comply with SGMA.
- **Floods are not the exact opposite of drought.** California can have chronic water scarcity, and even droughts, in years where floods bring substantial damages, and deaths, as seen in 2023.
- **Droughts (and floods) often have long tails after most would declare these events "over."** This is the case for groundwater replenishment reducing and ecosystems following this drought.
- **Native ecosystems and biodiversity evolved under cyclical flood and drought conditions, but many ecosystems are now exposed to chronic drought.** Persistent drought has set ecosystems on a trajectory towards assemblages dominated by non-native species. Actual drought just accelerates the transition.
- **There is always a shortage of cheap water.** California's water demands will exceed water supplies in most years, meaning that many will want more water, although most of these will not be willing to pay the costs of providing additional water.

The full article is available on the WaterBlog website.

Jay Lund *is a Professor of Civil and Environmental Engineering at University of California, Davis, and Vice Director at its Center for Watershed Sciences.*
Andrew L. Rypel *is a Professor and the Peter B. Moyle and California Trout Chair of coldwater fish ecology at the University of California, Davis. He is a faculty member in the Department of Wildlife, Fish & Conservation Biology and Director of the Center for Watershed Sciences.*

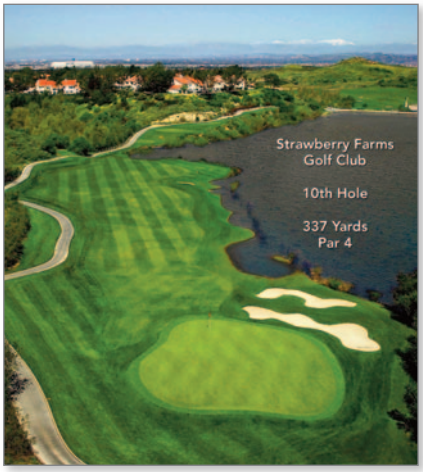
2023 Golf Tourney Set for Strawberry Farms GC

Monday, June 5, 2023

7:15 am Check-In/Breakfast • 9:00 am Shotgun Start

Our 2023 Tournament is set! We appreciate the enthusiasm shown by all who have already signed up and encourage any golfers who haven't signed-up yet to act quick. We look forward to a great day of golf.

Sponsorship Opportunities are still available. If you or your company are interested in sponsorship, the details are below.



Sponsorship Opportunities!

Sponsorship pricing has remained constant at $250, same price it's been for over six years. And in a year that's seen rapid price increases, we're pleased we could hold the line on this.

Your sponsorship helps buy the prizes for the event. It also pays for the planned breakfast and awards ceremony, where SFGC's famous barbeque and no-host bar will be provided. Your sponsorship also provides for a company tee sign and company name, contact and phone number on the reverse of the rules, which goes to every player the day of the event. Sponsors are also listed in the OCWA monthly newsletter to all association members starting in April, as well as on the OCWA website. What a great good marketing deal!

To become a priority sponsor, simply print the form, fill it out and send it in with a check for $250.

Lastly, please check your OCWA Membership status as we will be reviewing your status more closely this year as that is a requirement to be in the event. The benefits of membership far outweigh the modest $70 per year cost. You can sign up for Membership on-line at www.ocwater.org/join-us.

For additional information, please e-mail Mike Sinacori at Msinacori@newportbeachca.gov or call him at (949) 644-3342.

CLICK HERE TO DOWNLOAD SPONSORSHIP AND REGISTRATION FORM

Corporate Sponsors

The following companies joined with OCWA to sponsor this year's Golf Tournament.

AES Water, Inc.	*Darik Walton*
American Flow Control	*Perry Phillip*
Atkinson, Andelson, Loya Ruud & Romo	*Jeff Hoskinson*
Black and Veatch	*Derek Kurtti*
Black and Veatch	*Jeff Neeman*
CAB Engineers, Inc.	*Cory Bersch*
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Cla-Val Company	*Monte Roberts*
Clow Valve Company	*Richard Ledesman*
DUDEK	*Mike Metts*
Ford Meter Box	*Blake Kidd*
General Pump	*Michael Bodart*
GCI Construction	*Mike Pindt*
Guida Surveying, Inc.	*Ralph Guida*
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HDR	*Steve Friedman*
JCM Industries / TRIPAC	*Bill Foster, Sr.*
Leighton	*Jeff Hull*
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MKN	*Ryan Gallagher*
Mueller Systems	*Kevin Cornejo*
Michael Baker International	*John Nagle*
PACE Advanced Water Engineering	*Andy Komor*
Paulus Engineering, Inc.	*Jason Paulus*
Richard Slade & Associates	*Richard Slade*
SIP Industries	*Matt Segerstrom*
Stantec	*Jim Cathcart*
TE Roberts, Inc.	*Tim Roberts*
Tetra Tech	*Laurence Esguerra*
TRIPAC	*Bill Foster, Sr.*
TRIPAC	*Bill Foster, Sr.*
United Water Works	*Shaw Turnage*

Opportunities remain for those who wish to participate as a Sponsor. To learn more, visit the OCWA Golf Tournament webpage, or email Michael Sinacori, Tournament Chairman, at msinacori@newportbeachca.gov

Twelfth Annual County-Wide

2023 SafetyFest

Join us for the twelfth annual county-wide safety event created specifically for the water industry.

There will be Contact Hours available to those attendees who attend any – or all – of the state-approved training sessions offered at SafetyFest.

Training Session Topics will be Announced Soon.

CEU
Earn Education Units for Sessions
(Value TBD)

Thursday, May 25, 2023

7:30 am to 4:00 pm

Registration begins at 7 am

Continental breakfast and a lunch buffet are included.

Moulton Niguel Water District

26161 Gordon Road • Laguna Hills, California 92653

Tickets: $60.00 PER PERSON *(Member & Non-Member)*

Space is limited. Make reservations early.

Register online at: **www.ocwater.org**

Or you may contact: **Bobby Young** at **(949) 342-1440**
or via email: byoung@lbcwd.org

You may also pay by check. Mail payment to:

Orange County Water Association
Attention: SafetyFest
P.O. Box 51404 • Irvine, California 92619-1404

RSVP IS A FINANCIAL COMMITMENT.
NO-SHOWS WILL BE BILLED

Explaining Water Units to People Who Like Basketball

By JAY LUND, *UC Davis, Center for Watershed Sciences*

It's March madness once again as we try to explain water conditions in California to real people in the midst of additional basketball madness.

We all enjoy and suffer with basketball. This commonality can make it a useful unit of volume among the many units of volume used for water.

A basketball has the volume of about 1/4 cubic feet (4 basketballs per cubic foot). So a flow of 1,000 cubic feet per second (cfs) has a volume equivalent of having 4,000 basketballs coming at you every second.

An acre-foot (af) is a volume one foot deep over an acre of area. It has a volume of 43,560 cubic feet or 325,850 gallons, or 174,240 basketballs.

One cfs flowing for one day (24 hours) discharges almost 2 acre-feet (1.98) of volume (348,480 basketballs/day).

A million gallons per day (mgd) has the same volume as 1.87 million basketballs per day. (There are 7.48 gallons per cubic foot)

A cubic meter (m^3) is about 35.3 cubic feet, which equals about 141 basketballs of volume.

Here is a California water units translator (rounded some, highlighting the most useful conversions):

Unit	per Basketball	per Cubic foot	per Acre-foot	per Gallon	per Million gallons	per Cubic meter
Basketballs*	1	4	174,240	0.53	530,000	141
Cubic feet	0.251	1	43,560	0.133	133,000	35.3
Acre-feet	really small	really small	1	really small	0.33	really small
Gallons	1.87	7.48	325,850	1	1 million	264
Million gallons	really small	really small	3.06	one millionth	1	really small
Cubic meters**	0.0071	0.028	1.233	0.004	3.785	1

*Some internet divergence exists on the volume of a basketball; here I have gone with 434 cubic inches.
** Cubic meters are almost never used in California, but people from outside the US and California will find this useful. I left out miner's inches as a California unit, as it is getting archaic.

For California's water infrastructure, the Sacramento Valley flood bypass system has a conveyance capacity of almost 750,000 cubic feet per second (600,000 cfs in the lower Yolo Bypass and 130,000 cfs in the Sacramento River main stem). This is equivalent to the volume of 3 million basketballs per second (260,000 mega-basketballs per day – mbd).

California's largest reservoir has a storage capacity of 4.55 million acre-feet, or almost 800 billion basketballs.

In terms of water use, most of California's roughly 8 million acres of irrigated agriculture uses 3-4 acre-ft per acre annually (520,000-700,000 basketballs per acre/year) each year totaling about 26 million acre-ft per year, or 4.5 trillion basketballs of water per year.

California's urban water users, almost 40 million people, use roughly 140 gallons per capita per day (74 basketballs/person-day or 27,100 basketballs/person-year), totaling about 7 million acre-ft per year, or 1.2 trillion basketballs of water per year of urban water use.

Maybe this basketball lens for California water use is helpful for "#SciComm" junkies and others at pains to communicate scienterrific things to real people. As a civil engineering undergraduate student, it seemed that a third of all my calculations were unit conversions. We might have learned more with a single standard international unit such as basketballs (since metric hasn't caught on much here). (Still, if I made a mistake in the table, let me know.)

Welcome to March Madness!

TOP TEN HISTORIC SIERRA SNOW SEASONS

A seemingly never-ending winter at Lake Tahoe has now etched its way into the history books as the Sierra's second-snowiest on record.

Some 56.4 feet has now fallen this season at the Central Sierra Snow Lab in Soda Springs, California.

That tops the 55.9 feet that fell in 1982-83. The biggest winter in its 77 years of official record-keeping was nearly 68 feet in 1951-52 when more than 200 passengers on a luxury train were stranded three days near Donner Pass.

Here is a list of the Top 10 Sierra winters with the most snow in almost 80 years years since the UC-Berkeley Central Sierra Snow Lab started keeping records in 1946 northwest of Lake Tahoe near Donner Pass at Soda Springs, California:

1951-52 — 812 inches (2,062 cm), or 67.7 feet (20.6 meters)
2022-23 — 677 inches (1,719.6 cm), or 56.4 feet (17.2 meters)
1982-83 — 671 inches (1,704 cm), or 55.9 feet (17 meters)
2010-11 — 643 inches (1,635 cm), or 53.6 feet (16.35 meters)
1981-82 — 624 inches (1,583 cm), or 52 feet (15.8 meters)
1968-69 — 602 inches (1,529 cm), or 50.2 feet (15.3 meters)
1994-95 — 598 inches (1,519 cm), or 49.8 feet (15.2 meters)
1955-56 — 594 inches (1,509 cm), or 49.5 feet (15.1 meters)
1957-58 — 593 inches (1,506 cm), or 49.4 feet (15 meters)
2016-17 — 573 inches (1,455 cm), or 47.7 feet (14.5 meters)

Source: UC-Berkeley Central Sierra Snow Lab; Soda Springs, California; founded 1946. The snow season coincides with the water season that begins on October 1 and runs through the following September 30.

2023 OCWA Corporate Sponsors

By their generous support, the following corporations and agencies have helped ensure the OCWA Board of Directors will be able to pursue its many goals for 2023. On behalf of the membership, and the entire Orange County water community, we thank you.

Atkinson, Andelson, Loya, Ruud & Romo

Ardurra • Black & Veatch

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DN Tanks • Dopudja Wells • Genterra

Hazen & Sawyer • Irvine Ranch Water District

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Tetra Tech • Wood Rodgers

POSITIONS AVAILABLE

OCWA Members and their organization can post unlimited job listings to the Association website for FREE. Listings are promoted with weekly e-blasts sent to our 1,600+ contacts, representing over 45 agencies and more than 120 companies county-wide.

This is saturation coverage throughout the County.
What else would you expect from the only Orange County Association dedicated to the local water community?

If you would like to post a job opening here, and are a current member, please send a PDF, or a link to a web page detailing the position to the OCWA webmaster.

CURRENT OPPORTUNITIES:

City of Fullerton - Director of Public Works

MNWD - Contracts, Purchasing, & Risk Manager

Project Partners - Landfill Regulatory Engineer

IRWD - Wetlands Specialist (04-23)

IRWD - Laboratory Supervisor - Organic Chemistry (04-12)

OCWD - FHQ Recharge Operations Supervisor

MWDOC - Intern: Water Use Efficiency (04-14)

SAWPA - Communications Specialist

and many more listings on the website . . .

For further information on these and other currently open positions, please visit the "Opportunities" section of the OCWA website:

www.ocwater.org/Job-Opportunities

Members and their agency or company can post Opportunities to the OCWA website, free of charge, as often as they'd like. If you wish to post a job opening, and are a current member, please send a PDF or a link to your web listing to the timhogan@socal.rr.com. We'll post the listing to the website and send out a weekly jobs e-blast to over 1,600 people in the OC water community.

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OCWA's Board of Directors meets on the third Wednesday of each month, unless notified otherwise. The next meeting is scheduled for:

April 19, 2023
10:30 am to 11:30 am

Dave & Buster's Restaurant
Irvine Spectrum
Entertainment Center

✦ ✦ ✦