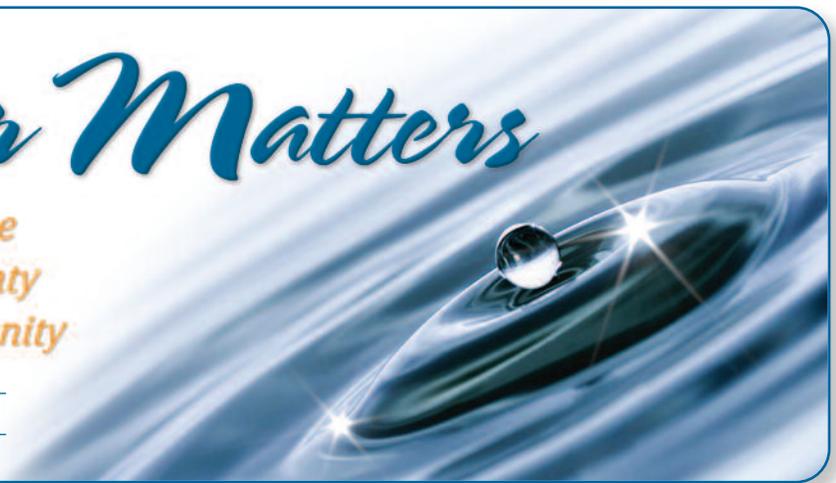




Water Matters

News for the
Orange County
Water Community

JANUARY, 2018



Oh, NO! Not *this* Again!

The Beginning of a 2018 Drought?

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

Every year is different for water management in California. The 2012-2016 water years were among the driest and warmest on record. 2017 was the wettest year of record for much of California, with thousands of water managers struggling to store as much water as possible in reservoirs and aquifers.

So far for this 2018 water year (which began October 1), Northern California precipitation is about 67% of average for this time of year. Further south, the San Joaquin Basin precipitation is about 38% of average and Tulare basin is about 25% of average. Snowpack statewide is about 27% of average for this time of year.

December has had essentially no precipitation and a stationary ridge in the Pacific Ocean off California seems likely to block most moisture from the Pacific Ocean into January.

Fortunately, today California has 109% of average water storage in reservoirs for this time of year, 1.5 maf more than average reservoir storage. The wet 2017 water year substantially refilled Northern California's less depleted aquifers. But only a small part of the additional drought groundwater withdrawals has been recharged for the more depleted aquifers of the southern Central Valley and southern California.

Here's some simple statistical analysis on two reasonable questions.
1) Will the 2018 water year be dry? Likely, but maybe not.

Let's look at some historical statistics of monthly precipitation in Northern California.

For the last 97 years, when December precipitation was in the lowest 20% of all years, 79% of the overall water years were drier than the median precipitation. As the plot below summarizes, the

dry December likely means a drier year, mostly because the annual total is deprived of December precipitation, but also because there is some correlation that drags down precipitation in other months. From the regression equation slope, one inch loss of December precipitation averages 1.28 inches in lost annual Northern California precipitation. One inch less December precipitation tends to be accompanied by an additional 0.28 inches of less precipitation in other months. So there is a good chance that 2018 will be drier than the median and drier than average.

Continued on Page 4

January Luncheon:

DAQRI: Bringing Augmented Realty to the Modern Workplace

Speaker: **Michelle Zhang**

Business Development Team, DAQRI

Wednesday, January 17, 2018

Dave & Buster's Restaurant

Irvine Spectrum Entertainment Center

11:30 am: Registration

12:00 – 1:30: Lunch & Presentation

To make reservations, please go to www.OCWater.org

Reservations must be made by EOB, Tuesday, January 16, to qualify for the Reservation Rate. Cancellations received AFTER this date CANNOT be refunded.

For more information, contact Leticia Villarreal at
(714) 378-3203

Please identify yourself by name and membership number.

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FOR COMPLETE INFORMATION, SEE PAGE 6 OR VISIT OCWATER.ORG

2018 Board of Directors

The incoming 2018 OCWA Board of Directors is:

Roni Young, President; **Gregorio Estrada**, Vice President;

John Robinson, Treasurer; **Ryan Gallagher**, Secretary

Michael Sinacori, Director; **Bobby Young**, Director;

Sandy Scott-Roberts, Director, and **Neil Harper**, Ex Officio

2017 Clarke Prize Lecture and Conference Presentations Available for Viewing on the Web

Both Videos and Slide Presentations Can Be Viewed and Downloaded

According to Dr. Charles N. Haas, the recipient of the National Water Research Institute's 2017 Clarke Prize, pathogens remain a significant public health concern in the twenty-first century. His Lecture, *An Engineer to Biologists, and a Biologist to Engineers*, delivered during NWRI's twenty-fourth Annual Clarke Prize Award Ceremony, focused on addressing water quality challenges using a multi-disciplinary approach.



Dr. Charles N. Haas

Increasing Concern Over Pathogens

Haas began his Lecture by explaining that issues related to identifying and controlling pathogens remain a challenge to the water industry, despite significant scientific advances over the last century. These issues, as highlighted by the water crisis in Flint, Michigan, have increased the public's awareness of pathogens and required water scientists to address the need for more thorough risk assessment of the safety and quality of water supplies. Risk assessment involves the process in which scientists estimate the potential risk of the effects of pathogens to public health.

Haas has spent much of his career addressing this issue and is known for developing Quantitative Microbial Risk Assessment (QMRA), which involves hazard identification, dose response, exposure assessment, and risk characterization. This valuable tool has influenced the development of public health guidance and policies by prominent organizations both nationally and internationally. The U.S. Environmental Protection Agency has cited Haas' research in the Surface Water Treatment Rule and its iterations (including the Long Term 2 Enhanced Surface Water Treatment Rule) and Ground Water Rule (2006).

Tackling Antibiotic Resistance

In the Lecture, Haas also explored the ability of some pathogens to resist antibiotics, which is emerging as a major public health concern. Pathogens like *Klebsiella* and *Staphylococcus aureus* continue to multiply because antibiotics have lost the ability to control or kill them. As an example, methicillin-resistant *Staphylococcus aureus* (MRSA) now represents over 50 percent of *S. aureus* infections in the United States, with half a million hospitalizations per year. Haas stressed the need for more engineering-based quantitative analysis to better understand the role that water management may or may not play in spreading antibiotic resistance and to help define control strategies for addressing this emerging challenge in water and wastewater.

Questions of Climate Change

Another challenge highlighted in the Lecture was the effect of climate change on waterborne pathogens. Haas had become interested in the link between climate change and pathogens through the work of Dr. Joan Rose and other colleagues, who have been analyzing the occurrences of reported drinking water disease outbreaks with preceding precipitation events. He described his own research on infectious water diseases and climate change in suburban counties, and explained that the use of epidemiological tools led him to discover

that humidity, rather than temperature, was a better predictor of pathogens in water and wastewater.

He stated that there are more questions than answers regarding climate change, but one possible solution is the creation of better quantitative models that address pathogen-related challenges resulting from climate change, particularly focusing on temperature, precipitation, humidity, and wind-blown dust.

A Proposed Multi-Disciplinary Approach to Risk Assessment

Haas noted that QMRA is a great tool for developing quantitative, engineering-based solutions to water issues, but that it is "an evolving field of practice." Again, he stressed the need to approach biological problems with multi-disciplinary education.

Haas concluded the Lecture with a quote from Louis Pasteur: "Chance favors only the prepared mind." That is, educators need to prepare students to have expertise in one discipline, but understand enough of other disciplines to communicate and interact with researchers in different fields as they work together to solve transdisciplinary water challenges around the globe.

More information about the Clarke Prize, including downloadable copies of Haas' Lecture, is available at www.clarkeprize.com.

2017 Clarke Prize Conference Presentations Now Available Online

The PowerPoint presentations from the 2017 NWRI Clarke Prize Conference are now available on NWRI's website. The conference focused on urban sustainability, specifically potable reuse.

Presentations from the Conference included:

- Joan Rose of Michigan State University, "A Clarke Prize Laureate's Perspective on the 2017 Clarke Prize Lecture"
- Brian Pecson of Trussell Technologies, Inc., "The Acute Threat: Perspectives on Pathogens in Potable Reuse"
- James Colston of Orange County Sanitation District, "Enhanced Source Control to Support Potable Reuse"
- Ufuk Erdal of AECOM, "Pathogen Removal Mechanisms and Pathogen Credits in Membrane Bioreactor-Based Potable Reuse Trains"
- Andrew Salvesson of Carollo Engineers, "Assessing and Mitigating Chemicals in Potable Reuse"
- Jeff Neemann of Black & Veatch, "The Relevance of Low Molecular Weight Compounds on Monitoring for Direct Potable Reuse"
- Jeff Mosher of Water Environment & Reuse Foundation, "The Water Environment & Reuse Foundation's Activities to Advance Potable Reuse"
- Mark Sobsey of University of North Carolina, Chapel Hill, "Emerging Issues to Achieve Microbially Safe and Sustainable Water"

Also featured on the website is the Clarke Prize Award Ceremony Lecture, given by this year's recipient, Dr. Charles N. Haas.

[Click here](#) to download the conference PowerPoint presentations.

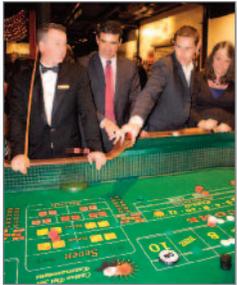
To download Dr. Haas' lecture, [click here](#).

To view the lecture on YouTube, visit the [NWRI YouTube channel](#).

2017 Holiday Party was An Evening of High Stakes Merriment

From elegant dinner table settings to high stakes gaming tables, our 60th Annual Christmas & Holiday Party was an evening of unforgettable enjoyment. And our venue – the Marconi Automotive Museum – more than measured up to expectations.

Those who arrived early had the pleasure to wander unimpeded through an amazing display of classic automotive excellence – everything from exotic racing cars to rare luxury sedans, muscle machines to limited production prototypes. For those who appreciate cars or craftsmanship, or who just admire the beauty of fine engineering, it was a rewarding experience.



After a sumptuous meal prepared by White House Catering, guests hit the gaming tables to test their luck and skills. A special treat for the evening, however, were Slot Car races on a classic track, complete with computerized scoring. Many guests were heard to declare it took them back to their youth, as the excited look on so many faces would attest.



We were blessed this year to have a wide array of Sponsors. With their support, we awarded a great many prizes to our raffle winners, everything from a Keurig Coffee Maker to blue tooth speakers, a Fit-Bit wearable fitness tracker to an Echo Dot smart home controller, t-shirts and hats, gift baskets, and plenty of holiday cheer.

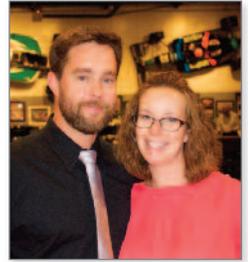


Gifts for our guests weren't the only presents distributed. We also collected dozens of toys which the Marconi Foundation will distribute to disadvantaged children throughout the county.

We were happy to see so many new faces at this year's event. After enjoying an evening of merriment with

us, we hope many of you will join OCWA, to take advantage of the many networking and educational opportunities our Association offers.

With wishes for all for a happy and prosperous New Year, we hope to see you again at next year's Holiday Party!



Visit the OCWA webpage to view or download dozens of photos from the 2017 Holiday Party.

Holiday Party Sponsors



'Checkered Flag' Sponsors
DUDEK



'Team Owner' Sponsors

AKM Consulting Engineers ♣ Black & Veatch
Carollo Engineers ♠ CDM Smith
CivilSource/NV5 ♦ Civiltec Engineering
Hazen & Sawyer ♥ HDR ♠ KEH & Associates
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Rutan & Tucker, LLP ♣ SA Associates ♦ Stantec
Tetra Tech, Inc. ♠ West Yost & Associates

'Pit Crew' Sponsors



Atkinson, Andelson, Loya, Ruud & Romo
Bush & Associates, Inc.
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2018 OCWA CALENDAR OF EVENTS

Date	Event/Topic	Location
February 21	Luncheon/Speaker TBA	Dave & Busters
March 21	Luncheon/Speaker TBA	Dave & Busters
April 18	Luncheon/Speaker TBA	Dave & Busters
May 16	Luncheon/Speaker TBA	Dave & Busters
May 24	10 th Annual SafetyFest	Santa Ana Public Works Yard
June 18	O.C.W.A. 39 th Annual Golf Tournament	Strawberry Farms Golf Club (Irvine)

Date	Event/Topic	Location
July 18	Luncheon/Speaker TBA	Dave & Busters
August 15	Luncheon/Speaker TBA	Dave & Busters
September 19	Exhibition & Operator Competition	Rattlesnake Reservoir
October 17	Luncheon/Speaker TBA	Dave & Busters
November 21	Luncheon/Speaker TBA	Dave & Busters
December 7	61 st Annual Holiday Dinner Dance	Marconi Automotive Museum

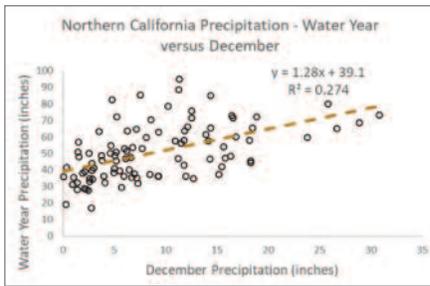
Could 2018 See the Beginnings of a new Drought Cycle?

Continued from Page 1

However, of the 19 historical years with the driest 20% of Decembers, four had total precipitation above the 97-year median. So there is roughly a 21% chance that 2017 will be an above-median water year.

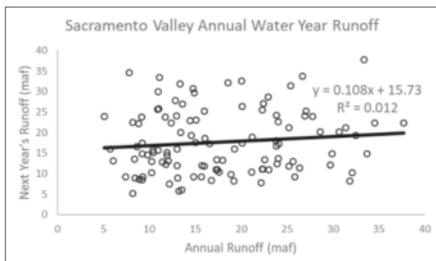
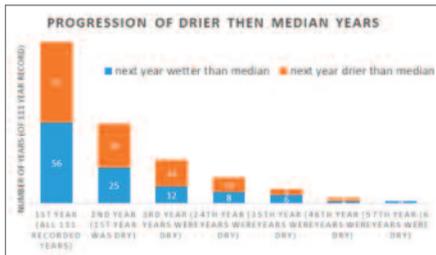
2) If 2018 is a dry year, is it the beginning of a new drought for California? Perhaps not.

With its long dry summers, every year California has a worse drought than most of the US has ever seen. This troubled early settlers, but today California's city water supply and irrigation systems have enough reservoir and aquifer storage, supply interconnections, and institutional responsiveness so that most economic water uses are largely



immune from one-year droughts. (Ecosystem impacts are a sadder story, however.)

California almost has to have at least two dry years together for there to be a noteworthy drought. Even if this year is dry, there is only about a 50% chance that the next year is drier than the median. Total water year precipitation has very little correlation between years, as seen in the two figures below.



Looking at the statistics for Sacramento Valley runoff (since 1906), by definition half of these 111 water years (55 years) are drier than the median. Thirty years are in the second or more year of successive dry years. 18 years are

in the third or more consecutive dry years, 10 years are in the fourth or more consecutive dry year, four are in the fifth of more consecutive drier than median year, and two years are in the sixth consecutive drier year. No historical droughts exceed six consecutive drier years.

The frequency of longer drought years declines almost as if there were no correlation for dry years. This is shown more formally below, which plots annual Sacramento Valley runoff against the runoff in the previous year. There is a roughly 10% correlation in annual runoff, which explains about 1% of variance in annual runoff (some, but not much).

Bottom line – California's 2018 water year will likely be drier than the median year, and still more likely to be drier than the average year.

Although we would like to predict California's hydrology for the coming season and years, we are unlikely to have great skill in this – perhaps ever.

Fun statistical fact (for those who read to the bottom): Most years are drier than average. In the historical record of Sacramento Valley unimpaired flow, 57% of years are drier than average. Why? Averages are increased by very wet years, which do not affect the median flow (50% above and 50% below). Because precipitation and flow usually can't be less than zero, extreme dry years cannot pull the average down as much as extreme wet years pull the average up. This skews their probability distributions away from zero, with more than 50% of years being drier than average. (But you already knew that water in California is not normal.)



Jay Lund is a professor of Civil and Environmental Engineering and Director of the UC Davis Center for Watershed Sciences. To read this entire article, see the CaliforniaWaterBlog.com.

Mesa Water Exceeds 1,600 Days of Safe Work with No Lost-Time Incidents

By STACY TAYLOR, Mesa Water District

Mesa Water has achieved the "gold standard" of safety performance.

"Mesa Water's commitment to safe work practices has resulted in almost four-and-a-half years of no lost-time incidents, thus reducing claims and saving costs for our organization and our customers," said Mesa Water Board President Jim Atkinson. "With the dedicated efforts of our staff, management team, and Board members, Mesa Water has avoided accidents and injuries while accomplishing the highest safety performance standards."

In 2014, Mesa Water recognized opportunities for improving its overall safety rating by enhancing its existing Environmental, Health, and Safety (EHS) program. According to regular EHS audits, Mesa Water has received increasingly high marks for its safety policies,

Mesa Water District, a top-performing public water agency, has accomplished the notable milestone of over 1,600 days without a lost-time accident. Due to its robust environmental health and safety program,

practices, training, and recordkeeping. Mesa Water's most recent audit was conducted in May 2017, resulting in a score of excellence for safety.

"By implementing District-wide safety accountability, education, measurement, reinforcement and rewards, Mesa Water nearly doubled its 2012 safety performance by the end of 2014," said Mesa Water General Manager Paul E. Shoenberger, P.E. "From 2014 forward, Mesa Water's safety performance has increased another 20 percent to achieve its current best-in-class level of safety."

Since 2014, workplace safety experts BSI EHS Services and Solutions has conducted safety audits of 24 required programs at Mesa Water, provided onsite safety training for staff, and ensured proper program implementation. Through training, evaluation and testing, as well as review of new and changing safety and environmental regulations to ensure Mesa Water remains compliant, BSI has supported Mesa Water in its safety successes.

According to the Bureau of Labor Statistics, Mesa Water is well below the national average for reportable injuries, with less than half the total number of reportable injuries as similar water, sewer, and other utilities throughout the U.S.



... to foster advancement in the Water Works Industry...

ARE YOU INVOLVED IN THE WATER INDUSTRY IN ORANGE COUNTY?

If yes, then consider becoming a member of the Orange County Water Association (OCWA).

OCWA mission is to foster advancement in the Water Works Industry, set high standards for potable water, exchange ideas and work for standard policies and procedures of mutual help during water emergencies, disseminate information for the education of the general public in the use of water and its value to civilization and aid in water research.

ORANGE COUNTY WATER ASSOCIATION BY THE NUMBERS

OVER **230** MEMBERS

45+ AGENCIES REPRESENTED

120+ Companies Represented

SAVE \$100+/yr with membership event discounts

50+ YEARS OF SERVICE TO ORANGE COUNTY

AS A MEMBER OF OCWA YOU WILL RECEIVE THE FOLLOWING BENEFITS

Build Your Network

- **Monthly Meetings:** Reduced fees for our monthly meetings which provide an opportunity to hear from local leaders on new and innovative projects, and meet other local water industry professionals.
- **Annual Holiday Party:** The annual holiday party brings together over **200+ members and guests.**
- **Annual Golf Tournament:** This member only event draws 100+ water professionals. The event features prizes and a non-scramble format.
- **Expand Your Contacts:** Members gain access to OCWA's vast member directory.

Advance Your Career

- **Board Positions:** Earn a position on the Board to gain leadership.
- **Gain Visibility:** Gain opportunities to present your agency/company's projects or programs to our local network.
- **Committee Positions:** As a member, consider joining one of various committees.

Education and Training Opportunities

- **Monthly Newsletter:** Jobs, projects, local water news, regulatory and legislative updates each month.
- **Safetyfest:** Earn CEUs from State approved training sessions.
- **Annual BBQ:** This Operator Training Event, offers CEUs, over 20 vendor exhibitions, and a Pipe Tapping Contest.

To join OCWA visit our website at: ocwater.org/join-us

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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:

**January 17, 2018
10:30 am to Noon**

Dave & Buster's Restaurant
Irvine Spectrum
Entertainment Center

♦ ♦ ♦

Unless otherwise noted, all articles in this newsletter reflect the views or opinions of the authors and not the official opinion of OCWA, its membership or Board of Directors. All Advertisements contained in the newsletter are subject to the OCWA Advertising Policy. The OCWA Advertising Policy is available on request from the Association.

January Luncheon Topic

DAQRI: Bringing Augmented Reality (AR) to the Modern Workplace

Presenter:

Michelle Zhang

Business Development Team, DAQRI

Technology continues to advance around us, from new equipment such as drones to new software solutions, and these technologies are changing our industry. To highlight the change these technologies will have on our industry and to create thought provoking discussion, OCWA would like to highlight one of these technologies. Join us on January 17th to learn more about Augmented Reality (AR) and how it is being integrated into our industry.

The presentation will include a brief overview of DAQRI's AR Technology, videos of use cases, and a group demonstration. At the conclusion of the program, audience members will be encouraged to come up for individual demonstrations.



To view a video of DAQRI's Augmented Reality (AR) Technology in action, click the picture.

About Our Speaker

Michelle Zhang works on the Business Development team at DAQRI, an augmented reality company focused on bringing "AR Everywhere." She has been at the forefront of bringing AR to companies small and large. She enjoys helping companies realize their passion for innovation, and furthermore, helping them bring their concepts to life.

Wednesday, January 17, 2018

Dave & Buster's Restaurant ♦ Irvine Spectrum Entertainment Center

11:30 am: Registration ♦ 12:00 – 1:30: Lunch & Presentation

OCWA Members with Reservations..... \$30 Non-Members with Reservations..... \$40
OCWA Members without Reservations... \$40 Non-Members without Reservations..... \$40

*Reservations must be made by EOB, Tuesday, January 16, to qualify for the Reservation Rate.
Cancellations received AFTER this date CANNOT be refunded.*

To make reservations, please go to the OCWA website: www.ocwater.org

For more information, contact Leticia Villarreal at (714) 378-3203

Please identify yourself by name and membership number.

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ACWA Fall Conference Presentations Available on Line

Did you miss a keynote address or interesting session at **ACWA's 2017 Fall Conference & Exhibition** in Anaheim from November 28 through December 1? Download presentations and materials from the days of programs, forums, town halls, and luncheons from ACWA's website. [Click here to access it all.](#)

ACWA members also may access available presentations from the pre-conference committee meetings by visiting individual committee pages (member login required).

More than 1,700 water professionals and leaders from throughout California gathered at the conference, which offered an array of programs – and insights from water leaders – on ways to strengthen California's water system.