



2020 AWRA-WA
Annual State Conference

**The Challenges of Change:
*How Washington is Responding
to Interdisciplinary Changes
to Water Resources***



October 6, 2020

Virtual Conference

**The American Water Resources Association
Washington Section (AWRA-WA)**

is a scientific and educational 401(c)(3) non-profit organization established to encourage and foster interdisciplinary communication among persons of diverse backgrounds working on any aspect of water resources disciplines. Individuals interested in water resources are encouraged to participate in the activities of the Washington Section. Opinions and views expressed in this conference are those of the speakers, not AWRA-WA.

Cover Photo: Tom Ring
Program Design: Rebecca Inman, Department of Ecology

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Photo by: Brendan Dowling, Dept. of Ecology

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CONFERENCE WELCOME

Dear Colleagues,

The Washington Section of the American Water Resources Association (AWRA-WA) welcomes you to the 2020 State Conference.

This year's theme is centered around fundamental changes in water resources and water resources management that have occurred over the past several decades, the changes that are anticipated in the future, and the ways in which Washington has and is responding to those changes.

Our understanding of the extent of Washington's water resources, how the climate would impact those resources, and our water needs was very different 50 years ago. Thus, the way we used water, and regulated the use of water, was also very different. Our understanding of the extent of our water resources, our values, and our management practices have shifted a great deal over that period of time. Today's conference is slated with exceptional presenters to help us understand the vast changes in water resources and water resources management that have occurred over the past several decades, understand changes that are anticipated to occur in the future, and identify tools and strategies for adapting to change today and into the future.

The conference committee has been meeting weekly since January to organize this year's conference event. We are excited about the quality of the program and diverse viewpoints represented. We thank the conference committee members, an all-volunteer group, for their investment of time in identifying the conference theme, finding highly talented speakers, and executing the logistics of AWRA-WA's very first virtual conference.

Our sponsors also play a critical role in this event. The AWRA-WA thanks them for keeping the prices of this event lower and therefore making it easier for more people to attend. Their generosity also funds two student scholarships, as well as paying for students to attend the conference and dinner events throughout the year for free.

The AWRA-WA is a non-profit, volunteer-run organization with a clear vision to: provide forums for advancing water resources management in Washington and the Pacific Northwest region; serve the public interest by supporting education and informational exchanges; involve professionals and students from all disciplines and interested members of the public in activities that promote broad discussion and understanding of water resources issues; and recognize excellence in water resource education, management, and research. If you have

CONFERENCE WELCOME

any suggestions for us to further these causes, then please write your comments on the survey or talk to members of the Board or committee.

Finally, we want to thank each and every one of you for attending. This year's conference looks very different than our conferences in the past because of COVID-19. We decided to host this year's conference virtually for the safety of each of our attendees and speakers. Although we cannot meet in person this year, we hope that you will find that the quality of the presentations and the opportunities for meaningful discussion with other attendees is the same as at any of our past conferences. We hope you enjoy the excellent presentations, network with your peers in the discussion forums and Zoom Rooms, and make some new connections. We look forward to seeing you at future AWRA-WA events.

Sincerely,

Jenna Mandell-Rice and Tom Ring, Conference Co-Chairs



Photo by Tom Ring

2020 CONFERENCE COMMITTEE

Conference Co-Chairs

Jenna Mandell-Rice, Van Ness Feldman
Tom Ring

Members

Rabia Ahmed, Greene Economics
Tyson Carlson, Aspect Consulting
John Chandler, Puget Sound Energy
Amanda Cronin, AMP Insights
Tom FitzHugh, Stantec
Gretchen Greene, Greene Economics
Steve Hirschey
Felix Kristanovich, Ramboll Environ
Jessica Kuchan, Confluence Law
Jason McCormick, McCormick Water Strategies
Katherine Ryf, Landau Associates
Carrie Sessions, Washington Department of Ecology



Photo by Tom Ring

2020 BOARD MEMBERS

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Student	
Representatives:	Silas Sleeper, Central Washington University Sean Wu, University of Washington

AGENDA

8:00—8:15	Welcome by Conference Co-Chairs
	<i>Jenna Mandell-Rice and Tom Ring</i>
8:15—9:05	Keynote Address
Abstract on	<i>Speaker: Tony Willardson</i>
9:05—10:35	Session 1: Changes to Water Quality, Supply, Use, and Management
	<i>Host: Carrie Sessions</i>
Abstracts on pages 10—11	<u>Speakers</u> Dr. Gretchen Greene Rachael Paschal Osborn Tom Ring Mindy Roberts
10:35—11:05	Networking Break
11:05—12:35	Session 2: Market Solutions and Responses to Change
	<i>Host: Carrie Sessions</i>
Abstracts on pages 12—13	<u>Speakers</u> Mitchell Kunstel Greg McLaughlin Doug Quinn Richael Young
12:35—1:35	Lunch Break (on your own)/Networking Break
1:35—1:50	State of AWRA-WA Section and Outstanding Service Award
1:50—3:20	Session 3: Technological Solutions and Responses to Change
	<i>Host: Carrie Sessions</i>
Abstracts on pages 16—17	<u>Speakers</u> Armin Munevar Dr. Thomas Quinn Randy Reber Tracy Tackett
3:20—3:50	Networking Break
3:50—4:50	Session 4: Policy Solutions and Responses to Change
	<i>Moderator: Adam Gravley</i>
	<u>Panelists</u> Maia Bellon Brady Kent Arden Thomas Senator Judy Warnick
4:50—5:00	Closing Remarks

PROGRAM AND ABSTRACTS

8:00 - 8:15

Welcome by Conference Chairs

Conference Co-Chairs: Jenna Mandell-Rice and Tom Ring

8:15 - 9:05

Keynote Address

*Speaker: Tony Willardson, Executive Director
Western States Water Council*

*The Challenges of Change:
Resilient Water Resource Management*

Abstract: Water in the West is an increasingly scarce and precious resource. Western States have and will continue to face unique hydrologic, legal, and infrastructure challenges. Population growth, competing economic and ecological demands, and changing social values have left surface and ground water supplies stressed in many areas. This has increased the number and complexity of conflicts among users and uses.

A secure water future is becoming more costly and increasingly uncertain given our unpredictable climate, aging and often inadequate infrastructure, data limitations regarding water supplies and demands, competing or poorly defined water rights, and a constantly evolving regulatory landscape. Effectively addressing these challenges – to ensure that the West has an adequate, secure and sustainable supply of water of suitable quality to meet its diverse economic and environmental needs now and in the future – will require stronger collaboration and cooperation that transcends political and geographic boundaries between states, federal agencies, tribes, and local communities.

PROGRAM AND ABSTRACTS

SESSION 1

9:05 - 10:35

Changes to Water Quality, Supply, Use, and Management

Host: Carrie Sessions

Dr. Gretchen Greene

Waters of the State: How Have We Been Using Our Resource?

Abstract: This presentation will cover a brief history of water use in Washington, current uses, and an evaluation of future uses based on trends. Dr. Greene will review water sources and identify some of the newer challenges going forward. The presentation is intended to provide a context for thinking about the changing water management strategies that will be discussed throughout the remainder of the conference program. There WILL be a quiz!

Rachael Paschal Osborn

When Water Isn't Wet: Evolution of Washington's Water Right Mitigation Standards

Abstract: Because rivers and aquifers in Washington are over-appropriated, mitigation is needed to address the impacts of new water appropriations. Since the mid-1990s, policy and litigation led to rigorous standards for in-kind mitigation (water replacement in the same time, place and quantity as the depletion), to protect senior water rights. Recent legislation authorizing out-of-kind mitigation (i.e., habitat projects or monetary payments) is poorly designed and will ultimately harm both out-of-stream water users and instream flows, particularly given climate change impacts on hydrology.

Mindy Roberts

Water Quality in Washington—Past, Present, Future?

Abstract: People in Washington highly value clean water, and 84 percent of registered voters consider pollution of rivers, lakes, streams, and Puget Sound a serious problem. Many waters do not meet the needs of people or wildlife. While some progress has been made to improve the quality of Washington's freshwater and marine water, more is needed to leave a legacy for future generations.

PROGRAM AND ABSTRACTS

SESSION 1 continued

Changes to Water Quality, Supply, Use, and Management

Tom Ring

Evolution of Groundwater Regulation in Washington - Emphasis on the Yakima Basin

Abstract: The 1990s saw a paradigm shift in the way Washington State's regulated groundwater with regard to surface water, groundwater interactions. That decade falls within a continuum of evolving science and technology, growing population and demand for water, recognition of the ecological and aesthetic importance of water, and a century and a half of Treaty making, legislation, and litigation. followed by ongoing efforts to deal with water supply and fisheries problems in the basin.

In June of 1993, the Department of Ecology issued the first of potentially hundreds of approvals for new irrigation wells in the Yakima Basin, stating the belief that hydraulic continuity with the Yakima River was negligible, despite published literature to the contrary provided by the Yakama Nation. After five years of litigation, and with Postema working its way through the courts, Ecology informed the PCHB that new facts, additional science, and new case law developed since 1993 indicated that some of the decisions should be reversed or remanded.

Ultimately, Ecology, the Yakama Nation and the U.S. Bureau of Reclamation entered into an agreement that set the stage for future management decisions in the basin. A USGS groundwater study of the Yakima basin found that groundwater pumping had reduced streamflow in the Yakima River system by approximately 200 cubic feet per and that additional groundwater development would further deplete surface water.

New permits for consumptive use of groundwater have not been issued in the Yakima basin since the 1990s without mitigation. Later, mitigation began to be required for exempt wells, first in Kittitas County, then Yakima and Benton counties. These events in the nineties served as a hinge point in basin water management that was followed by ongoing efforts to deal with water supply and fisheries problems in the Yakima basin.

10:35 - 11:05

Networking Break

See page 17 or the conference "Information Packet" email message for instructions on contacting other attendees.

PROGRAM AND ABSTRACTS

SESSION 2

11:05—12:35

Market Solutions and Responses to Change

Host: Carrie Sessions

Mitchell Kunstell

Water Management in the Energy Imbalance Market

Abstract: Seattle City Light (SCL) joined the Energy Imbalance Market (EIM) in April of 2020, bringing a 100% hydro portfolio into an already diverse generation mix. The primary feature of the EIM is cost minimization through real-time balancing of supply against demand. SCL has utilized the EIM to assist in the optimization of water management on both run-of-river (Boundary) and cascading (Skagit) hydro systems. SCL has seen a decrease in net power costs while managing stringent lake levels and stream flow requirements. The first five months of participation have brought new challenges and opportunities that SCL is excited to tackle over the coming years.

Greg McLaughlin

Water Markets for Instream Flow

Abstract: Greg will talk about incentives and market forces for conservation water and instream flow restoration, using examples from over 20 years of projects implemented in Washington State. Themes will include legal mechanisms by which water can be transferred instream and how the Washington State Trust Water Rights Program protects those flows. The presentation will provide examples of how targeted flow restoration strategies benefit aquatic species protected by tribal treaties and the Endangered Species Act. The market-based approach of using voluntary agreements with landowners has been a foundation of Washington Water Trust's (WWT) project development strategy. A core message of this presentation will explore those circumstances in which flow restoration efforts are compatible with, as opposed to in conflict with, the economic and other values of landowners and irrigators. WWT's experience with Washington State's Streamflow Restoration Act analyses and emerging issues on water and equity will also be discussed.

PROGRAM AND ABSTRACTS

SESSION 2

Market Solutions and Responses to Change

continued

Doug Quinn

Municipal Market Solutions to Changes in Water Resources

Abstract: This session looks at regulatory changes that carry fiscal implications affecting Clark Public Utilities, a public water purveyor serving over 90,000 people in Southwest Washington. The presentation will touch on three key areas associated with the services provided by the utility, including discussion of the Washington Watershed Resource Inventory Area Act, regulatory influences on new water right work, and Water Use Efficiency (WUE)/Conservation efforts.

Richael Young

The High Costs of Water Trading: How Transaction Costs Price Out Small Deals That Could Lead to Big Wins for Agriculture

Abstract: Spoiler alert: It's not the price of water that's costing growers large gains from water trading; it's the transaction costs associated with it. High technical and legal standards often exceed the price of water itself, pricing out smaller deals that, in aggregate, could substantially improve agriculture's resilience to water-related production risk. Such standards include the burden of proving the validity of a water right and satisfying "no injury or harm" clauses, often absent clear regulatory guidance. Plus, a discussion on how weak monitoring and enforcement diminish the value of water rights and the incentive to trade them.

12:35 - 1:35

Lunch (on your own)/Networking Break

To contact other attendees:

- Go to the "Main Navigation" menu on the conference website and select "Attendees"
- Select the name of the attendee with whom you want to connect
- Select "Send Message" and type message into message box

You can also use the "Send Message" feature to send a link to a Zoom meeting (for which you are the host). You can also set up virtual meetings with groups of other attendees or join ongoing virtual meetings! To do so:

- Go to the "Main Navigation" menu on the conference website and select "Community"
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PROGRAM AND ABSTRACTS



Photo by Tom Ring

1:35 - 1:50

State of AWRA-WA Section and Outstanding Service Award

STATE OF THE AWRA WASHINGTON SECTION

Presented by: John Chandler, Board President

OUTSTANDING SERVICE AWARD

Presented by: Stanley Miller

Each year since 2001, AWRA-WA has recognized a member of the state's water resource community for their outstanding contribution to Washington's water resources. The state section developed this award program to recognize an individual who has shown significant and sustained commitment to the protection and wise management of the state or region's water resources. The Awards Committee accepts nominations for the award from any AWRA-WA member.

The first recipient was Jim Esget of the Bureau of Reclamation for his work in developing agreements among fisheries interests, hydropower producers, and irrigators that provide water for all these uses in the Yakima River Basin. Since this first award, over a dozen water resources professionals and several organizations have been recognized. In addition to a commemorative plaque for the recipient, AWRA-WA provides a donation of \$500 to a non-profit group selected by the recipient to promote work on water resources locally, nationally, or around the world.

PROGRAM AND ABSTRACTS

2020 OUTSTANDING SERVICE AWARD

Maia Bellon receives this year's AWRA-WA Service Award for "Outstanding Contribution to Washington's Water Resources"



The Outstanding Water Resources Professional Award for 2020 is being presented to Maia Bellon at this year's state conference. Maia recently returned to the practice of law after serving as the director of the Washington State Department of Ecology since 2013. At Ecology, Maia served as one of Governor Inslee's closest advisors on climate, water, toxics, and air quality issues. She was the longest-serving Ecology director in state history and led the agency to great achievements in water resources, water quality, and carbon emission reduction.

While at Ecology, Maia oversaw ten environmental programs and the Offices of the Columbia River and Chehalis Basin.

She managed a broad range of environmental challenges and opportunities including updating regulations on water quality human health criteria.

Maia was appointed by Governor Inslee as a member of the Southern Resident Orca Taskforce. She also served as the Sustainable Energy and Clean Environment Goal Council Lead for the Governor's Results Washington Office from 2013-2018.

In addition to her work as Director of Ecology, Maia has contributed to the water resources field as the deputy program manager (2010-2011) and then as the program manager (2011-2013) for Ecology's Water Resources Program. She sustainably managed the state's freshwater resources, including allocation of water and protection of instream flows and senior water rights. She promoted positive environmental and economic outcomes through innovative water supply solutions for communities, farms and fish. During this time, Maia also oversaw Ecology's Dam Safety Office and Well Construction and Licensing Program.

Prior to joining Ecology, Maia served as an assistant attorney general in the Ecology Division of the Washington State Attorney General's Office for 15 years.

When she is not working, Maia enjoys exploring the coastline of the Pacific Northwest and traveling with her family.

PROGRAM AND ABSTRACTS

SESSION 3

1:50 - 3:20

Technology Solutions and Responses to Change

Host: Carrie Sessions

Armin Munévar

Towards Resiliency—Envisioning and Adapting to Future Risks

Abstract: This presentation will present a resiliency planning framework and provide case studies that are leading examples of addressing future risks in an integrated water resource management context. Through case studies, the presentation will explore approaches of addressing future uncertainties, characterizing and measuring risks, and the development of adaptation strategies designed to address long-term sustainability.

Dr. Thomas Quinn

Changing themes in salmon conservation: A brief, 40+ year, personal perspective

Abstract: The research perspectives and issues in salmon conservation have been changing constantly for over a century. The presentation will provide a personal view of these changes, as seen through the eyes of someone moving to the west coast in 1976 to study salmon and trout, and who continues to work on their behalf. Some things that we saw as pressing concerns in the 1970s and 1980s are no longer so, whereas other things low or off the radar screen back then have become increasingly prominent. Along with these changes in issues, there have been important changes in the governmental processes, funding sources for research, and scientific understanding of salmon conservation. This presentation will end with a forward-looking perspective, emphasizing not only the path we have taken but the one ahead of us.

Tracy Tackett

Growing Green Stormwater Infrastructure: Achieving More than Stormwater Goals

PROGRAM AND ABSTRACTS

SESSION 3

continued

Technology Solutions and Responses to Change

Randy Reber

Precision Agriculture and Irrigation Efficiency

Abstract: The digital mapping of each field and the application of technology to each input. Water being the most critical component of all. The efficient application of irrigation water is becoming increasingly important in the West with each constituent desiring more. Agriculture has an inherent water right we cannot take for granted as other water demands increase.

Precision agriculture is the foundation of this as farmers are literally on the first step of practical application of current technology specific to water usage. There are tremendous efficiency gains to be had with the current technology tools and the progress is exponential in this area. The purchase of these tools and integration is fundamentally an economic decision for each farmer.

Agriculture is a very capital-intensive business with investment based on profitability per acre. Water as an input cost is just one aspect of crop production in which land, fertilizer, energy and equipment compete for the same capital. The decision is simply based on increased yield or lower input expenses. In summary Farming is Business.

3:20 - 3:50

NETWORKING BREAK

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- To set up a new virtual meet-up, select “Suggest a Meet” and fill out the form.

PROGRAM AND ABSTRACTS

SESSION 4

POLICY SOLUTIONS AND RESPONSES TO CHANGE

3:50 - 4:50

Moderator: Adam Gravley

Panelists

Maia Bellon

Brady Kent

Arden Thomas

Senator Judy Warnick

4:50 - 5:00

CLOSING REMARKS

STUDENT FELLOWSHIP PROGRAM

Nominations and Applications Sought

Each year the Washington Section of AWRA offers at least two graduate student fellowships. These awards are presented to a student enrolled in any Washington State advanced degree program studying a topic related to water resources science, policy, or management. One award, the Rod Sakrison memorial, goes to a member of a Washington Section sponsored student chapter of AWRA. The other award goes to any student in a water resources program.

In 2020, the Board awarded three student fellowships in the amount of \$2,500. The 2020 awards went to (1) Alyssa DeMott, a Central Washington University student studying the long-term geomorphic effects of the Glines Canyon Dam removal on the Elwha River; (2) Hisham A. Eldardiry, a University of Washington student studying adaptive reservoir operations in the Nile River basin; and (3) Ravi Appana, a Washington State University student studying the representation of groundwater dynamics in regional hydrological models. In addition to the cash award of \$2,500, Alyssa, Hisham, and Ravi each received full membership in the National AWRA and in the State Section.

The application period for the 2021 student fellowships is now open. **February 12, 2021** is the application deadline for the 2021 award.

STUDENT FELLOWSHIP PROGRAM

(CONTINUED)

How to Apply

Any academic department with students enrolled in water resources programs may submit nominations for the award in a brief letter of nomination by a faculty representative familiar with the student's work. In addition, qualified students should prepare and submit an application packet, limited to five pages (excluding the faculty nomination), which includes the following:

1. The completed Application Form.
2. Statement of goals and objectives for graduate work.
- 3a. Detailed description of the student's research interest; or
- 3b. If pursuing a non-thesis degree, a one-page essay on how the course of study will allow the student to accomplish the goals and objectives identified in item 2.

The letter of nomination may be included in the application packet, or mailed separately by the faculty representative. Application packets and nomination letters are due by **February 12, 2021**, to:

**Stan Miller, Fellowship Committee
AWRA Washington State Section
1329 South Ferris Court
Spokane, WA 99202**

Prior recipients of the fellowship award may reapply if their research is different from or an expansion on the work presented earlier. Applicants may receive no more than two awards during their academic career.

How Fellowships are Awarded

The Fellowship Committee will evaluate all applications received based on the following:

- The interdisciplinary nature of the course of study and research.
- The effectiveness of the response communicating research objectives.
- The potential for applying the work to the current needs in water resource management.
- Overall impression of the applicant's qualifications and presentation.

The Fellowship Committee will recommend recipients to the Washington Section Board of Directors. The winners will be notified as soon as the Board approves the awards and will receive special recognition at a State Section event.

Additional Information

The application and additional information are available on the AWRA-WA website at <http://www.waawra.org>. Further questions can be answered by Stan Miller at (509) 953-7887 or samillerh2o@comcast.net.

SESSION SPEAKER AND MODERATOR BIOGRAPHIES



Keynote Address

Tony Willardson, Tony Willardson was named as Executive Director of the Western States Water Council in July 2009. The Council is a government entity, an instrumentality of each of the eighteen participating States, created by western governors in 1965 to advise them on water laws, policies, and programs. Tony joined the Council in 1979. He holds a BA in political science from Brigham Young University, with minors in economics and business management, and a MS in public administration from the University of Utah. He is a member of the National Honor Society for Public Affairs and Administration (Pi Alpha Alpha). Tony is the author of numerous articles, reports and policy papers covering a wide range of water resource issues, including water-related data

gathering and monitoring, remote sensing of water use, water conservation, drought, water use fees, water project financing and cost sharing, ground water management and recharge, interregional water transfers, intrastate water transfers, and future water needs and sustainable water supply strategies.

Maia Bellon. Maia Bellon was appointed the director of the Washington State Department of Ecology in February of 2013 by Governor Jay Inslee. She oversaw ten environmental programs and the Offices of the Columbia River and Chehalis Basin. After serving as the director of the Washington State Department of Ecology, Maia Bellon returned to the practice of law as a Partner at Cascadia Law Group PLLC.



Adam Gravley. Adam Gravley practices water law and policy

at Van Ness Feldman in Seattle. Adam represents clients in administrative agency, litigation, legislative, and private transactional matters involving water rights and resources, utilities, real estate, energy generation and transmission, irrigated agriculture, industrial and commercial assets, municipal corporations, project development, and resource protection. He is a past president of the American Water Resources Association (Washington Chapter) and current co-chair of the Board of Advisors to Dividing The Waters, a non-profit program of the National Judicial College. He has degrees from Kalamazoo College (BA), Brown University (MA), and Georgetown University (JD).



SESSION SPEAKER AND MODERATOR BIOGRAPHIES



Dr. Gretchen Greene. Dr. Gretchen Greene has over 25 years of diverse economics consulting experience in water management, natural resource, energy, and community economics. Current areas of focus include water demand and management, flood damages, ecosystem services, benefit cost analysis, and decision making with risk and uncertainty. She works with federal, state, tribal, and municipal agencies as well as private industrial clients and law firms. She earned her Ph.D. at University of Florida and teaches economics at Clark College in Vancouver, Washington.

Brady Kent. Brady Kent works for the Yakama Nation as an Agricultural Development Coordinator. This is a unique role where the irrigation modernization and conservation practices being implemented are combined with the Tribe's need for an agricultural expansion and development, the highlight of which is working on the Yakima Basin Integrated Plan (YBIP)



coordinating projects and activities across the watershed. Mr. Kent graduated from the University of Washington with a degree in Earth & Space Sciences focusing on geomorphology and hydrology. He is an avid outdoors man and has begun making his first cedar canoe.



Mitch Kunstel. Mitch Kunstel is a Power Marketer for Seattle City Light.

Greg McLaughlin. Greg is a project manager with Washington Water Trust. His instream flow and water resource management projects have culminated in 65 cfs and 9,000 acre-feet of annual flow to fish-critical tributaries throughout Washington State. His work includes water right reviews, connecting project benefits to salmon recovery plan, and shepherding those projects through the Ecology review process.



SESSION SPEAKER AND MODERATOR BIOGRAPHIES



Armin Munévar, P.E. Armin Munévar is a Jacobs' global technologist for Integrated Water Resource Management and a firm leader in climate resiliency and water resources planning. Mr. Munévar is responsible for developing and implementing resilience planning frameworks, evaluating impacts on water resource systems, and implementing strategies that help clients achieve sustainable water management. Armin has over 20 years of experience leading complex, integrated water management programs on major watersheds in the

United States and internationally, including the Colorado River Basin, California's Central Valley and Bay-Delta, Russian River, Great Salt Lake, Saskatchewan River Basin, Texas Gulf watersheds, and various watersheds in Chile and Guatemala. Mr. Munévar's recent experience has emphasized bridging of science, policy, and technical aspects to incorporate climate change into implementable projects for sustainable water management. Mr. Munévar holds a B.S. and M.S. in Civil Engineering from UCLA and UC Davis, respectively.

Rachael Paschal Osborn. Rachael Paschal Osborn is a public interest water lawyer and has provided representation to Indian tribes, environmental organizations, labor unions, and small communities since 1992. Rachael served as co-founder and executive director of the Center for Environmental Law & Policy (1993-1999, 2007-2011), and co-founder and board member of Washington Water Trust (1997-2001), two organizations dedicated to the protection and restoration of free-flowing waters in Washington state.



Doug Quinn. Mr. Quinn is a registered Professional Engineer and Land Surveyor with experience in municipal services, urban planning, and economic development. Since 2003, he has served as the Director of Water Services for Clark Public Utilities overseeing a 40,000 customer system. At a state level, Mr. Quinn chaired the Washington Water Utility Council; served as Gubernatorial appointee on the K-12 Construction Task Force and Public Works Assistance Account Board. Regionally, he is a chair of the Clark County Water Utility Coordinating Council. Locally, he is a Camas School Board Director, past board Chair of the Battle Ground and Camas/Washougal Chambers of Commerce, and a board member of the Camas Downtown Association. He enjoys various outdoor activities, including boating, backpacking, photography, and scuba diving.

SESSION SPEAKER AND MODERATOR BIOGRAPHIES

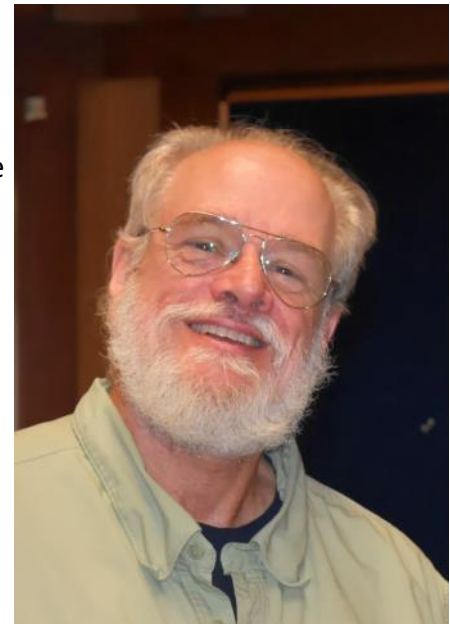
Dr. Thomas Quinn. Thomas Quinn is a professor in the School of Aquatic and Fishery Sciences at the University of Washington, where he has taught since 1986. His research career has been devoted to studying the behavior, ecology, evolution, and conservation of salmon and trout. He has conducted most of his work in western Washington and also southwestern Alaska, but he had projects in other areas as well. He and his students have investigated all the local species of salmon, trout, and char, including projects in streams and rivers, lakes, estuaries, and the ocean.



Randy Reber, Round Lake Farms, Stratford, Washington.

Tom Ring. Since 1990, Tom Ring has worked in the Yakima Basin on groundwater and surface water quantity and quality, water rights, irrigation and fisheries issues, and planning for

future water needs. Tom has been a fixture in important water resource management efforts like the Yakima Basin Integrated Plan.



Mindy Roberts. Mindy Roberts leads Washington Environmental Council's People for Puget Sound program, where she dedicates time to improving and maintaining the health of our unique ecosystem. Her previous work focused on identifying sources of contamination to Washington's waters – streams, rivers, lakes, and Puget Sound – and designing management plans for the Department of Ecology.

SESSION SPEAKER AND MODERATOR BIOGRAPHIES



Carrie Sessions. Carrie is the Policy, Legislative, and Economic Analyst for the Department of Ecology’s Water Resources Program. In that role, she leads discussions about statewide policy issues, analyzes proposed rules and legislation, and works with the legislature on changes to water law. Prior to joining Ecology, Carrie did policy and economic analysis on the state, federal, and international levels, including work for consulting firms and for the United Nations Environment Program. She also spent several years teaching applied leadership. Carrie is a graduate of Colorado College and holds an MPA

and MS from the University of Washington in environmental policy and economics, with an emphasis in water resource management. She graduated from all three programs with top academic honors.

Tracy Tackett. Tracy Tackett is the Green Stormwater Expansion Infrastructure Initiative (“GSI”) Manager for Seattle Public Utilities. Tracy has over twenty years of drainage and wastewater project experience. She has designed numerous innovative GSI projects, including the country’s first full street retrofit to manage stormwater with bioretention.



Arden Thomas. Arden Thomas is the water resource manager at Kittitas County, where she works to integrate Kittitas County's groundwater use mitigation program with flood control zone district activities for coordinated and holistic water resource management.

SESSION SPEAKER AND MODERATOR BIOGRAPHIES



Senator Judy Warnick. Senator Warnick grew up on a small family dairy farm in Deer Park, Washington. She and her husband, Roy, own and operate a small business in Moses Lake. Judy and Roy have three grown daughters and eight grandchildren who all live in Eastern Washington. She currently serves as the Ranking Member on the Senate Agriculture, Water, Natural Resources and Parks Committee, and is the Senate Republican Assistant Caucus Chair.

Richael Young. Richael Young specializes in agricultural water valuation, water risk, and the design of allocations and markets. As an economist, engineer, and entrepreneur, she brings together complementary skillsets for water resources management and policy. As cofounder and CEO of Mammoth Water, a public benefit corporation, Richael led the development and implementation of the first smart markets, or electronic clearinghouses, for surface water and groundwater in the world. The rollout of Mammoth Water’s smart markets has reduced search and transaction costs to trade water for thousands of America's food producers, making water trading more affordable, accessible, and equitable.



AWRA WA PAST PRESIDENTS

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2018	Jason McCormick	1998	Adam Gravley
2017	Steve Nelson	1997	Rod Sakrison
2016	Allison MacEwan	1996	Rod Sakrison
2015	Tyler Jantzen	1995	Jackie Hightower
2014	Megan Kogut	1994	Paul Korsmo
2013	Dustin Atchison	1993	Peter Willing
2012	Scott Kindred	1992	Stan Miller
2011	Beth Peterson	1991	Rachel Friedman-Thomas
2010	Felix Kristanovich	1990	Joan Lee
2009	Jamie Morin	1989	Bill Eckel
2008	Jacque Klug	1988	David Brown
2007	Cleve Steward	1987	Alan Ward
2006	Mona Thomson	1986	Dale Anderson
2005	Tom Martin	1984	George Wannamaker
2004	Joe Mentor Jr.	1982	Nancy Nelson
2003	Anne Savery	1981	Chuck Mosher
2002	Stephen Hirschey	1980	Kris Kaufman
2001	Fran Solomon	1979	Gary Minton
2000	Pete Sturtevant		

AWRA-WA PAST CONFERENCES

- 2019 Water Resources Planning and Implementation: Challenges, Complexity, and Uncertainty
- 2018 Hirst, Foster, Boldt, and Beyond: A New Era of Water Management
- 2017 100 Year Anniversary of the Washington water code: Where We Came From & Where We're Going
- 2016 Rural Domestic and Municipal Water Supply
- 2015 Water Management Strategies in the Face of Climate Change
- 2014 Water Resources Infrastructure: Emerging Frameworks to Meet Multiple Objectives
- 2013 Future Directions in Water Resource Management
- 2012 The Columbia River, Basin, and Treaty
- 2011 A Perspective on Water Quality Issues Across Washington State
- 2010 Water Rights: Investing in 21st Century Water Management
- 2009 AWRA National Conference, hosted by WA-AWRA
- 2008 The Future of Water Storage in Washington State
- 2007 Transboundary Water Resources of Washington State and British Columbia
- 2006 Water Resource Disasters in Washington: Risk and Recovery
- 2005 AWRA National Conference, hosted by WA-AWRA
- 2004 The Impact of Climate Change on Pacific Northwest Water Resources
- 2003 Water's Woven Web: Land Use Planning and Water Resource Management in Washington
- 2002 Beyond Watershed Planning
- 2001 The Impact of Drought on Water Resources and Energy Management in the Northwest
- 2000 Water Marketing in Washington: Negotiating for a Future
- 1999 Impressions of 1999 State Water Legislation: ESA Update and Pending 4(d) Rules
- 1998 ESA, Economy, Salmon and Agriculture...Where is the Water?
- 1997 Balancing Instream Needs with Out-of-Stream Demands
- 1996 The Water 'Crisis'- Myth, Reality, and Opportunities



AWRA-WA PAST CONFERENCES

- 1995 Water Quality/Water Quantity: An Artificial Distinction
- 1994 Fluvial Geomorphology: What We've learned in 20 Years, and where do we go from here? Interactions: River Dynamics, Land Forms and Land Use.
- 1993 Good Science, Good Decisions: The Role of Technical Analysis in Water Policy
- 1992 Reconciling Water and Growth
- 1991 State Water Policy and Growth Management
- 1990 Construction and Streams, Lakes and Wetlands: Closing the Gap between Planning and Doing
- 1989 New Developments in Floodplain Management
- 1988 Hydrology and Erosion Aspects of Timberland-Urban Conversions
- 1987 Attaining Compliance: Realities of Water Quality Regulation
- 1986 Off-site Impacts of Eroding Soils
- 1984 Groundwater Protection in Washington State, Preventing Aquifer Contamination and Depletion
- 1983 Small Streams and Lakes in the Urbanizing Environment—Will They Survive?
Washington and Idaho Lakes and Their Future
- 1981 Water Resources Implications for Small Hydro Power Generation



Photo by: Tom Ring

NOTES

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