



2021 AWRA-WA
Annual State Conference

**Transboundary Water Management
and Water Market Trends**

October 6 & 7, 2021

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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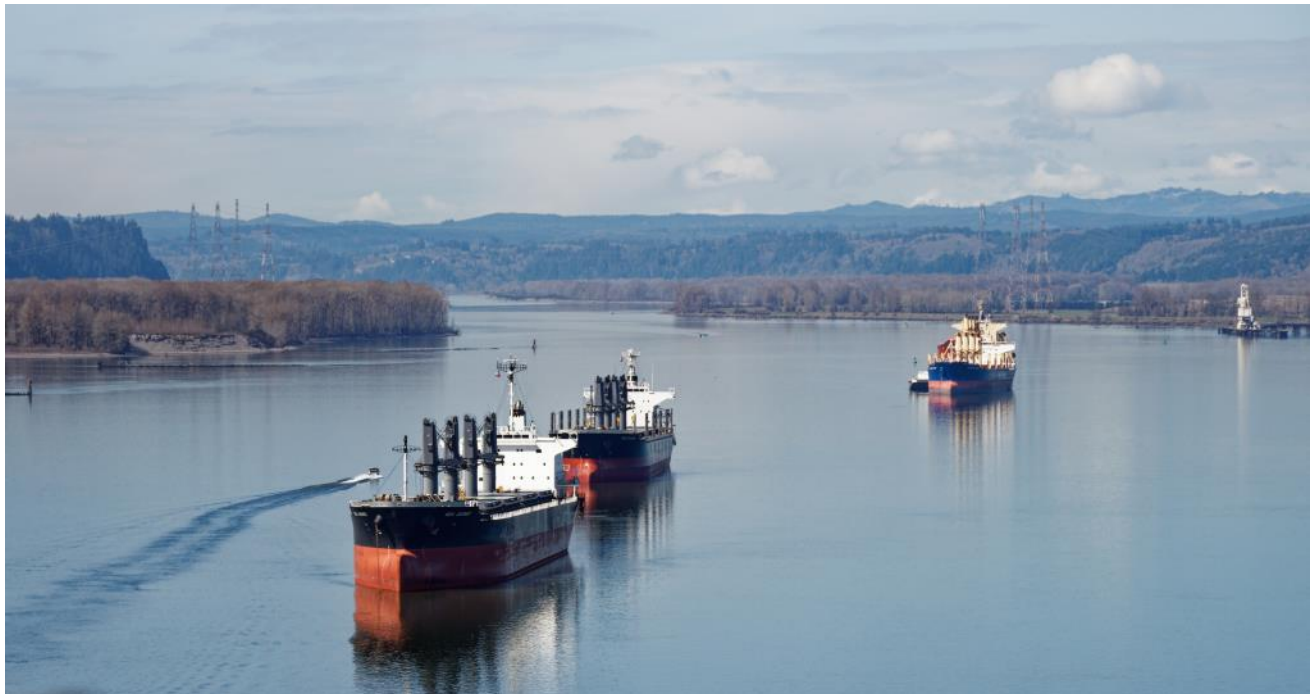
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Columbia River near Longview, the ultimate transboundary river: international, interstate, and intertribal.

Photo by Tom Ring

CONFERENCE WELCOME

Hello Colleagues,

The Washington Section of the American Water Resources Association (AWRA-WA) welcomes you to the 2021 two-day virtual State Conference held on October 6 and 7, 2021. The conference committee is thrilled to offer a virtual platform to bring the water resource community together as our nation continues to maneuver the COVID-19 pandemic remotely. Day 1 highlights three water basins and the diversity between them. Followed by Day 2 showcasing unique water trends, giving an opportunity to understand and value the differences of each. A unique feature this year is two presentations by former Washington Section Fellowship winners and a fun interactive networking session each day with your peers.

This year's theme is "**Transboundary Water Resources Management and Water Marketing Trends.**" The keynote address will be presented by Robert W. Sandford (Bob) who holds the Chair in Water and Climate Security at the United Nations University Institute for Water, Environment and Health. In this capacity Bob was the co-author of the UN Water in the World We Want report on post-2015 global sustainable development goals relating to water. He is also lead author of Canada in the Global World, a new United Nations expert report examining the capacity of Canada's water sector to meet and help others meet the United Nations 2030 Transforming Our World water-related Sustainable Development Goals. Bob is the author, co-author or editor of over 30 books on topics including the history and water resources of the Canadian Mountain West.

Sessions for day one of this two-day event highlight interagency management in the Spokane, Palouse, and Walla Walla River Basins. The Spokane and Walla Walla Basin sessions address ways of maintaining river flows under water stress situations. The Palouse Basin session focuses on the declining water levels in the aquifer serving the University communities of Moscow, Idaho and Pullman, Washington.

Day two sessions include international considerations for the management of the Columbia River including elements of the current negotiations of the Columbia River Treaty and United States Tribal and Canadian First Nations efforts to reintroduce salmon above Grand Coulee Dam and the proposed temperature Total Maximum Daily Loads (TMDL) for the Columbia. Day 2 also cover recent developments on salmon recovery on the Snake River and Trends in Water Marketing within the State.

The AWRA-WA is a federally recognized 501(c)(3) non-profit organization for people involved in water resources in Washington State. We thank our sponsors who help us reach our goals

CONFERENCE WELCOME

to provide forums for advancing water resources management in Washington and the Pacific Northwest region. A highlight of AWRA-WA, through sponsorship, allows us to fund two or more student scholarships, to support early career professionals.

We expanded our marketing of this year's conference to invite a diverse and inclusive audience for the opportunity to make new 'transboundary' connections. We ask that you become involved with AWRA-WA to actively participate in the vital conversations surrounding water resources management through long term membership, joining our volunteer run committees, engagement opportunities, and continuing/becoming an annual Sponsor.

Be well and stay hydrated,

Katherine Ryf and Stan Miller, Conference Co-Chairs



2021 CONFERENCE COMMITTEE

Conference Co-Chairs

Stanley Miller
Katherine Ryf, Landau Associates

Members

Rabia Ahmed, Greene Economics
James Bush, Aspect Consulting
Tyson Carlson, Aspect Consulting
John Chandler, Puget Sound Energy
Amanda Cronin, AMP Insights
Tom FitzHugh, Stantec
Gretchen Greene, Greene Economics
Felix Kristanovich, Windward Environmental LLC
Jenna Mandell-Rice, Van Ness Feldman
Jason McCormick, McCormick Water Strategies
Tom Ring



“Bathtub ring” shown as Lake Mead drops to the lowest level recorded due to the Colorado River’s low flows.

Photo by Tom Ring



2021 BOARD MEMBERS

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Student Representative:	Samuel Fixler, Central Washington University

AGENDA DAY 1

10:30 - 11:00	Student Poster Presentation
11:00 - 11:15	Welcome by Conference Chairs
	<i>Katherine Ryf and Stan Miller</i>
11:15 - 12:15	Keynote Address Valuing Water: Global Reset & the Future of Hope
Abstract on page 11	<i>Speaker: Robert Sandford</i>
12:15 - 1:15	Interagency Management in the Spokane Basin
Abstracts on page 12	<u>Speakers</u> Bijay Adams Guy Gregory Kara Odegard Terry Pickel
1:15 - 1:30	Networking Break
1:30 - 2:30	Interagency Management in the Palouse Basin
Abstracts on pages 13 - 14	<u>Speakers</u> Robin Nimmer Korey Woodley
2:30 - 3:00	AWRA Scholarship Project Adaptive Reservoir Operation in the Transboundary Nile River Basin: Towards Win-Win Solutions
Abstract on pages 14 - 15	Speaker: Hisham Eldardiry
3:00 - 4:00	Interagency Management in the Walla Walla Basin
Abstract on page 15	<u>Speakers</u> Melissa Downes Chris Kowitz Chris Marks Scott Tarbutton
4:00 - 5:00	Interstate Water Management: Lessons Learned in Managing Water Across State Lines
	<i>Moderator: Tom Ring</i> <u>Panelists</u> Guy Gregory Chris Marks Korey Woodley

AGENDA DAY 2

10:30 - 11:00	Current Events: Water Year 2021: A Different Flavor of Drought
Abstract on page 17	Jeff Marti
11:00 - 11:30	State of AWRA-WA Section and Outstanding Service Award
Pages 17 - 18	Tom FitzHugh presenting State or the AWRA-WA Section Stan Miller presenting 2021 Outstanding Service Award
11:30 - 1:15	Columbia River Management
Abstracts on page 19	<u>Speakers</u> Aja DeCoteau Andy Dunau Kelly Ferron
1:15 - 1:30	Networking Break
1:30 - 2:30	Water Market Trends
Abstracts on pages 19 - 20	<u>Speakers</u> Kristina Ribellia Harry Seely Eric Weber
2:30 - 3:00	Interjurisdictional Management of the Snake River
Abstract on page 20	Speaker: Rick Agnew
3:00 - 3:30	AWRA Scholarship Project: Elwha River
Abstract on pages 20 - 21	Speaker: Alyssa Demott
3:30 - 3:50	Water Bank Development and Transformation in a Tri-County Watershed
Abstract on page 21	Speaker: Michael Hermanson
3:30 - 4:50	Panel: Interstate Water Management: Lessons Learned in Managing Water Across State Lines
	<i>Moderator: Jenna Mandell-Rice</i> <u>Panelists</u> Rick Agnew Michael Garrity Phil Rigdon Robert Sandford

PROGRAM AND ABSTRACTS

DAY 1

10:30 - 11:00 Student Poster Presentation

11:00 - 11:15 Welcome by Conference Chairs

Conference Co-Chairs: Katherine Ryf and Stan Miller

11:15 - 12:15 Keynote Address

Speaker: Robert Sandford, United Nations University Institute for Water, Environment and Health

Valuing Water: Global Reset & the Future of Hope



Abstract: COVID and the climate are sending us a signal. The risk at that moment is that our society will lapse into some different but still functionally unaltered version of what we had before the pandemic which would be a disaster leading only to the next disasters. The world won't be and shouldn't be the same again. Our interests should reside in not re-creating the world we had, but the world we want.

While it will be critical to rebuild our societal structure once this pandemic passes, many are of the view that we should be using this hiatus to thoughtfully consider how we can restructure in ways that perpetuate our gains in reversing Earth

system damage globally while at the same time making other critically needed changes to our economies and lifestyle expectations that will make us not just less vulnerable to pandemics in the future but bolster meaningful persistent action in achieving the goals of the UN's 2030 Transforming Our World global sustainable development agenda in time to ensure we never come this close to crossing the threshold of societal collapse again.

It is entirely possible to restore the world and bring about climate stability. We know what to do in terms of transboundary water policy and we know how to do it, but we are rapidly running out of time before by way of our needs and numbers we push planetary boundaries beyond points of no return threatening much of life on Earth. We live in a transformational moment in which a new and better world is within our grasp. We must seize that moment.

PROGRAM AND ABSTRACTS

DAY 1

12:15 - 1:15

Interagency Management in the Spokane Basin

Guy Gregory, Gregory Geologic

The Spokane River: the Case for Conversation

Abstract: The Spokane Valley-Rathdrum Prairie Aquifer supports a vibrant economy and community in two states. Water withdrawal for use affects surface water resources, most visibly in Spokane River flows. Successful emphasis on conservation and wise use region-wide can preserve Spokane River flows, while accommodating increased growth and demand. The discussion will integrate Instream flow requirements and recent water use information together with modeled and empirical evaluations of pumping effects.

Terry Pickel, Idaho-Washington Aquifer Collective

The Idaho/Washington Aquifer Collaborative (IWAC)

Abstract: A brief history of the formation and purpose of the Collaborative in relation to source water protection and conservation. Past projects will be highlighted that further the goals and purpose of the team members and will describe how this all pertains to and reflects potential responsibilities of regional public water systems and system operators. Will discuss future plans and potential projects related to conservation of regional resources.

Kara Odegard, City of Spokane

Why We Conserve: Insights into Spokane's Water Conservation Efforts

Abstract: This summer, the Spokane Tribe reintroduced Chinook salmon to the Little Spokane River after a 111-year absence. Even during a summer of record-breaking heat waves, groundwater from our aquifer keeps streams cool enough to support anadromous fish recovery programs. Kara's presentation will provide a brief overview of why the City's water conservation efforts are so vital to the long-term sustainability of our region. Her presentation will also include highlights from the City's water conservation planning.

BiJay Adams, Liberty Lake Water and Sewer District

Landscape Irrigation Efficiency

Abstract: Over half the water used annually is applied to landscapes. Currently the landscape irrigation industry lacks national or international standards for construction and installation of irrigation systems. This presentation will cover the importance of irrigation design and practices to improve irrigation efficiency and landscape health. Proper installation and maintenance of irrigation systems is critical to reduce runoff and keep pesticides, fertilizers, herbicides and automotive fluids out of storm drains, drywells, the aquifer and river. Water purveyors from Idaho and Washington have teamed up to develop efficient irrigation and landscape design standards.

PROGRAM AND ABSTRACTS

DAY 1

1:15 - 1:30

Networking Break

Time to unwind with friends and colleagues! Join us for a fun water-related trivia quiz and show your competitive side. And, yes, there will be prizes, too.
(Networking Break sponsored by Greene Economics)

1:30 - 2:30

Interagency Management in the Palouse Basin

Korey Woodley, Palouse Basin Aquifer Committee, University of Idaho

Palouse Basin Aquifer Committee History, Aquifer Levels, and Path to Water Supply alternatives

Abstract: The Palouse Basin Aquifer Committee (PBAC) is a voluntary, cooperative, multijurisdictional group with representatives from the cities, counties, and universities within the basin. PBAC is charged with ensuring a long-term, quality water supply for the Palouse basin region. This task is to be accomplished by implementing the Ground Water Management Plan (GWMP), enacted in 1992.

Groundwater is pumped in the basin by five major water suppliers (Pullman, Moscow, Colfax, Washington State University, and the University of Idaho), several smaller cities and towns, and many businesses and rural residents residing in the unincorporated areas of Whitman County, Washington, and Latah County, Idaho. Groundwater levels in the lower aquifer system have been declining since measurement began in the late 19th century. Growth in the area following World War II led to increased pumping from the aquifer system. By the late 1950s, the cities, state institutions, and regulatory agencies recognized a severe decline in water levels.

Concerns regarding long-term water supplies in the area led to the 1967 formation of an informal committee, now known as PBAC, to study the problem and make recommendations to the administrative and elected representatives of the major pumping entities.

The history of groundwater declines in the Palouse Basin tells a story of urgency; therefore, it is essential to review and share the history/lessons learned along the way to plan our future water resources.

PROGRAM AND ABSTRACTS

DAY 1

1:30 - 2:30

Interagency Management in the Palouse Basin, cont.

Robin Nimmer, Alta Science and Engineering

Palouse Basin Water Supply Alternatives Investigation within Transboundary Water Management

Abstract: The Palouse Groundwater Basin underlies areas of northern Idaho and eastern Washington. The cities of Moscow, ID and Pullman, WA as well as their respective universities, University of Idaho and Washington State University, derive their water from the lower aquifer (i.e., the Grande Ronde aquifer). Groundwater levels in this aquifer have been declining since the first wells were drilled in the 1890s. The Palouse Basin Aquifer Committee (PBAC) was formed in the 1960s and is comprised of representatives from the four entities in addition to Latah and Whitman counties to ensure a long-term quality water supply.

Continued water level decline has led to an exploration and assessment of water supply alternatives to supplement groundwater in order to stabilize groundwater levels and allow for community growth. PBAC chose four water supply alternatives and with Alta Science and Engineering, Inc. and their team, they are conducting public outreach, filling data gaps, developing interim steps for the alternatives, investigating funding sources, and narrowing to the top one or two alternatives to move forward. Some of these alternatives are focused in either Idaho or Washington, but others include water from one state being moved to another state. It is one aquifer, a shared resource, where two states, two communities, two counties, and two universities must work together to plan and implement a supplemental water supply.

2:30 - 3:00

AWRA Scholarship Project

Hisham Eldardiry

Adaptive Reservoir Operation in the Transboundary Nile River Basin: Towards Win-Win Solutions

Abstract: The Nile River Basin (NRB) is home to more than 200 million people sharing the water resources for agriculture, industry, municipal uses, in-stream navigation, and hydropower generation. A central and existential water management issue for the region is maintaining a sustainable supply of water against increasing population, recurring drought, and climate change.

Nowhere is this issue of national survival more critical than for Egypt, a populous country of about 100 million that is singularly dependent on a single river. Recent published datasets on future dams reveal an increasingly impounded NRB for hydropower development by

Continued on next page.

PROGRAM AND ABSTRACTS

DAY 1

2:30 - 3:00

AWRA Scholarship Project, cont.

upstream and transboundary nations, notably Ethiopia. The most downstream country, Egypt, therefore needs to adapt the operation of High Aswan Dam (HAD), which is key to the country's water security, to planned transboundary dams, such as the Grand Ethiopian Renaissance Dam (GERD).

My talk will present a satellite-based blueprint for adapting HAD operation under the impacts of filling/operation of the GERD. This blueprint provides a tangible way forward for existing dams to adapt their operation to real-world transboundary challenges while inspiring a win-win deal and considering the equitable rights of development in the Nile countries.

3:00 - 4:00

Interagency Management in the Walla Walla

Chris Kowitz, North Central Region Manager, Oregon Water Resources

Chris Marks, Confederated Tribes of Umatilla Indian Reservation

Melissa Downes, Department of Ecology, Office of Columbia River

Scott Tarbutton, Department of Ecology, Office of Columbia River

Walla Walla River Watershed Transboundary Water Management Challenges & Opportunities

Abstract: The Walla Walla Basin is a hydrologically, jurisdictionally, and biologically complex watershed, extending across Washington and Oregon state lines. In addition to being a bi-state basin, the Walla Walla also lies within the aboriginal territory of the Confederated Tribes of the Umatilla Indian Reservation. The Walla Walla was once an ecologically healthy and thriving region that supported tribal life. Over the last 150 years, the basin has been transformed to support agriculture and urban centers. This transition has had measurable environmental impacts and also threatens the Basin's ability to overcome growing issues related to climate change and population growth.

Despite many organizations working to improve environmental conditions while also meeting the needs of the built economy and people, the basin has struggled to achieve significant progress. Instead of turning to adversarial approaches, the basin requested additional support from Oregon and Washington and initiated the development of a thirty-year integrated plan and a USGS basin study to help overcome the legal and financial hurdles that have inhibited the progress needed to meet current and future demands on the basin's natural resources.

PROGRAM AND ABSTRACTS

DAY 1

4:00 – 5:00

Interstate Water Management: Lessons Learned in Managing Water Across State Lines

Moderator: Tom Ring

Panelists

Korey Woodley,

*Palouse Basin Aquifer Committee,
University of Idaho*

Chris Marks,

Confederated Tribes of the Umatilla Indian Reservation

Guy Gregory,

Gregory Geologic



The Columbia River Treaty authorized the United States government to build Libby Dam, and Canada agreed that the reservoir, Lake Koocanusa (an acronym: Kootenai, Canada, USA), could back 42 miles into British Columbia (<https://www.nwcouncil.org/reports/columbia-river-history/columbiarivertreaty>). The Kootenai River flows from Canada into Montana. After flowing through Libby Dam, the Kootenai flows across northern Montana and Idaho before turning north near Bonners Ferry, ID and back into Canada and eventually returning to the US as a tributary of the Columbia River.

Photo by Tom Ring

PROGRAM AND ABSTRACTS

DAY 2

10:30 - 11:00

Current Events

Jeff Marti, Department of Ecology

Water Year 2021: a Different Flavor of Drought

Abstract: The Water year 2021 featured one of the best snowpacks in recent memory. Some ski resorts opened before Thanksgiving and statewide average Snow Water Equivalent averaged 132 percent of normal on April 1st. Forecasted runoff was normal to above normal for watersheds originating at higher elevation, snowpack-dominated areas. But in early spring, a significant and long-lasting precipitation deficit developed, resulting in a divergence of water supply availability for snowpack vs rain-dominated parts of the state. Dryland producers were especially vulnerable, while irrigated producers were in a much better position to cope. All users experienced impacts from a historic late June heat wave. A state Drought Advisory was issued in late May. In mid-July, the state issued a full emergency Drought Declaration. For a state drought framework centered around emergency withdrawals, dryland impacts were an awkward fit. Looking ahead, forecasted La Niña conditions provide some cause for optimism, but full recovery by next spring of soil moisture over much of Eastern Washington seems unlikely.

11:00 - 11:30

AWRA News and Awards

State of the AWRA Washington Section

Presented by AWRA-WA Board President: Tom FitzHugh, Stantec

Outstanding Service Award

Presented by: Stan 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

DAY 2

2021 OUTSTANDING SERVICE AWARD

Stan Isley 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 Stan Isley at this year's state conference.

Stan's career in Water Resources at the Department of Ecology spanned more than three decades. He served as watermaster in the Teanaway basin (Yakima tributary) where curtailing less senior water right holders was a regular part of the job. In the 2015 drought he had the difficult task of cutting off all but one of the irrigation water rights in the Teanaway.

Stan was detailed to act as Ecology liaison to the Bureau of Reclamation for the Yakima River Basin Water Enhancement Project on what I am told was a 90 day assignment. He retired from that position 25 years later. He provided invaluable service to the Water Transfer Working Group which includes participants from all the major water user groups in the Yakima Basin. In order to maintain the integrity of the water transfer process in the basin, someone had to crunch all the numbers. Stan scrutinized every water transfer in the basin for 20 years, routinely finding and correcting math errors in quantities, seasons, and places of use. All of us looked to him for verification. He had the trust of all participants across the spectrum of water users.

His diligence and integrity have certainly earned him recognition for career accomplishments.

PROGRAM AND ABSTRACTS

DAY 2

11:30 - 1:15

Columbia River Management

Kelly Ferron, Department of Ecology

TMDL for Temperature in the Columbia and Lower Snake Rivers

Abstract: Presentation will focus on Department of Ecology's plan and efforts for implementing EPA's Temperature TMDL in the Columbia and Lower Snake Rivers. The presentation will provide some context on the progress in the last year, a high level overview of the reissued TMDL, and Washington's plan to work with stakeholders and tribes to address temperature sources in the Columbia and Snake rivers.

Andy Dunau, Lake Roosevelt Forum

Lake Roosevelt and Columbia River Management

Abstract: From a Lake Roosevelt and Upper Columbia River Perspective, this presentation will weave together current highlights of Salmon Reintroduction, the Columbia River Treaty, the Columbia River Biologic Opinion, water resources and lake management. This will include the multiple tribes, agencies and stakeholders engaged, the cross currents of interests, and the role of communications in understanding the parts and the whole of future possibilities.

Aja DeCoteau, Columbia River Intertribal Fish Commission

Intertribal Water Management and Multi-Agency Coordination on the Columbia River

Abstract: The Columbia River Inter-Tribal Fish Commission (CRITFC) represents four lower Columbia tribes with reserved treaty fishing rights and co-management authority of fish and wildlife in the Columbia River Basin. CRITFC's goals are to put fish back in the river and protect the watersheds where they live, protect treaty fishing rights and sovereignty, share our salmon culture and to provide services to our tribal fishing communities.

1:15 - 1:30

Networking Break

In case you missed the first water-related trivia on Day 1, or had too much fun and want to participate again, join us for another round and a chance to win prizes (Networking Break sponsored by Greene Economics).

1:30 - 2:30

Water Market Trends

Kristina Ribellia, Western Water Market

The Washington Water Market: Emerging Trends, Drivers and Pricing

Abstract: From Wall Street to down the street, Western Water Market is bringing new light and opportunities to Washington's water market. As the market operator, Kristina Ribellia will share key observations of the Washington water market, including emerging trends, pricing insights, and recommendations for creating a more open and efficient market in the state.

Session abstracts continued on next page.

PROGRAM AND ABSTRACTS

DAY 2

1:30 - 2:30

Water Market Trends, continued

Harry Seeley, WestWater Research

Water Market Trends and Transboundary Issues and Opportunities

Abstract: The presentation will address how markets for water rights are being applied across different regions and purposes to address water supply constraints and regulatory actions. Mr. Seely will provide an overview of water market activity and focus on some of the important trends in water market design, regulation and development.

Eric Weber, Landau Associates

Water Markets in the Columbia Basin Project Area Boundaries and Current Trends

Abstract: For water markets to work, the attributes of a water right or federal water contract have to be changed. There are rule books (e.g., the state water code) to guide the process. However, in reality performing a successful change is often a complex process dictated by local conditions, policy, precedent and regulatory staffing. Mr. Weber will present a few brief case studies to demonstrate the state of the practice and discuss ways to make the process more efficient.

2:30 - 3:00

Interjurisdictional Management of the Snake River

Rick Agnew, Van Ness Feldman, LLP

Columbia/Snake River Basin: Recent Federal Legislation and Proposed Changes in the Columbia River Treaty

Abstract: This presentation will cover pending federal legislative and policy considerations concerning river management in the Lower Snake River Basin, with a specific focus on proposals in Congress to breach or otherwise remove from active operation four hydroelectric dams in the Lower Snake River. Also covered in the presentation will be the active negotiations between the U.S. and Canada to modify the Columbia River Treaty.

3:00 - 3:30

AWRA Scholarship Project - Elwha River

Alyssa Demott, University of Washington

Long-term geomorphic effects of the Glines Canyon Dam removal on the Elwha River

Abstract: The Elwha River once provided vital habitat for a variety of salmonid species, but after two dams were emplaced on the river in the early 1900s, habitat diminished, and salmon populations declined. From 2011-2014, the dams were finally removed to restore the Elwha ecosystem.

To understand the long-term geomorphic impacts of the Glines Canyon Dam removal on the Elwha River, I quantified changes in four parameters: in-channel large wood, main channel sinuosity, channel braiding, and sedimentation.

Continued on next page.

PROGRAM AND ABSTRACTS

DAY 2

3:00 - 3:30

AWRA Scholarship Project - Elwha River continued

High-resolution imagery from 2012-2020 was used to map large wood and digitize main and secondary river channels, and field surveys were completed at study sites to assess sediment-size distribution six years after the completion of the dam removal. Analysis of large wood revealed that the number of individual logs peaked during the dam removal but decreased after the removal and remained low. Logjam area increased steadily throughout the eight-year study period while the number of logjams stayed constant, suggesting that individual logs were recruited into existing logjams over time.

Main channel sinuosity increased during and after the removal, peaking in 2017. After 2017, sinuosity decreased for the remainder of the study period, but has yet to return to sinuosity conditions from before the removal.

Channel braiding peaked during the dam removal process, dropped, and remained relatively consistent for the remainder of the study period, reaching a possible equilibrium state that is more braided than before the dam removal.

A comparison of sediment-size distribution data from before, during, and after the dam removal revealed that six years after the completion of the removal, sediment bars are no longer dominated by the armored, coarse sediment observed when the dam was in place, nor are they dominated by the pulse of fine sediment released during the dam removal. In 2020, a more mixed sediment-size distribution was observed.

Quantitative geomorphic data from this study allows us to understand the changes that occur on a gravel-bed river following a large dam removal. The results demonstrate the complexity and interconnectedness of various geomorphic parameters and suggest that while some geomorphic parameters may establish a new equilibrium in the years following a dam removal, others will continue to evolve over longer timescales.

3:30 - 3:50

Water Bank Development and Transformation in a Tri-County Watershed

Mike Hermanson, Spokane County

Abstract: Assessment, development, completion, and operation of the Little Spokane Water Bank has spanned the time before the Hirst Decision to completion and adoption of the RCW 90.94 WRRIA 55 Watershed Plan Addendum. This presentation will focus on how the bank has addressed the changing rural water supply requirements and need in WRIA 55, and how the organizational structure has facilitated those transitions.

PROGRAM AND ABSTRACTS

DAY 2

3:50 - 4:50

INTERSTATE WATER MANAGEMENT: LESSONS LEARNED IN MANAGING WATER ACROSS STATE LINES

Moderator: Jenna Mandell-Rice

Panelists

Rick Agnew, Van Ness Feldman

Michael Garrity, WA Department of Fish and Wildlife

Phil Rigdon, Superintendent,
Dept. of Natural Resources, Yakima Nation

Robert Sandford, United Nations University
Institute for Water, Environment and Health



Mount Adams from Trout Lake

Photo by Tom Ring

SPEAKER BIOGRAPHIES

Keynote Address



Robert Sandford. Robert (Bob) Sandford holds the Chair in Water and Climate Security at the United Nations University Institute for Water, Environment and Health. In this capacity Bob was the co-author of the UN [Water in the World We Want](#) report on post-2015 global sustainable development goals relating to water. He is also lead author of *Canada in the Global World*, a new United Nations expert report examining the capacity of Canada's water sector to meet and help others meet the United Nations 2030 *Transforming Our World* water-related Sustainable Development Goals.

In his work Bob is committed to translating scientific research outcomes into language decision-makers can use to craft timely and meaningful public policy and to bringing international example to bear on local water issues. To this end, Bob is also senior advisor on water issues for the [Interaction Council](#), a global public policy forum composed of more than thirty former Heads of State including Canadian Prime Minister Jean Chretien, U.S. President Bill Clinton and the former Prime Minister of Norway, Gro Brundtland. Bob is also a Fellow of the Centre for Hydrology at the University of Saskatchewan and a Fellow of the Biogeoscience Institute at the University of Calgary. He is also a member of Canada's [Forum for Leadership on Water \(FLOW\)](#), a national water policy research group centered in Toronto.

Bob is the author, co-author or editor of more than thirty books including *Cold Matters: The State & Fate of Canada's Snow and Ice*; *Saving Lake Winnipeg*; *Flood Forecast: Climate Risk & Resilience in Canada*; *The Columbia River Treaty: A Primer*; *Storm Warning: Water & Climate Security in a Changing Canada* and *The Climate Nexus: Water, Food, Energy and Biodiversity*, which he co-authored with former Deputy Minister of Environment Jon O'Riordan, all published by Rocky Mountain Books. *The Columbia Icefield* and *North America in the Anthropocene* followed in 2016, both published by Rocky Mountain Books. They were followed in 2017 by *The Hard Work of Hope: Climate Change in the Trump Era*, co-authored again with Jon O'Riordan. [Our Vanishing Glaciers: The Snows of Yesteryear and the Future Climate of the Mountain West](#) won the prestigious \$10,000 [Lane Anderson Award](#) for the best science writing in Canada in 2017. Previously shortlisted for the Lane Anderson Award in 2016 for [North America in the Anthropocene](#), Robert was very honored to receive the 2017 award with recognition from The Fitzhenry Family Foundation.

His latest book *Rain Comin' Down* was published by Rocky Mountain Books in the fall of 2019.

SPEAKER BIOGRAPHIES

BiJay Adams. BiJay Adams is the General Manager for the Liberty Lake Sewer and Water District. BiJay is responsible for implementing the policies and objectives established by the Board of Commissioners and carrying out the District's Mission. As General Manager, BiJay is responsible for all aspects of District operations and business management including but not limited to developing policies, achieving regulatory compliance, comprehensive planning, customer service, intergovernmental and professional relations, and environmental stewardship.



Rick Agnew. Rick Agnew is a Partner at Van Ness Feldman, where he represents a variety of clients, particularly on matters relating to federal laws and permits governing energy projects, environmental matters, and the uses of natural resources.

Rick has served as committee counsel and staff supervisor in the U.S. House of Representatives on a wide array of federal issues, involving natural resources, Native Americans, and energy production and use. Subsequent to federal service, Rick has

practiced extensively in natural resource, Native American, and electric policy issues before Congress and federal agencies. Rick served as Chairman of Van Ness Feldman LLP from 2012-2019, and then returned to practice in Seattle on a full time basis.

Aja DeCoteau. Aja DeCoteau is a citizen of the Confederated Tribes and Bands of the Yakama Nation and has other tribal lineage with the Cayuse, Nez Perce and Turtle Mountain Band of Chippewa Indians. She has over twenty years of experience working on natural resource management and policy issues in the Columbia River Basin. She currently serves as the Watershed Department Manager for the Columbia River Inter-Tribal Fish Commission (CRITFC) in Portland, OR, where she coordinates fisheries restoration and watershed protection activities on behalf of the Yakama, Nez Perce, Umatilla, and Warm Springs tribes.



Aja also sits on the Board of Trustees for Earthjustice and the Board of Directors for the Columbia Land Trust and the Portland Energy Conservation, Inc. (PECI). She received her Bachelor of Arts in Environmental Studies and Native American Studies from Dartmouth College, and holds a Master of Environmental Management from Yale University, School of the Environment.

SPEAKER BIOGRAPHIES

Alyssa DeMott is currently a graduate student at Central Washington University in Ellensburg, WA, and she will be completing her master's degree in geological sciences in June 2021. She received her bachelor's degree in geological sciences at the State University of New York (SUNY) at Geneseo in 2019. At SUNY Geneseo, Alyssa conducted planetary geomorphology research and had the opportunity to work on NASA's Mars InSight Mission as an undergraduate research assistant. Though passionate about both planetary and terrestrial geomorphology, she ultimately decided to pursue graduate research focused on fluvial geomorphology. Alyssa's thesis project examines the geomorphic impacts of a large dam removal on the Elwha River in northwest Washington. After graduation, Alyssa will be working as a geomorphologist in Washington, and looks forward to expanding her knowledge of river restoration and aquatic habitat.



Melissa Downes. Melissa is a hydrogeologist and serves as Financial and Project Section Manager for the Washington State Department of Ecology's Office of Columbia River (OCR). In this role she oversees a technical project management team, who assist with water supply project development for OCR, including the technical, permitting and policy evaluations of water supply projects such as storage reservoirs, ASR projects, pump exchanges, water acquisitions, and conservation projects.

Andy Dunau. Andy Dunau has over 30 years of diverse experience in environmental, education and communications outreach. He currently serves as Executive Director of the Lake Roosevelt Forum and Spokane River Forum.



SPEAKER BIOGRAPHIES

Hisham Eldardiry. Hisham is a postdoctoral research associate at the Pacific Northwest National Laboratory (PNNL). Hisham earned his PhD degree in Civil and Environmental Engineering from the University of Washington, Seattle in 2021. The primary focus of Hisham’s research is geared towards finding sustainable solutions to the challenges facing the security of energy and water systems in transboundary basins. In his PhD, Hisham integrated hydrological modeling with satellite remote sensing to derive adaptive reservoir operating policies in the Nile river basin. Hisham’s PhD research has recently been recognized in different news media including [BBC](#) Science in Action program and [ArabNews](#) deep dive article.



Kelly Ferron. Kelly Ferron works in the WA Department of Ecology’s Water Quality Program and is the Implementation Lead for EPA’s Temperature TMDL for the Columbia and Lower Snake Rivers. Kelly is experienced in environmental facilitation, science communication, and focuses on working with stakeholders and tribes to implement policies to improve water quality in Washington. She also works on Ecology’s Puget Sound Nutrient Reduction Project and coordinates the Puget Sound Nutrient Forum, a stakeholder advisory group focused on finding solutions for addressing human sources of nutrients to Puget Sound.

Michael Garrity. Michael Garrity is Energy, Water, and Major Projects Division Manager with the Washington Department of Fish and Wildlife, where he coordinates the state Columbia River policy team and works on a variety of salmon, dam, water management, and energy facility siting issues. Prior to joining WDFW in 2016, Michael was NW Regional Director of American Rivers, where he was lead negotiator for a coalition of conservation groups on the Yakima Basin Integrated Plan. Michael has a BA in history from the University of Washington and a JD with an environmental law specialization from Berkeley Law.



SPEAKER BIOGRAPHIES

Guy J. Gregory. Guy Gregory is an independent Hydrogeologist working from Spokane, WA. He has degrees in geology (BS Washington State University; MS University of Vermont) and is a licensed geologist and hydrogeologist in Washington and a registered geologist in Oregon. His career activities include mineral exploration throughout North America, and working in waste management, hazardous site cleanup, and water management for the Washington Department of Ecology. He currently works assisting clients in solving water supply and storage problems.



Mike Hermanson. Mike Hermanson is the Water Resources Manager in the Department of Environmental Services at Spokane County. Over the last 14 years at Spokane County Mr. Hermanson has been involved in long term monitoring of the Spokane Valley Rathdrum Prairie aquifer, water resources public education and outreach, addressing PCBs in the Spokane River Watershed, and the development and implementation of watershed plans for WRIAs 54, 55, and 57. He has been involved in numerous water resource investigations, both as a project manager and scientist. He graduated from Western Washington University in 1994 with a degree in Environmental Science and is a certified professional hydrologist.

Chris Kowitz. Chris Kowitz is the North Central Region Manager for the Oregon Water Resources Department. The North Central Region consists of three district offices in The Dalles, Condon, and Pendleton. In this role, he oversees regulatory and policy matters for the region which include surface and groundwater resources in the lower Deschutes, lower John Day, Umatilla, and Walla Walla River watersheds.

Chris grew up in Northeast Washington and holds a Bachelors of Environmental Science from Western Washington University. His professional experience includes 15 years working in the natural environment, including natural resources management and restoration, water resource planning, applied research, and policy development. He has worked for city, county, and state governments in the Northwest, specializing in program implementation, inter-jurisdictional coordination, environmental systems, and stakeholder engagement.



SPEAKER BIOGRAPHIES



Chris Marks. Chris Marks is the First Foods Policy Program Manager in the Department of Natural Resources for the Confederated Tribes of the Umatilla Indian Reservation. Chris received his Juris Doctorate from Vermont Law School in 2006 and began working for the CTUIR. Prior to serving as the Program Manager, Chris served as a Water Rights Policy Analyst in the First Foods Policy Program to restore, protect, and enhance water conditions necessary to support the First Foods and the ability to exercise associated Treaty rights. In addition to continued engagement in

collaborative water management forums and local, state, and federal water management decision-making processes, Chris manages Program engagement in the Hanford Natural Resources Damage Assessment process, Climate Adaptation Planning, and Salmon Recovery.

Jeff Marti. Jeff Marti is an environmental planner and the drought coordinator for the Department of Ecology. Jeff has worked there for 30 years, which is as long as an official climate period. Jeff chairs the state Water Supply Availability Committee, which monitors and forecasts water supply and drought conditions. He has a B.S. from Iowa State University and a Masters of Environmental Studies from The Evergreen State College.



Robin Nimmer. Dr. Nimmer is a senior hydrogeologist, project manager, and leader of the Water Resources Division at Alta Science and Engineering. She is a Professional Geologist in Idaho and a Licensed Geologist in Washington. She works on hydrogeology-related projects in Idaho and eastern Washington, and specializes in flow and transport in fractured rock. Projects range from helping individuals and communities have sufficient water, to characterizing and

remediating groundwater contamination, and groundwater monitoring oversight at one of the largest Superfund sites in the country. Robin loves water but is still a geologist at heart, and is happy to stop at a good rock outcrop.

SPEAKER BIOGRAPHIES



Kara Odegard. Kara is the Manager of Sustainability Initiatives for the City of Spokane where she focuses on policy related to climate and the environment. She works with diverse stakeholders, scientists, and advisors to promote policies leading to a more inclusive, equitable, and regenerative society.

Terry Pickel. Terry has been a licensed operator for 40 years. He has worked at the Couer d'Alene Water Department for the last 16 years, where he manages the day-to-day operations of the department. Currently, the department has a staff of 22 full time employees. Prior to his time at the Couer d'Alene Water Department, Terry spent 24 years at the City of Cheney where he was Water Supervisor for 10 years. He is currently licensed for Water Distribution, Treatment, and Cross Connection Control in both Idaho and Washington. He is Past President of the Inland Empire Subsection and current President of the Idaho/Washington Aquifer Collaborative (IWAC).



Kristina Ribellia. Kristina Ribellia is the founder of Western Water Market and the host of the Western Water Market Podcast. She launched westernwatermarket.com in early 2020 to help connect water right buyers and sellers locally across the West and is building a growing network of the water right professionals needed to assist with a successful transaction.

Phil Rigdon. Philip Rigdon has been the Yakama Nation Superintendent of Department of Natural Resources for the last 16 years and has worked for the Yakama Nation for 27 years within the Forestry & Natural Resources. In this capacity, he oversees programs working to improve and protect water quality, water rights, fisheries, forestry, wildlife, cultural, and environmental activities for the Yakama Nation.

Mr. Rigdon represents the Yakama Nation on the Yakima River Basin Water Enhancement Project Workgroup & Conservation Advisory Group. Mr. Rigdon served as the President of the Intertribal Timber Council and represents the Yakama Nation on the Tapash Sustainable Forest Collaborative.

Mr. Rigdon obtained a B.S. in Forest Management from the University of Washington in 1996 and earned a Master of Forestry from Yale School of Forestry and Environmental Studies in 2002.



SPEAKER BIOGRAPHIES



Harry Seely. Harry Seely is a Principal with WestWater Research and has over 25 years of experience in water resource economic analysis. He regularly conducts analyses to support development and participation in markets for water rights throughout the western United States. He is also involved in multi-disciplinary teams evaluating the economic costs and benefits of proposed water supply and reallocation projects.

Scott Tarbutton. Scott Tarbutton is a hydrogeologist with WA Department of Ecology Office of Columbia River. He has over 13 years of experience in natural resource monitoring and

regulation. His current role includes project management for Walla Walla flow enhancement, Potholes supplemental feed route, and various ASR projects. Before his time with the Office of Columbia River, he was a hydrogeologist with Ecology's Environmental Assessment Program specializing in surface water-groundwater interactions and Ecology's Toxic Cleanup Program specializing in the remediation of petroleum contamination in soil and groundwater.



Eric Weber. Eric Weber is a hydrogeologist and certified water rights examiner with 34 years of experience in water resource and water quality projects in Washington and Oregon. His focus includes assisting the agricultural and municipal communities with water resource development, water rights portfolio management, water brokerage services and regulatory compliance.

Korey Woodley. Korey Woodley is the Executive Manager of the Palouse Basin Aquifer Committee and has been in this position since 2016. She is an esteemed Woman in Science in the Palouse Basin, specializing in water resource management and negotiations. She is equipped with a BA in Political Science and a BS in Environmental

Geography with an emphasis in Meteorology and Mathematics. Woodley completed her undergraduate degrees as a McNair Scholar. In 2016, she obtained an MS in Environmental and Natural Resource Sciences from Washington State University. Woodley is currently obtaining a Master's in Public Administration at the University of Idaho.



STUDENT FELLOWSHIP PROGRAM



Pond in Drumheller Channels,
Columbia Basin, WA.

Photo by Tom Ring

Nominations and Applications Sought

Each year the Washington Section of AWRA offers 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 2021, the Board awarded three student fellowships in the amount of \$2,500. The 2021 awards went to Ashlee Abrantes and Rachel Fricke from the University of Washington, and Sam Fixler from Central Washington University. Ashlee's thesis topic is "Utilizing environmental DNA as an Index for Freshwater conservation and management." Rachel's thesis topic is "Employing mobile applications to assess human benefits from and risks to water resources." Sam's work is an "Investigation of Channel Morphology and Groundwater Connectivity at Taneum Creek, WA." In addition to the cash award of \$2,500, Ashlee, Rachel, and Sam each received full membership in the National AWRA and in the State Section.

The application period for the 2022 student fellowships is now open. **February 11, 2022** is the application deadline for the 2022 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 11, 2022**, and can be sent by email to samillerh2o@comcast.net or mailed to:

Stan Miller, Fellowship Committee Chair
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.

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.

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.
- The reviewers' 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.

AWRA WA PAST PRESIDENTS

2020	John Chandler	2000	Pete Sturtevant
2019	Rabia Ahmed	1999	Teresa Platin
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

AWRA-WA PAST CONFERENCES

- 2020 The Challenges of Change: How Washington is Responding to Interdisciplinary Changes to Water Resources
- 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



AWRA-WA PAST CONFERENCES

- 1996 The Water 'Crisis' - Myth, Reality, and Opportunities
- 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

Columbia River Gorge near Lyle.

Photo by Tom Ring



2021 AWRA-WA Annual State Conference



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