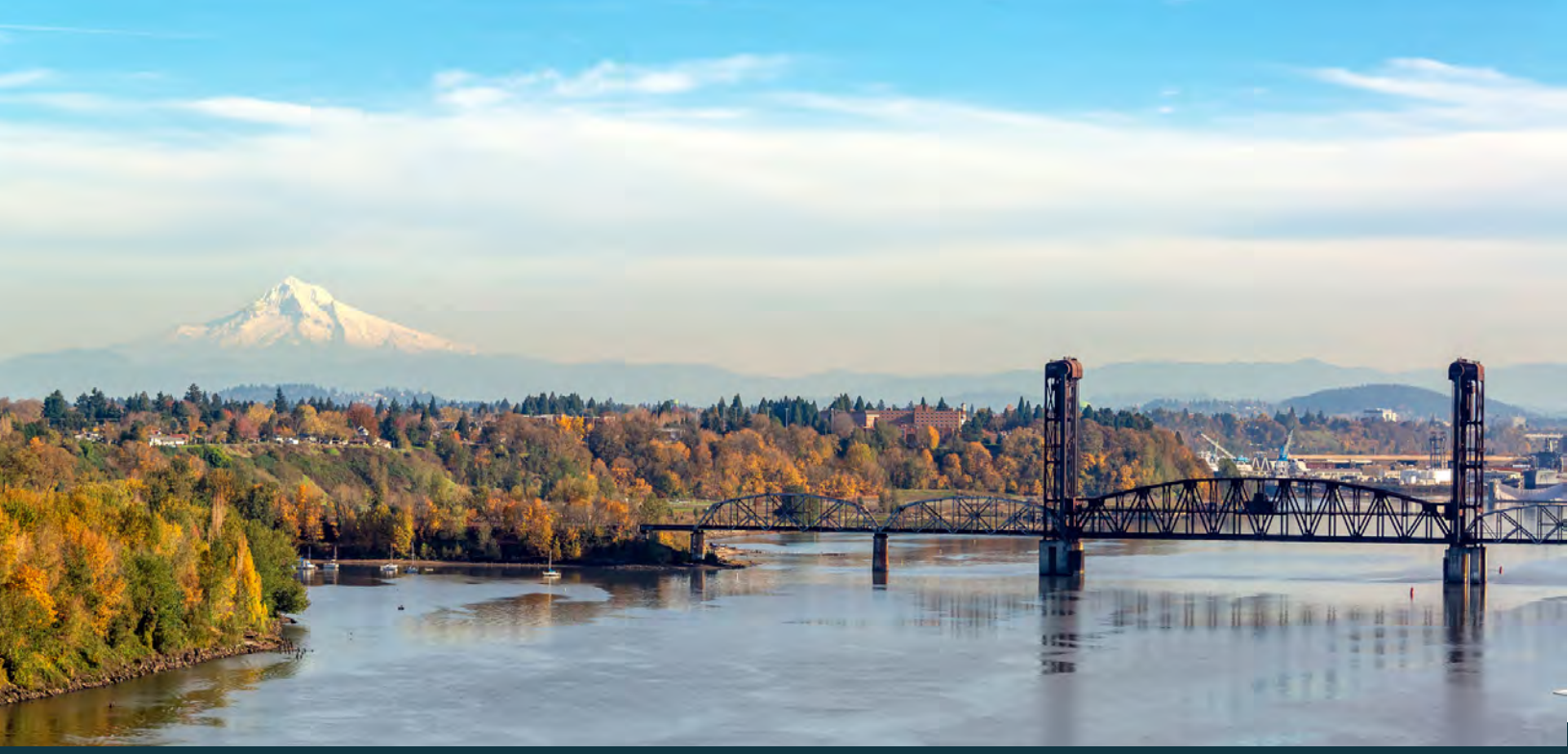

8th Interagency Conference on Research in the Watersheds

Adaptive Watershed Science and Ecosystem Management in a Changing Climate

June 5-8, 2023

Hosted by the U.S. Geological Survey

ICRW Conference Sponsors

USGS science for a changing world

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United States Environmental Protection Agency

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Oregon Cooperative Fishery Research Unit Semper Catostomus

Oregon State University

LimnoTech Water Environment | Scientists Engineers

LimnoTech provided support for student scholarships

Welcome From the Conference Co-Chairs

Dear Colleagues,

Welcome to the Eighth Interagency Conference on Research in the Watersheds (ICRW8), hosted by the U.S. Geological Survey on the campus of Oregon State University in Corvallis, Oregon. The ICRWs began as a way to bring together scientists from the United States federal agencies with research or management concerns related to watersheds. Since the first ICRW in 2003, they have expanded to include a broad community of watershed researchers spanning federal, state, university, tribal, and even international participants. ICRW8 is the largest ICRW meeting to date and marks an exciting return to an in-person format. We are grateful for the opportunity to see you all here.

The theme for ICRW8 is "Adaptive Watershed Science and Ecosystem Management in a Changing Climate." In the Pacific Northwest, fires of unprecedented size and intensity, a summer "heat dome" which broke record high temperatures, late-season flooding, and sustained drought have all occurred in recent years. Similar extreme disturbance events, which stand atop longer-term trends in climate and increasing human pressure on ecosystems and water resources, now occur regularly across the globe. In the face of these extraordinary pressures, managers, policymakers, regulators, and society at large have a critical need for new insights, adaptive frameworks, and better predictions to aid in adaptively managing human and ecosystem response to climate change. It is our hope that ICRW provides a venue to share new insights and discuss ongoing challenges, connect, and spark new ideas toward meeting these critical challenges.

The ICRW meetings are made possible by the collective efforts of our steering committee and the organizations they represent. We thank them heartily for their contributions and welcome you all to Corvallis.

With our regards,

Krista L. Jones and Laurel Stratton Garvin, Conference Co-chairs

U.S. Geological Survey

Oregon Water Science Center

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ICRW Committees

Steering Committee

Krista Jones, USGS, co-chair

Laurel Stratton Garvin, USGS, co-chair

Bhavna Arora, LBL

David Bosch, USDA-ARS

J. Renee Brooks, US EPA

Chris Carlson, USDA-FS

Brian Caruso, USFWS

Alisa Coffin, USDA-ARS

Scott Davis, BLM

Dick Fowler, USDA-FS

Andrew Hedrick USDA-ARS

Phil Heilman, USDA-ARS

Liz Keppeler, USDA-FS

Chuck Lane, US EPA

Jim Latimer, US EPA

Jen Moore, USDA-ARS

Pete Murdoch, USGS

Jordan Read, CUASHI

Madeline Scranton, CUASHI

Rick Webb, USGS

Ken Hurst Williams, LBL

Subcommittee	Name
Technical Program	**Krista Jones, USGS, chair**
	David Bosch, USDA-ARS
	J. Renee Brooks, US EPA
	Brian Caruso, USFWS
	Scott Davis, BLM
	Chuck Lane, US EPA
	Pete Murdoch, USGS
	Laurel Stratton Garvin, USGS
	Rick Webb, USGS
Facility and Events	**Krista Jones, USGS, co-chair**
	Laurel Stratton Garvin, USGS, co-chair
	Heather Bervid, USGS
	Julia Grabowski, USGS
	Andrew Hedrick USDA-ARS
	Todd Jarvis, OSU IWW
	Chuck Lane, US EPA
Field Trips	**J. Renee Brooks, US EPA, chair**
	Chris Carlson, USDA-FS
	Laurel Stratton Garvin, USGS
	Liz Keppeler, USDA-FS
	Jen Moore, USDA-ARS
	Ken Hurst Williams, LBL
Proceedings	**Jim Latimer, US EPA, chair**
	Bhavna Arora, LBL
	Brian Caruso, USFWS
	Alisa Coffin, USDA-ARS
	Andrew Hedrick, USDA-ARS
	Phil Heilman, USDA-ARS

Plenary Speakers

Mr. Jaime A. Pinkham

Standing at the Looking Back Place

Jaime Pinkham is the Acting Assistant Secretary of the Army for Civil Works, where he assists in establishing policy direction and supervision over the U. S. Army Corps of Engineers' Civil Works program, including programs for conservation and development of the nation's water and wetland resources, flood control, navigation, and aquatic ecosystem restoration. Mr. Pinkham has also served as the Executive Director of the Columbia River Inter-Tribal Fish Commission; Vice President of the Bush Foundation, leading their Native Nations program; as a member of and served on numerous non-profit organizations; and is chairman emeritus for the American Indian Science and Engineering Society and past president of the Intertribal Timber Council. He has dedicated decades of his life to advocating for tribal sovereignty, self-determination, and treaty rights in the Pacific Northwest. Mr. Pinkham is a citizen of the Nez Perce Tribe, he received forestry degrees from Oregon State University (OSU) and Peninsula College, is an OSU Alumni Fellow, and received an Outstanding Alumnus Award from OSU's College of Forestry. He is a recipient of national awards from the Wilderness Society, the Native American Fish and Wildlife Society, and the Intertribal Timber Council for his service to tribal communities.

Dr. Erica Siirila-Woodburn

A low-to-no snow future and the American West's emerging climate change crisis

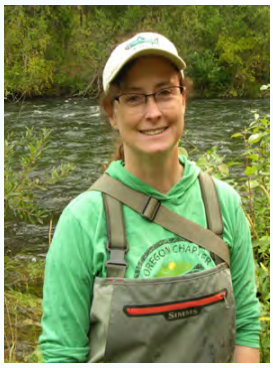
Dr. Erica Siirila-Woodburn is a Research Scientist in the Earth and Environmental Sciences Area at Lawrence Berkeley National Laboratory studying above-and-below-ground connections in the water cycle in the face of climate change, with a focus on computational hydrology. Erica holds a PhD and MS in Hydrology from the Colorado School of Mines and a BA in Geology from the University of Colorado at Boulder. Before joining LBNL in 2015, she was a postdoctoral fellow at the Polytechnic Institute of Barcelona researching the impact of subsurface heterogeneity on groundwater solute transport and human health risk. Her recent work includes studying how shifts in precipitation patterns, climate extremes, wildfires, and land cover change impact water partitioning. Erica has provided expert briefings to the California State Legislature and the Western States Water Council, and has had her research highlighted in >500 media features

Dr. Adam S. Ward

Climate change is shortening and disconnecting stream networks

Dr. Adam Ward is a Professor & Department Chair of Biological & Ecological Engineering at Oregon State University. Ward received BS and MS degrees in Civil Engineering from Michigan Technological University, worked in consulting for several years, and earned his PhD from Penn State University in 2011. He has subsequently held posts in Geoscience at the University of Iowa and Public & Environmental Affairs at Indiana University. Ward's research is in catchment science – the integrated study of physical, chemical, and biological processes at watershed scales. His team integrates field-based experiments, long-term data sets, and numerical modeling to predict water quality, quantity, and ecosystem function in response to changes in climate and management decisions.

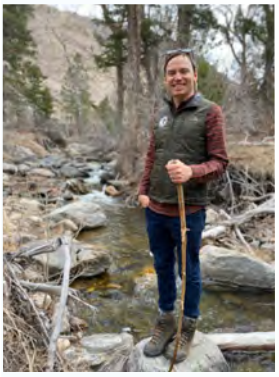
Plenary Speakers con't



Dr. Rebecca Flitcroft

Burning with Resilience: wildfire, water, and life in the West

Dr. Rebecca Flitcroft is a research fish biologist with the USDA Forest Service, PNW Research Station, and Team lead for the Landscape and Ecosystem Management Team. She serves as co-chair of the International Union for the Conservation of Nature, World Commission on Protected Areas, Freshwater Specialist Group. She holds a B.S. from Willamette University in Environmental Science and Economics; an M.S. from Oregon State University in Natural Resource Geography; and a PhD from Oregon State University in Fisheries Science. In her career, Dr. Flitcroft has focused on inter-disciplinary research to broaden our understanding of natural processes, aquatic ecosystems, and the importance of natural disturbance regimes. She particularly focuses on life history diversity, distribution, and habitat connectivity of Pacific salmonids. Her work related to wildfire has tended to explore immediate and long-term effects on native salmonids through models and field-based investigations that link water quality, geophysical conditions, and fish life history.



Dr. David Lawrence

Facing the profound challenge of ecological transformation: the Resist-Accept-Direct framework as a path forward

Dr. David Lawrence specializes in aquatic ecology and has worked as a scientist within the National Park Service (NPS) Climate Change Response Program since 2017. In this role David conducts and translates research to support climate change adaptation for protected areas across the country. David is actively collaborating in efforts to assist the management of ecosystems undergoing ecological transformation and to assess the adaptive capacity of species to climate change. Prior to his appointment with the NPS, David was the Director of Aquatic Conservation at the National Fish and Wildlife Foundation. David completed his Ph.D. at the University of Washington in 2013, where he was a Northwest Climate Science Center fellow. His doctoral research investigated the interactive effects of climate change, land-use alteration, and invasive aquatic species on Pacific salmon in rivers of the Northwest. David also worked as a staff scientist at the University of Washington and the Louisiana Universities Marine Consortium, and as a consultant at Marine Research, Inc., based in Woods Hole, Massachusetts. His fieldwork has taken him to high desert rivers in the Pacific Northwest, coastal rivers in the Northeast, marshes of the Gulf coast, and the high seas in Alaska.

Highlights

8th Interagency Conference on Research in the Watersheds Adaptive Watershed Science and Ecosystem Management in a Changing Climate

June 5-8, 2023 • Hosted by the U.S. Geological Survey

Oregon State University, Corvallis, OR

Monday, June 5th

- Conference Workshops – **1:00-4:00 PM**
- Plenary: Mr. Jaime Pinkham, **Standing at the Looking Back Place** – **6:45-7:30 PM**
- Welcome Reception – **7:30-9:00 PM**

Tuesday, June 6th

- Plenary: Dr. Erica Siirila-Woodburn, **A low-to-no snow future and the American West's emerging climate change crisis** – **8:30-9:00 AM**
- Plenary: Dr. Adam Ward, **Climate change is shortening and disconnecting stream networks** – **9:00-9:30 AM**
- Concurrent Sessions – **10:00-11:30 AM**
- Lunch + Plenary: Dr. Becky Flitcroft, **Burning with Resilience: wildfire, water, and life in the West** – **11:30 AM-1:00 PM**
- Concurrent Sessions – **1:00-2:30 PM**
- Concurrent Sessions – **3:00-4:30 PM**
- Poster Session – **7:00-9:00 PM**

Wednesday, June 7th

- Field Trips – **7:00 AM-4:30 PM**
- Dinner and Evening Gala – **6:00-9:00 PM**

Thursday, June 8th

- Plenary: Dr. David Lawrence, **Facing the profound challenge of ecological transformation: The Resist-Accept-Direct framework as a path forward** – 8:30-9:00 AM
- Concurrent Sessions – **9:30-11:00 AM**
- Concurrent Sessions – **12:00-1:30 PM**
- Conclusion and **"Passing the Gavel"** to the U.S. Department of Energy Lawrence Berkeley National Lab, hosts of the Ninth ICRW – **1:30-2:00 PM**

Schedule at a Glance

Monday, June 5, 2023		
Registration, Workshops, and Conference Opening Plenary and Reception		
12:00 PM–6:30 PM	Registration	Myrtle Tree Alcove
11:00 AM–1:00 PM	Lunch (on your own)	
1:00 PM–4:00 PM	**Workshops**	*Room*
	W1. Working with geospatial hydrologic data for watershed analyses in R and Python using web services	Agriculture Leaders
	W2. Integrating USDA-ARS and NEON water quality data for southeast rivers	Agriculture Production
	W3. Introduction to the Water, Energy, and Biogeochemical Model (WEBMOD)	Agriculture Science
	W4. Tracer techniques and the OTIS solute transport model	Wells Fargo Bank
4:00 PM–6:30 PM	Dinner (on your own)	
6:30 PM–6:45 PM	Welcome	Austin Auditorium
6:45 PM–7:30 PM	**Plenary: Mr. Jaime Pinkham,** *Standing at the Looking Back Place*	
7:30 PM–9:00 PM	**Welcoming Reception (Cash Bar Available)**	Giustina Gallery
Tuesday, June 6, 2023		
Registration, Morning Plenary Sessions, Afternoon Concurrent Sessions, and Evening Poster Session		
8:00 AM–5:00 PM	Registration	Myrtle Tree Alcove
8:30 AM–9:00 AM	**Plenary: Dr. Erica Siirila-Woodburn,** *A low-to-no snow future and the American West's emerging climate change crisis*	Austin Auditorium
9:00 AM–9:30 AM	**Plenary: Dr. Adam Ward,** *Climate change is shortening and disconnecting stream networks*	
9:30 AM–10:00 AM	Coffee break (30 mins)	Myrtle Tree Alcove
10:00 AM–11:30 AM	**Concurrent Sessions**	*Room*
	S01. Part 1: Partnering science, decision makers, and industry in catchment studies ⚡◆	Agriculture Leaders
	S02. Low-Flows Part 1: Consequences of climate change and extreme weather on snowpack dynamics and streamflow in the Western USA◆	Agriculture Production
	S03. Protective water temperature regimes and standards in a hot, dry future: Science needs and policy challenges◆	Agriculture Science
	S04. Mercury cycling in western reservoirs	Wells Fargo Bank
	S05. Retrospective and prospective catchment studies at the H.J. Andrews Experimental Forest ⚡◆	Construction and Engineering Hall
11:30 AM–1:00 PM	Lunch provided, followed by plenary presentation	CHM2Hill Alumni Center, Casacade Ballroom 110
	Plenary: Dr. Becky Flitcroft, *Burning with Resilience: wildfire, water, and life in the West*	
1:00 PM–2:30 PM	**Concurrent Sessions**	*Room*
	S06. Part 2: Partnering science, decision makers, and industry in catchment studies	Agriculture Leaders
	S07. Low-Flows Part 2: Causes and consequences of decreasing late-summer low-flows in the Western USA◆	Agriculture Production
	S08. Emerging methods in the geomorphology of river corridors◆	Agriculture Science
	S09. Improved groundwater and surface-water science for water management and restoration in the semiarid Western U.S.: Insights from the Harney Basin, OR and Salton Sea, CA◆	Wells Fargo Bank
	S10. Part 1: Wildfire Effects on Watersheds: Implications for water security, water quality, aquatic habitats, and aquatic species◆	Construction and Engineering Hall

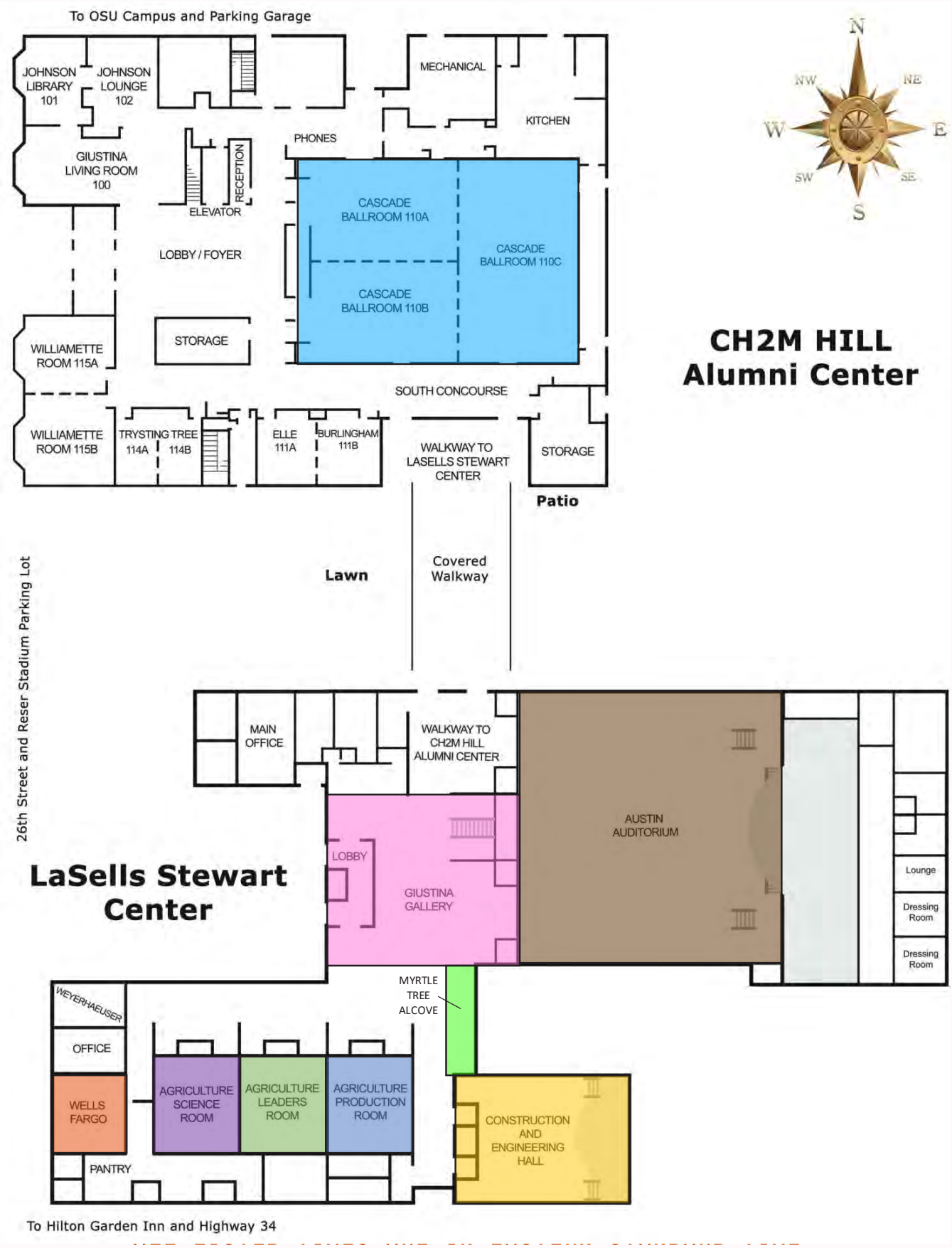
SCHEDULE AT A GLANCE *continued*

Tuesday, June 6, 2023 *continued*		
2:30 PM–3:00 PM	Coffee break (30 mins)	Myrtle Tree Alcove
3:00 PM–4:30 PM	**Concurrent Sessions**	*Room*
	S11. Understanding and predicting harmful algal blooms◆	Agriculture Leaders
	S12. Part 1: Advancing watershed science using machine learning, diverse data, and mechanistic modeling from the summit to the sea - Hydrological Extremes and Data◆	Agriculture Production
	S13. Small Streams and Big Changes: Headwater streams in a rapidly changing climate◆	Agriculture Science
	S14. Hydrological and biogeochemical connectivity along the hillslope-riparian-stream continuum◆	Wells Fargo Bank
	S15. Part 2: Wildfire Effects on Watersheds: Implications for water security, water quality, aquatic habitats, and aquatic species⚡◆	Construction and Engineering Hall
4:30 PM–7:00 PM	Dinner (on your own)	
7:00 PM–9:00 PM	**Poster Session (Cash Bar Available)**	Giustina Gallery

Wednesday, June 7, 2023		
	ICRW Field Trips and Evening Gala	
6:30 AM–9:15 AM	Pick up boxed lunches	Giustina Gallery
7:00 AM–4:30 PM	Field trips	
6:00 PM–9:00 PM	**Dinner and Evening Gala (Cash Bar Available)**	CHM2Hill Alumni Center, Casacade Ballroom 110

Thursday, June 8, 2023		
	Plenary and Concurrent Sessions, "Passing the Gavel," and Adjournment	
8:00 AM–12:00 PM	Registration	Myrtle Tree Alcove
8:30 AM–9:00 AM	**Plenary: Dr. David Lawrence**, *Facing the profound challenge of ecological transformation: The Resist-Accept-Direct framework as a path forward*	Austin Auditorium
9:00 AM–9:30 AM	Coffee break (30 mins)	Myrtle Tree Alcove
9:30 AM–11:00 AM	**Concurrent Sessions**	*Room*
	S16. Tribal watershed science and management◆	Agriculture Leaders
	S17. Part 2: Advancing watershed science using machine learning, diverse data, and mechanistic modeling from the summit to the sea - Machine Learning Applications◆	Agriculture Production
	S18. Learning Through Doing: River valley restoration to a Stage 0 condition◆	Agriculture Science
	S19. Long-term data and flow processes on experimental watersheds: Implications to ecohydrologic studies to address climate change◆	Wells Fargo Bank
	S20. GIS Part 1: Watershed assessment through a combined partnership prioritization and GIS modeling approach	Construction and Engineering Hall
11:00 AM–12:00 PM	Box lunch provided	Myrtle Tree Alcove
12:00 PM–1:30 PM	**Concurrent Sessions**	*Room*
	S21. The Walla Walla River Basin: Characterizing the integrated groundwater and surface water system and impacts of water use	Agriculture Leaders
	S22. Part 3: Advancing watershed science using machine learning, diverse data, and mechanistic modeling from the summit to the sea - Biological and Physical Watershed Processes◆	Agriculture Production
	S23. Modeling developments in reservoirs and regulated rivers	Agriculture Science
	S24. Watershed evapotranspiration in a changing environment◆	Wells Fargo Bank
	S25. GIS Part 2: Closing the Gaps: Utilizing GIS and machine learning for watershed-based inventory and analysis	Construction and Engineering Hall
1:30 PM–2:00 PM	**Conclusion and Passing the Gavel for the Ninth ICRW**	Austin Auditorium

Event Map


To OSU Campus and Parking Garage
JOHNSON LIBRARY 101
JOHNSON LOUNGE 102
GIUSTINA LIVING ROOM 100
RECEPTION
ELEVATOR
MECHANICAL
KITCHEN
PHONES
CASCADE BALLROOM 110A
CASCADE BALLROOM 110B
CASCADE BALLROOM 110C
LOBBY / FOYER
STORAGE
WILLIAMETTE ROOM 115A
WILLIAMETTE ROOM 115B
TRYSTING TREE 114A 114B
ELLE 111A
BURLINGHAM 111B
SOUTH CONCOURSE
WALKWAY TO LASELLS STEWART CENTER
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26th Street and Reser Stadium Parking Lot
LaSells Stewart Center
MAIN OFFICE
WALKWAY TO CH2M HILL ALUMNI CENTER
LOBBY
GIUSTINA GALLERY
AUSTIN AUDITORIUM
Lounge
Dressing Room
Dressing Room
MYRTLE TREE ALCOVE
WEYERHAEUSER
OFFICE
WELLS FARGO
AGRICULTURE SCIENCE ROOM
AGRICULTURE LEADERS ROOM
AGRICULTURE PRODUCTION ROOM
CONSTRUCTION AND ENGINEERING HALL
PANTRY
To Hilton Garden Inn and Highway 34

Workshops

Monday, June 5 2023

Pre-registration Required

W1: Working with Geospatial Hydrologic Data for Watershed Analyses in R and Python Using Web Services

Leaders: Marc Weber (EPA), weber.marc@epa.gov; Dave Blodgett (USGS), dblogett@usgs.gov; Mike Johnson (Lynker), jjohnson@lynker.com

Monday, June 5, 1-4 PM

This workshop will focus on a project-based overview of concepts and open-source tools for performing geospatial analyses with hydrologic data for watershed scale analysis using web services in R and Python. We'll provide an overview of foundational spatial libraries in R and Python and examine and work with key hydrology-focused packages in R and Python. This will be a hands-on tutorial where we will work through a watershed-scale project demonstrating use of a handful of geospatial web services in both languages for conducting scientific studies.

W2: Integrating USDA-ARS and NEON Water Quality Data for Southeast Rivers

Leaders: Jim Coloso (Battelle, NEON Project), jcoloso@battelleecology.org
Oliva Pisani (USDA ARS), oliva.pisani@usda.gov

Monday, June 5, 1-5 PM

This workshop involves retrieving data from the STEWARDS database and NEON data portal. Participants will then use a combination of excel and R software to merge the datasets and compare water quality parameters at two nearby Georgia rivers, the Little River and Flint River. Spreadsheets and code used for the workshop will be available on GitHub for reference before and after the workshop.

W3: Introduction to the Water, Energy, and Biogeochemical Model (WEBMOD)

Leader: Rick Webb (USGS), rmwebb@usgs.gov

Monday, June 5, 1-4 PM

This half day workshop will demonstrate how WEBMOD simulates flows of water, major ions, stable isotopes, and temperature for a natural watershed draining the continental divide in Colorado and fields irrigated with water from the Yakima River in Washington. The course will be taught by Richard Webb, the principal developer of WEBMOD and author of the User's Manual. Participants will be provided with background theory, software and input files and learn how to run the model in batch mode and within a Graphical User Interface.

Work Shops con't

W4: Tracer Techniques and the OTIS Solute Transport Model

Leader: Rob Runkel (USGS), runkel@usgs.gov

Time: Monday, June 5, 1-5 PM

Tracer techniques and solute transport models are frequently used to quantify the temporary detainment of solutes in hyporheic and surface storage zones. The physical process of "transient storage" has implications for a wide variety of constituents as the storage process affects residence time and the extent of biogeochemical processing. This 2-hour workshop provides an overview of the hydrologic processes underlying the OTIS solute transport model (One-dimensional Transport with Inflow and Storage), and how these processes are represented in the stream transport equations. Emphasis will be placed on fundamental concepts such as experimental design, data evaluation, and parameter estimation using tracer techniques. An additional 1 hour of instruction will include a step-by-step "how-to" on the use of OTIS to estimate transient storage parameters based on tracer data. This optional 1-hour extension is recommended for attendees who plan to implement OTIS within their research programs. Beginner to intermediate model users are encouraged to attend. Additional information on OTIS is available at http://water.usgs.gov/software/OTIS/.

Field Trips

Wednesday, June 7, 2023

ICRW8 Field Trips (Wednesday, June 7, 2023): All field trips will depart from the LaSells Stewart Center on the OSU campus at the time specified for each trip and return by 4:30 pm. **PLEASE ARRIVE 15 MINUTES BEFORE THE DEPARTURE TIME.** Field trips are capped for attendees as specified for each trip and will close once full, except the Corvallis Area Tours (self-guided, no attendee cap). A box lunch will be provided through OSU catering. There are no additional costs for field trip registration.

FT1: Metolius River Hiking Tour (Chris Carlson, USFS)

This field trip will depart Corvallis at 7:30 am and drive to the Metolius River on the east side of the Cascade Range (approximately 2-hour drive). The Metolius River is a spring-fed river that emerges from the base of Black Butte as a full river. We will visit river near the Wizard Falls Fish Hatchery, take a short hike along the river to take in the scenery and the springs feeding the river, and have lunch. For the afternoon, we will drive to Jack Creek and hike the trail to the headwaters spring (about 1-mile round trip). We will see the base of a lava flow where the creek starts and briefly explore the ecology of the spring. We will depart the Jack Creek trailhead at 2:30 pm to return to Corvallis by 4:30 pm.

FT2: River to Ridge - McKenzie River Basin Tour (Liz Keppeler, USFS)

This field trip will depart Corvallis at 7:00 am and climb the McKenzie Pass Highway, exploring the waters and landscapes of the Willamette National Forest up to the high western Cascades. Stops will include Finn Rock Reach where floodplain restoration and wildfire effects can be observed; the H.J. Andrews Experimental Forest where long-term research investigates watershed processes in managed and old-growth forest; and lastly, the high elevation basaltic lava flows that form Sahalie Falls and where hydrogeology and climate influence groundwater recharge and downstream water resources. Itinerary includes scenic stream-side hikes and a waterfall loop trail. We will return to Corvallis by 4:30 pm.

FT3: Willamette River Rafting Trip (Joe Ebersole, EPA)

This field trip will depart Corvallis at 7:00 am. Join us in a leisurely 12-mile rafting trip along the mighty Willamette River from Corvallis to Albany. The Willamette River is the 13th largest river within the USA, and the largest watershed contained within a single state draining 11,487 square miles. This 12-mile section of the river flows at a modest even pace over a gravel bed (no whitewater!) with sinuous bends and a few side channels, islands and sloughs. Views will include expansive river habitats, riparian forests, and agricultural lands between the two urban cities. Visit with colleagues and listen to experts discuss the ecology of coastal cutthroat trout and other native fishes and see examples of restoration efforts along the Willamette River. We will be guided by OSU Adventure Leadership Institute (ALI), who will provide essential river gear such as wetsuits, booties, and life jackets. All you need to bring is appropriate clothing (for under wetsuits if wetsuits are needed), a towel to dry after the trip, and a good attitude. Sun protection is highly recommended (sunscreen, hat, sunglasses). We will return to Corvallis by 4:30 pm.

Field Trips con't

FT4: Oregon Coast Trip (Jim Kaldy, EPA)

This field trip will depart Corvallis at 7:30 am and explore the dynamic and interesting confluence of geological and ecological wonders that is the Oregon Coast. The Oregon Coast Range and volcanic intrusions interact with the relentless force of water and the Pacific Ocean to create a wild and wonderful coastline. This excursion will be an early morning visit the tide pools at Seal Rock, just south of Newport on a minus tide (0940, -2.0 ft). Exploring the tide pools, you will likely find a variety of invertebrates such as mussels, urchins, anemones, chitons, and crabs as well as a variety of algae and seagrass. Perhaps seals sunning on the exposed rocks. After a bit of crawling around on the slippery rocks, we will visit the Hatfield Marine Science Center (HMSC) Campus. HMSC is a consortium of OSU and agency partners including EPA, NOAA, USFW, USDA, ACOE and ODFW. While at HMSC we will have opportunities to take in the "vertical evacuation" facility at the new Marine Science Initiative (MSI) building, view marine themed art displays (Sarah Logan – hand carved ceramics & Rain drawings; Lori Hepner's photography and projection works) in MSI and walk along the estuary trail. The return trip will start off along Newport's "working bayfront" to Toledo and then take a turn to go off the beaten path, tracing part of the Yaquina River through the watershed. Although anthropogenic development in the watershed is limited, the influence of current and historical silviculture on the watershed contrasts with the forest land. There are several opportunities along the way to observe marsh restoration, as well as log raft storage areas and other points of interest. Bring boots or a change of shoes as you are likely to get wet! Also suggested to bring a sweater/jacket/sweatshirt as the coast is usually much cooler than Corvallis, especially if upwelling is happening. We will return to Corvallis by 4:30 pm.

FT5: Willamette Valley Agricultural Tasting Tour (Renée Brooks, EPA)

This field trip will depart Corvallis at 8:30 am. The Willamette Valley has tremendous agricultural diversity allowing abundant produce year-round and agricultural products that are world renown. Join us on an agricultural tasting tour of the Willamette Valley and taste richness the Valley has to offer, as well as hear about its challenges. We will start at the OSU farmlands and dairy, walk to one of Oregon's historic covered bridges, then tour and taste at a local organic produce farm, a local winery (lunch stop as well), visit local orchards (hazelnuts and apples), and end with a visit to a local hard ciderhouse and tasting room. (Note – some locations will have products for sale so be sure to bring some cash/credit cards if you wish to purchase.) We will return to Corvallis by 4:30 pm.

FT6: Marys Peak Hike (Jen Moore, USDA-ARS)

This field trip will depart Corvallis at 9:30 am. Join us for a hike to the summit of the tallest peak in the coastal range. At 4,097 feet, you can see the Pacific Ocean to the west and numerous peaks (I've seen 9 volcanic peaks on a super clear day) of the Cascade Mountain Range to the east across the Willamette Valley. We will drive within a mile to the summit with opportunities to take in the views, go on an additional, short (1.8-mile loop) hike through the meadows and forest, and depending on our spring timing, enjoy the bountiful wildflowers. The trail links alpine meadows, an old growth noble fir forest, and the Parker Creek riparian area. The drive is about 1-hour and we have plenty of time to enjoy box lunches, hiking, and relaxing. We will return to Corvallis by ~2:00 pm.

Field Trips con't

FT7: Corvallis Area Tour (Self-guided)

This self-guided field trip option is available for those who wish to stay closer to Corvallis. You may pick-up your box lunch between 7:30-9:15 am from the La Sells Center on the morning of Wednesday, June 7. Some ideas for nearby walks, hikes, and scenic drives are listed below:

- Visit Corvallis Walking and Driving Tours
- Corvallis Murals Walk – easy walks in Corvallis
- Irish Bend Covered Bridge (Map) – easy walk on OSU campus in Corvallis
- Willamette River Trail (Willamette Park) – easy walking trails in Corvallis
- Avery Park Rose Garden and Natural Area along the Marys River – easy walking trails in Corvallis
- Bald Hill – easy to moderate walking/hiking trails near Corvallis
- Fitton Green Natural Area (Map) – easy to moderate hiking trails near Corvallis
- Peavy Arboretum – easy to moderate hiking trails near Corvallis
- McDonald-Dunn Forest – easy to difficult hiking trails near Corvallis
- Marys Peak – 1-hr drive with scenic views and short walks or a multi-mile hike; more ideas on how to enjoy Marys Peak here.
- Other nearby trails in the mid-Willamette Valley

Concurrent Sessions Technical Program

** Presenting author; ⚡ Lightning Talk; ◆ Associated poster(s)*

Tuesday, June 6, 10:00-11:30 AM

S01. Part 1: Partnering science, decision makers, and industry in catchment studies ⚡ ◆				
Moderator(s)	**Andrés Iroumé**, **Francisco Javier Balocchi Contreras**, Julia Jones, and Catalina Segura			
Room	Agriculture Leaders			
Time	*ID*	*Presenter*	*Authors*	*Presentation title*
10:00 - 10:13 AM	S01-1	Jimena Alonso	Jimena Alonso*, Alejandro Gonzalez, Santiago Capote, Sebastián Ferrer, Agustín Menta	Hydrologic Effects of Eucalyptus Afforestation in Uruguay: Towards long-term monitoring of experimental watersheds
10:13 - 10:26 AM	S01-2	Silvio Ferraz	Silvio Ferraz*, Aline Aparecida Fransozi, Carolina Bozetti Rodrigues, Walter de Paula Lima	Monitoring, processing, interpreting and communicating hydrological effects of Eucalyptus plantations management in Brazil
10:26 - 10:39 AM	S01-3	Francisco Balocchi	Francisco Balocchi*, Pablo Ramírez de Arellano, Guillermo F. Olmedo	Long-term Ecosystem Research network: From measurements to understanding land use land cover changes on the hydrology in the coastal Central and Southern Chile
10:39 - 10:52 AM	S01-4	Ricardo O. Barra	Ricardo Figueroa, Roberto Urrutia, Oscar Parra, Ricardo O. Barra*	Water Quality Monitoring of the Biobio River in Chile: An opportunity for collaboration between academia, government, and industry
10:52 -11:05 AM	S01-5	José Luis Arumí	José Luis Arumí*, Enrique Muñoz, Ricardo Oyarzún	Understanding spring contribution to minimum flow at the Diguillin River in Central Chile
11:05 - 11:18 AM	S01-6	Alexandra Etheridge	Alexandra Etheridge*, Alison Hopcroft, Dar Crammond	An Overview of the Collaborative Research Partnership between the United States Geological Survey Oregon Water Science Center and Portland State University
11:18 - 11:22 AM	S01-7	Andrés Iroumé	Andrés Iroumé*, Julia Jones, Rebeca Sanhueza	Flow Intermittency in Experimental Catchments in South Central Chile: The effects of morphometry, or forest plantation growth, or drought, or all together? ⚡ ◆
11:22 - 11:26 AM	S01-8	Felipe Cisneros	Felipe Cisneros*	Instruments for the integrated management of water resources from scientific research ⚡ ◆
11:26 - 11:30 AM	S01-9	David Blodgett	David Blodgett*, Andy Bock	What we call the things we study matters – toward greater consistency and precision in water science ⚡ ◆

S02. Low-Flows Part 1: Consequences of climate change and extreme weather on snowpack dynamics and streamflow in the Western USA ◆

Moderator(s):	**Safeeq Khan**, **Renée Brooks**, **David Dralle**, Elizabeth Keppeler, Steve Wondzell, and Joe Wagenbrenner			
Room	Agriculture Production			
Time	*ID*	*Presenter*	*Authors*	*Presentation title*
10:00 - 10:15 AM	S02-1	J. Renee Brooks	J. Renée Brooks*, Henry M. Johnson, Steven P. Cline, Randy Comeleo, Keira Johnson, William Rugh	Inferring snowpack contributions and the mean elevation of source water to streamflow in the Willamette River, Oregon using water stable isotopes
10:15 - 10:30 AM	S02-2	Mark S. Raleigh	Mark S. Raleigh*	How did the unprecedented 2021 Western North America heat wave impact snow and rivers of the Pacific Northwest?
10:30 - 10:45 AM	S02-3	Ian W. Whidden	Ian W. Whidden*, Andrew Bennett, Kevin Bladon, Julia Jones, Mark S. Raleigh	Landscape and forest canopy effects on snow water storage in a warming winter climate in the Lookout Creek drainage basin, Oregon
10:45 - 11:00 AM	S02-4	Andrew Hedrick	Andrew Hedrick*, Ernesto Trujillo, Kathleen Lohse, Sarah Godsey, Katherine Hale	Climate change effects on streamflow generation within a semi-arid headwater catchment in the rain-snow transition zone
11:00 - 11:15 AM	S02-5	Brian Caruso	Brian Caruso*, Lauren Eng, Andy Bock, Nick Hall	Modeling and assessment of climate change impacts on water resources at national wildlife refuges in the semi-arid Western U.S.
11:15 - 11:30 AM	S02-6	Nicholas Georgiadis	Nicholas Georgiadis*, Curtis DeGasperi, Kevin Bogue	Distinguishing climate change impacts from development impacts on summer low flows in Puget Sound streams

S03. Protective water temperature regimes and standards in a hot, dry future: Science needs and policy challenges ◆

Moderator(s):	**Joseph Ebersole**			
Room	Agriculture Science			
Time	*ID*	*Presenter*	*Authors*	*Presentation title*
10:00 - 10:15 AM	S03-1	Gordon Reeves	Gordon Reeves*	The Variability in Thermal Regimes: Using it to our advantage
10:15 - 10:30 AM	S03-2	Derek Godwin	Derek Godwin*, Carlos Ochoa, Gerrad Jones	Status, trends, and factor analysis of stream temperature along a longitudinal profile in a Western Oregon multi-use watershed
10:30 - 10:45 AM	S03-3	Jonathan Armstrong	Jonathan B. Armstrong*	How can seasonally warm habitats contribute to cold-water fisheries?
10:45 - 11:00 AM	S03-4	Brian Kastl	Brian Kastl*, Brian Thompson, Joseph L. Ebersole, Theodore E. Grantham	Accounting for temperature-stressor interactions in thermal tolerance assessments of Pacific salmon

11:00 - 11:15 AM	S03-5	Debra Sturdevant	Debra Sturdevant*, James McConaghie	Challenges for state adoption and implementation of regime-based water quality standards- the view from Oregon
11:15 - 11:30 AM	S03-6	Abigail J. Lynch	Abigail J. Lynch*, Laura M. Thompson, Anthony Ciocco, Amanda E. Cravens, Mitchell Eaton, Jeremy Littell, Brian W. Miller, Madeleine A. Rubenstein, Lindsey Thurman, Jackson B. Valler, Sarah R. Weiskopf, John M. Morton	Monitoring for RADical Ecosystem Change: Applying the Resist-Accept-Direct (RAD) framework

S04. Mercury cycling in western reservoirs

Moderator(s):	**Austin Baldwin** and **Brett Poulin**			
Room	Wells Fargo Bank			
Time	*ID*	*Presenter*	*Authors*	*Presentation title*
10:00 - 10:15 AM	S04-1	James J. Willacker	James J. Willacker*, Collin Eagles-Smith, James Chandler, Ralph Myers, Jesse Naymik, David P. Krabbenhoft	The Impact of Impoundment: The influence of riverine impoundments on fish mercury concentrations along an arid land river
10:15 - 10:30 AM	S04-2	Austin Baldwin	Austin Baldwin*, Collin Eagles-Smith, James Willacker, David Krabbenhoft, Michael Tate, Alysa Yoder, Brett Poulin, Jesse Naymik, Dain Bates, Nick Gastelecutto, Charles Hoovestol, Chris Larsen, Ralph Myers, James Chandler	In-reservoir physical processes control aqueous and biological methylmercury export from a seasonally anoxic reservoir
10:30 - 10:45 AM	S04-3	Collin Eagles-Smith	Collin Eagles-Smith*, James J. Willacker, David P. Krabbenhoft, James Chandler, Austin Baldwin, Jesse Naymik	Factors controlling methylmercury bioccumulation and biomagnification through the Hells Canyon Reservoir Complex on the Snake River
10:45 - 11:00 AM	S04-4	Virginia M. Krause	Virginia M. Krause*, Austin K. Baldwin, David P. Krabbenhoft, Jacob M. Ogorek, Michael T. Tate, Brett A. Poulin	Internal production of methylmercury in Snake River riparian zones upgradient of the Hells Canyon Complex (Idaho, Oregon)
11:00 - 11:15 AM	S04-5	Chris S. Eckley	Geoffrey D. Millard, Chris S. Eckley*, Todd P. Luxton, Jennifer Goetz, Sarah Janssen, John McKernan	Determining mercury transformation rates with stable isotope additions in three western USA reservoirs
11:15 - 11:30 AM	S04-6	Chris S. Eckley	Chris S. Eckley*, Collin Eagles-Smith, Todd P. Luxton, Jennifer Crawford, Caitlin Rumrill, Joe Goulet, Jennifer Goetz, Geoffrey Millard, Anna Wade	The influence of a flood-control reservoir on mercury methylation and bioaccumulation downstream of the Black Butte Mine Superfund Site, Oregon

S05. Retrospective and prospective catchment studies at the H.J. Andrews Experimental Forest ⚡ ◆				
Moderator(s):	**Catalina Segura**, **Julia Jones**, and **Brooke Penaluna**			
Room	Construction and Engineering Hall			
Time	*ID*	*Presenter*	*Authors*	*Presentation title*
10:00 - 10:14 AM	S05-1	Frederick Swanson	Frederick Swanson*	Watershed Change, Watershed Memory: Examples from H.J. Andrews Experimental Forest, Oregon
10:14 - 10:28 AM	S05-2	Steve Wondzell	Steve Wondzell*, Sherri Johnson, Gordon Grant, Julia Jones, Catalina Segura, Adam Ward	Gaging Uncertainty: Stationarity, detection limits, and long-term trends in discharge from paired-catchment studies
10:28 - 10:43 AM	S05-3	Pamela L. Sullivan	Pamela L. Sullivan*, Victoria Moreno, Keira Johnson, Alyssa Duro, Karla Jarecke, Alexander Redlins, Reece Gregory, Holly Barnard, Kamini Singha, Lola Klamm, Annalise Guthrie, Fiona Si Ting Liu, Kachinga Silwimba, Micah Unruh, Hoori Ajami, Sharon Billings, Alejandro Flores, Daniel Hirmas, Li Li	How will climate and land cover disturbance influence water and carbon cycles in the critical zone? Applying an ecohydrologic perspective toward H.J. Andrews
10:43 - 10:56 AM	S05-4	Ivan Arismendi	Ivan Arismendi*, Brooke E. Penaluna, Stanley V. Gregory	Trout Under Drought: A long-term study of annual growth and condition of stream-living Coastal Cutthroat Trout (Oncorhynchus clarkii clarkii)
10:56 - 11:10 AM	S05-5	Dana Warren	Dana Warren*, Allison Swartz, Catalina Segura	When in Drought: Stream ecosystem and aquatic biota responses to drought conditions in Western Cascade headwaters
11:10 -11:15 AM	S05-6	Charlie Wright	Charlie Wright*, Julia Jones, Frederick Swanson	Effects of forest harvest, floods, and wildfire on bedload export from headwater catchments in the H.J. Andrews Experimental Forest, 1957 to present ⚡ ◆
11:15 - 11:20 AM	S05-7	Zachary Perry	Zachary Perry*, Catalina Segura	The effects of physiography on flow paths and water storage in a mountainous catchment ⚡ ◆
11:20 - 11:25 AM	S05-8	Jaime Ortega	Jaime Ortega*, Catalina Segura, Pamela L. Sullivan	Drivers of relative streamflow contributions and flow paths in mountainous headwater streams ⚡ ◆
11:25 - 11:30 AM	S05-9	Paige Becker	Paige Becker*, Adam Ward, Steve Wondzell, Skuyler Herzog	Reach to Segment Upscaling: What goes missing when we upscale our hyporheic studies? ⚡ ◆

Tuesday, June 6, 1:00-2:30 PM

S06. Part 2: Partnering science, decision makers, and industry in catchment studies

Moderator(s):	**Andrés Iroumé**, **Francisco Javier Balocchi Contreras**, Julia Jones, and Catalina Segura			
Room	Agriculture Leaders			
Time	*ID*	*Presenter*	*Authors*	*Presentation title*
1:00 - 1:15 PM	S06-1	Adell Amos	Adell Amos*	Law and Policy in the Watershed: Integrating law and policy analysis in watershed level research
1:45 - 2:00 PM	S06-4	Jorge D. Abad	Jorge D. Abad*	Why did the Amazon Waterway Project (Hidrovía Amazónica) fail? Consequences of the lack of science-based studies on the development of comprehensive protocols
1:15 - 1:30 PM	S06-2	Andrés Iroumé	Rebeca Sanhueza, Andrés Iroumé*	Forest Management and Catchments: 15 years of research by CMPC in Nacimiento, Biobío Region, South-Central Chile
1:30 - 1:45 PM	S06-3	Francisco Balocchi	Francisco Oyarce, Bárbara Flores, Francisco Balocchi*, Pablo Ramírez de Arellano	Promoting Water Security from the Land: Forestal Arauco's catchment prioritization and management plan in south-central Chile
2:00 - 2:15 PM	S06-5	Melissa Schaar	Melissa Schaar*	Breaking barriers to collaborative science in the mining-affected transboundary Kootenai River Basin, United States and Canada
2:15 - 2:30 PM	S06-6	Alemayehu Shanko	Alemayehu Shanko*, Marco Ravina, Sergio Galletta, Augustin Dagbetin, Omama Ahmed Hussein Kamaleldin, Madalitso Mng'ombe, Lameck Mnyenyembe, MariaChiara Zanetti	Urban Wastewater Treatment in African Countries: Evidence from the Hydroaid Initiative

S07. Low-Flows Part 2: Causes and consequences of decreasing late-summer low-flows in the Western USA ◆

Moderator(s):	**Elizabeth Keppeler**, **Steve Wondzell**, **Joe Wagenbrenner**, Safeeq Khan, Renée Brooks, and David Dralle			
Room	Agriculture Production			
Time	*ID*	*Presenter*	*Authors*	*Presentation title*
1:00 - 1:15 PM	S07-1	John Mallard	John Mallard*, Garett Pignotti, Steve Wondzell, Sherri Johnson, Gordon Grant, Becky Fasth	Decreasing Late-Summer Low-Flows in the Pacific Northwest: Describing the scope of the problem and exploring its implications across scale
1:15 - 1:30 PM	S07-2	Steve Wondzell	Steve Wondzell*, John Mallard, Garett Pignotti, Sherri Johnson, Gordon Grant, Becky Fasth	Late Summer Streamflow Deficits: A search for an explanatory mechanism

S07. Low-Flows Part 2: Causes and consequences of decreasing late-summer low-flows in the Western USA ◆ **continued**

1:30 - 1:45 PM	S07-3	Noah Benitez-Nelson	Noah Benitez-Nelson*, David N. Dralle, W. Jesse Hahm, Daniella M. Rempe	Interannual differences in the refilling of vadose zone storage drives variability in streamflow generation across seasonally dry California watersheds
1:45 - 2:00 PM	S07-4	Joe Wagenbrenner	Joe Wagenbrenner*, Elizabeth Keppeler, Paul Richardson, Elise Miller, Salli Dymond, Kevin Bladon, Lorrayne Miralha	Experimental timber harvests in northern California show that drought can reduce post-harvest gains in summer low flows
2:00 - 2:15 PM	S07-5	Catalina Segura	Catalina Segura*, Julia Jones	Long-term trends in diel streamflow provide insight into the effects of forest disturbance on evapotranspiration
2:15 - 2:30 PM	S07-6	Ashley A. Coble	Ashley A. Coble*, Emily D. Heaston, Jason Dunham	Classifying flow permanence (FLOwPER) of non-fish-bearing streams on privately managed forests in an above-average low flow year

S08. Emerging methods in the geomorphology of river corridors ◆

Moderator(s):	**Marina Metes** and **Labeeb Ahmed**			
Room	Agriculture Science			
Time	*ID*	*Presenter*	*Authors*	*Presentation title*
1:00 - 1:15 PM	S08-1	Yunxiang Chen	Yunxiang Chen*, Jie Bao, Timothy Scheibe	AI-enabled drone surveys for streambed grain size distributions and hydro-biogeochemical parameters
1:15 - 1:30 PM	S08-2	James White	James White*, Karen Bartlet, Brandon Overstreet	Developing high-resolution substrate datasets to inform Chinook Salmon spawning models on the McKenzie River, Oregon
1:30 - 1:45 PM	S08-3	Jonahid Chakder	Jonahid Chakder*, Md Mahfuzul Haque	Geomorphic influence on the flash flood of the transboundary Khowai River of Bangladesh
1:45 - 2:00 PM	S08-4	Jackson Leonard	Jackson Leonard*, Temuulen Sankey, Lauren Tango	Connecting the Old with the New: Using new technology to build upon old datasets on the Verde River, Arizona
2:00 - 2:15 PM	S08-5	Jorge D. Abad	Jorge D. Abad*, T. V. Rojas, J. Marín-Díaz, L. Dominguez-Ruben	Mapping River Geomorphology Patterns in the Peruvian Amazon Basin: Their importance for biodiversity
2:15 - 2:30 PM	S08-6	Panel Discussion		

S09. Improved groundwater and surface-water science for water management and restoration in the semiarid Western U.S.: Insights from the Harney Basin, OR and Salton Sea, CA ◆				
Moderator(s):	**Amanda Garcia**			
Room	Wells Fargo Bank			
Time	*ID*	*Presenter*	*Authors*	*Presentation title*
1:00 - 1:15 PM	S09-1	C. Amanda Garcia	C. Amanda Garcia*, Stephen B. Gingerich, Henry M. Johnson	Groundwater budget of the Harney Basin, Oregon
1:15 - 1:30 PM	S09-2	Jordan Beamer	Jordan Beamer*, Mellony Hoskinson	Irrigation water use and groundwater pumpage in the Harney Basin
1:30 - 1:45 PM	S09-3	Casie Smith	Casie Smith*, Tammy Wood	Malheur Lake turbidity and implications for watershed restoration
1:45 - 2:00 PM	S09-4	Barry Hibbs	Barry Hibbs*, Camila Bautista	Identifying water sources at new wetlands on the shores of the retreating Salton Sea, California
2:00 - 2:15 PM	S09-5	Gerald H. Grondin	Gerald H. Grondin*, Darrick E. Boschmann, Halley J. Schibel, Benjamin P. Scandella	Hydrostratigraphic hydraulic property control on observed groundwater response to development in the Harney Basin, Oregon
2:15 - 2:30 PM	S09-6	Stephen B. Gingerich	Stephen B. Gingerich*, Henry M. Johnson, Darrick E. Boschmann, Gerald H. Grondin, C. Amanda Garcia	Geologic controls on groundwater availability in Harney Basin, Oregon

S10. Part 1: Wildfire Effects on Watersheds: Implications for water security, water quality, aquatic habitats, and aquatic species ◆				
Moderator(s):	**David Roon**, Jana Compton, Kevin Bladon, Rebecca Flitcroft, Will Long, and Caelan Simeone			
Room	Construction and Engineering Hall			
Time	*ID*	*Presenter*	*Authors*	*Presentation title*
1:00 - 1:15 PM	S10-1	William Burns	William Burns*, Nancy Calhoun, Jason Kean, Francis Rengers	Recent observations of post-fire debris flows in five megafires in the Western Cascades, Oregon
1:15 - 1:30 PM	S10-2	Sudhanshu Panda	Sudhanshu Panda*, Devendra M. Amatya, Amit Armstrong, Johnny M. Grace	Pre- and post-wildfire condition micro-watershed-wise forest road/stream crossings structure failure vulnerability assessment using geospatial modeling approach
1:30 - 1:45 PM	S10-3	Rachel Sleeter	Rachel Sleeter*, Stephen Hundt, Andrea Creighton	Post-fire vegetation tracking to estimate sediment erosion rates: A multi-sensor approach
1:45 - 2:00 PM	S10-4	Haley Canham	Haley Canham*, Belize Lane	Revealing hydrologic variability in post-wildfire rainfall-runoff response
2:00 - 2:15 PM	S10-5	Richard Webb	Sarah Elliott, Michelle Hornberger, Rebecca Frus, Donald Rosenberry, Richard Webb*	Assessment of critical drivers influencing post-fire water quality impairment in receiving waters in Western U.S.
2:15 - 2:30 PM	S10-6	Amanda Hohner	Amanda Hohner*	Wildfire implications for drinking water systems

Tuesday, June 6, 3:00-4:30 PM

S11. Understanding and predicting harmful algal blooms ◆

Moderator(s):	**Amalia Handler** and **Lara Jansen**			
Room	Agriculture Leaders			
Time	*ID*	*Presenter*	*Authors*	*Presentation title*
3:00 - 3:15 PM	S11-1	Taylor Dodrill	Taylor Dodrill*, Yangdong Pan, Shon Schooler, Janet Niessner, Ashley Russell, John Schaefer, Tawnya Peterson, Michelle Wood	Developing a local harmful algal bloom monitoring program in the Coos Bay area, OR: From fresh water to the sea
3:15 - 3:30 PM	S11-2	Catherine S. Fong	Catherine S. Fong*, Erik W. Meyer, Kelly M. Martin, Monica S. Buhler	Results of toxic cyanobacteria monitoring in Yosemite National Park, Sequoia and Kings Canyon National Parks, and Devils Postpile National Monument
3:30 - 3:45 PM	S11-3	Norman Buccola	Norman Buccola*, Sarah Burnet, Holly Bellringer, Kathryn Tackley	Status and trends in water quality for Willamette Basin reservoirs
3:45 - 4:00 PM	S11-4	Tyler King	Tyler King*, Katherine Walton-Day, Nicole Gibney, M. Alisa Mast, Evan Gohring, Rachel Gidley	Remote sensing and field verification of harmful algal blooms at Blue Mesa Reservoir, Curecanti National Recreation Area
4:00 - 4:15 PM	S11-5	Kurt Carpenter	Kurt Carpenter*, Paul Diaz, Natalie Hall, Tyler King, Carl Legleiter, Will Long, Adam Mumford, Wesley Noone, Brandon Overstreet, Barry Rosen, Sean Payne, Noah Schmadel	Post-fire hyperspectral surveys of periphyton to protect drinking water quality in three Cascade Range rivers following the September 2020 wildfires
4:15 - 4:30 PM	S11-6	James Watson	James Watson*, Mathew Titus, John Woodill	Automated harmful algal bloom predictions using machine learning and multiple data sources

S12. Part 1: Advancing watershed science using machine learning, diverse data, and mechanistic modeling from the summit to the sea - Hydrological Extremes and Data ◆				
Moderator(s):	**Xingyuan Chen**, **Anna Jalowska**, Dipankar Dwivedi, Alex Sun, Dev Niyogi, and Geneva Gray			
Room	Agriculture Production			
Time	*ID*	*Presenter*	*Authors*	*Presentation title*
3:00 - 3:15 PM	S12-1	Francisco Guerrero	Francisco Guerrero*, Allison Myers-Pigg	Merging human and artificial intelligence to accelerate scientific discovery in watershed science
3:15 - 3:30 PM	S12-2	Hedeff I. Essaid	Hedeff I. Essaid*, Aubrey L. Dugger, Trevor Amestoy, Nancy Baker, Adam Benthem, Joel Blomquist, Xingyuan Chen, Salme Cook, Galen Gorski, Andrew Hamilton, Liv Herdman, Abigail Jaye, Jennifer Keisman, Noah Knowles, P.C.D. Milly, Diana Pedraza, Jason Pope, Andreas Prein, Patrick Reed, Kevin Sampson, Ward Sanford, Gabriel Senay, Jared Smith, Terry Sohl, Chris Vernon, David Yates, Wes Zell, Jacob Zwart	Integrated modeling to assess Delaware River Basin water resource vulnerability to drought
3:30 - 3:45 PM	S12-3	Adnan Rajib	Adnan Rajib*, Bikas Gupta	Mapping wetlands with machine learning
3:45 - 4:00 PM	S12-4	Marja Haagsma	Marja Haagsma*, Stephen P. Good, Gabriel J. Bowen, David Noone, Christopher J. Still	Estimation of transpiration dynamics using a stable water isotope mass balance within a Bayesian framework
4:00 - 4:15 PM	S12-5	Patrick Dunn	Patrick Dunn*, Leanne Gilbertson	A partial least squared regression method for predicting stream nitrate loading in Iowa watersheds
4:15 - 4:30 PM	S12-6	Heather Golden	Heather Golden*, Grey Evenson, David Tyler Mahoney, Adnan Rajib, Jay Christensen, Charles Lane, Qiusheng Wu	Small inland surface waters disproportionately affect watershed processes: Insights from multiple models

S13. Small Streams and Big Changes: Headwater streams in a rapidly changing climate ◆				
Moderator(s):	**Jonathan Burnett**, **Jason Dunham**, **Roy Sando**, David Roon, and Kristin Jaeger			
Room	Agriculture Science			
Time	*ID*	*Presenter*	*Authors*	*Presentation title*
3:00 - 3:15 PM	S13-1	Nathan Chelgren	Konrad Hafen, Nathan Chelgren*, Jason Dunham, Adam N. Price	A data integration and modeling framework to improve streamflow estimates for low-order streams
3:15 - 3:30 PM	S13-2	Adam N. Price	Adam N. Price*, Kendra E. Kaiser	Analyzing modeled representations of no- and low-flow in the Pacific Northwest
3:30 - 3:45 PM	S13-3	Kristina Hopkins	Kristina Hopkins*, Charles Stillwell, Laura Gurley, Ryan Rasmussen, Deanna Hardesty	Remotely mapping streambank erosion hotspots in urban areas
3:45 - 4:00 PM	S13-4	Emily Heaston	Emily Heaston*, Jason Dunham	Feature mapping mobile data collection – tools for tracking stream flow permanence and stream road crossings in the Pacific Northwest
4:00 - 4:15 PM	S13-5	Lindsey Thurman	Lindsey Thurman*, Christopher Cousins, Tiffany Garcia, Dede Olson, Brooke Penaluna	Rangewide characterization of habitat suitability for headwater stream-associated torrent salamanders
4:15 - 4:30 PM	S13-6	Kenneth H. Williams	Kenneth H. Williams*, Laura T. Leonard, Jonathan O. Sharp	Reactive organic carbon export and associated contributions to disinfection byproduct formation during drinking water treatment in a subalpine watershed

S14. Hydrological and biogeochemical connectivity along the hillslope-riparian-stream continuum ◆				
Moderator(s):	**Pam Sullivan**, **Adam Ward**, and **Steve Wondzell**			
Room	Wells Fargo Bank			
Time	*ID*	*Presenter*	*Authors*	*Presentation title*
3:00 - 3:15 PM	S14-1	Scott G. Leibowitz	Scott G. Leibowitz*, Ryan A. Hill, Irena F. Creed, Jana E. Compton, Heather E. Golden, Marc H. Weber, Mark C. Rains, Chas E. Jones, Jr., E. Henry Lee, Jay R. Christensen, Rebecca A. Bellmore, Charles R. Lane	Connections Matter: National classification links wetlands and water quality
3:15 - 3:30 PM	S14-2	William Forney	William Forney*	The tug of wa(te)r in hydro-climo-biogeochemistry: Determining the winners in the watershed patterns behind multiple water quality indicators
3:30 - 3:45 PM	S14-3	Ann-Marie Fortuna	Ann-Marie Fortuna*, P.J. Starks, D.N. Moriasi, J.L. Steiner	Use of archived Conservation Effects Assessment Project (CEAP) data to monitor effects of conservation practices on water quality

S14. Hydrological and biogeochemical connectivity along the hillslope-riparian-stream continuum ◆ **continued**

3:45 - 4:00 PM	S14-4	Keira Johnson	Keira Johnson*, John N. Christensen, W. Payton Gardner, Matthias Sprenger, Li Li, Kenneth H. Williams, Rosemary W.H. Carroll, Nicholas Thiros, Wendy Brown, Curtis Beutler, Alexander Newman, Pamela L. Sullivan	Shifting groundwater fluxes in bedrock fractures and an alluvial fan: Evidence from stream water radon and water isotopes
4:00 - 4:15 PM	S14-5	Pin Shuai	Pin Shuai*, Tim Covino, Tim Fegel, Kelly Elder, Banning Starr, Xingyuan Chen, James Stegen	Understanding the impact of land cover change on hillslope hydrological and biogeochemical fluxes in a headwater catchment
4:15 - 4:30 PM	S14-6	Patrick Moran	Patrick Moran*, Jennifer Hamblen	Monitoring of transboundary rivers in Alaska and Washington for mining Impacts

S15. Part 2: Wildfire Effects on Watersheds: Implications for water security, water quality, aquatic habitats, and aquatic species ◆

Moderator(s):	**Jana Compton**, David Roon, Kevin Bladon, Rebecca Flitcroft, Will Long, and Caelan Simeone			
Room	Construction and Engineering Hall			
Time	*ID*	*Presenter*	*Authors*	*Presentation title*
3:00 - 3:14 PM	S15-1	Chuck Rhoades	Chuck Rhoades*, Tim Fegel, Matt Ross, Sam Struthers, Katie Willi, Jared Heath	Biogeochemical responses to severe wildfires in Colorado's headwater forests
3:14 - 3:28 PM	S15-2	Zhi Li	Zhi Li*, Bing Li, Peishi Jiang, Glenn Hammond, Pin Shuai, Xingyuan Chen	Evaluating watershed hydrologic responses to wildfires in Pacific Northwest using high-resolution numerical models
3:28 - 3:43 PM	S15-3	Francisco Balocchi	Francisco Balocchi*, Dante Corti, Miguel Castillo	Can we propose a hydrology research agenda to unravel the particularities of wildfires? The Chilean case in central southern Chile
3:43 - 3:56 PM	S15-4	Christine Hirsch	Christine Hirsch*, Joseph Ebersole, Rebecca Flitcroft, Marcia Snyder, Sara Wall	The "wet" Northwest Forest Plan area burns more than you might think: What long-term aquatic monitoring can offer fire science and management
3:56 - 4:10 PM	S15-5	David Roon	David Roon*, Kevin Bladon, Rebecca Flitcroft, Joseph Ebersole, Jana Compton	Synthesizing the effects of wildfire and shifting fire regimes on aquatic ecosystems in the Pacific Northwest
4:10 -4:15 PM	S15-6	Sidney A. Bush	Sherri L. Johnson, Sidney A. Bush*, Pamela L. Sullivan, Kevin D. Bladon, Adam S. Ward, Steven M. Wondzell	Stream biogeochemical response to mixed-severity fire and increasing storm magnitudes at H.J. Andrews Experimental Forest during the Holiday Farm Fire ◆

S15. Part 2: Wildfire Effects on Watersheds: Implications for water security, water quality, aquatic habitats, and aquatic species ◆ **continued**

4:15 - 4:20 PM	S15-7	Morgan Barnes	Morgan Barnes*, John Bailey, Kevin D. Bladon, Samantha Grieger, Maggi Laan, J. Alan Roebuck Jr., Timothy Scheibe, Joshua M Torgeson, Allison N. Myers-Pigg	Vegetation burn severity alters carbon, nitrogen, and phosphorus composition of chars and leachates: Implications for watershed biogeochemical cycling ◆
4:20 - 4:25 PM	S15-8	Katie Wampler	Katie Wampler*, Kevin D. Bladon, Allison N. Myers-Pigg	Drivers of carbon concentration and character through a river network following a 2020 Oregon wildfire ◆
4:25 - 4:30 PM	S15-9	Amy Mayedo	Amy Mayedo*, Kate Lajtha	Small watershed stream chemistry response to fire in a Pacific Northwest temperate rainforest ◆

Thursday, June 8, 9:30-11:00 AM

S16. Tribal watershed science and management ◆

Moderator(s):	**Bernadette Tsosie**			
Room	Agriculture Leaders			
Time	*ID*	*Presenter*	*Authors*	*Presentation title*
9:30 - 9:45 AM	S16-1	Gus Seixas	Gus Seixas*, Curt Veldhuisen	Forest management history influences eight decades of shallow landsliding in northwest Washington State
9:45 -10:00 AM	S16-2	Danielle Squeochs	Danielle Squeochs*	Aquifer replenishment and water management on the Yakama Reservation
10:00 - 10:15 AM	S16-3	Sheree Watson	Meryl B. Storb, Sheree Watson*	Groundwater Quality on the Fort Peck Reservation: A three-decade evaluation of nitrogen extent, magnitude and sources related to land use
10:30 - 10:45 AM	S16-4	Nicole Rasmussen, Caroline Walls	Nicole Rasmussen*, Caroline Walls*, Betsy Krier, Andrew Gendaszek, Oscar Wilkerson, Chad Opatz	Temperature dynamics and cold-water habitat leading restoration priorities within the Quillayute Watershed
10:45 - 11:00 AM	S16-5	Susannah Maher	Susannah Maher*, Mike Olis, Curt Veldhuisen, Gus Seixas	Multi-decadal temperature monitoring of forested tributaries in the Skagit Basin, Washington
10:15 - 10:30 AM	S16-6	Lindsay Wood	Lindsay Wood*, Caleen Sisk, Michael Preston	Restoring subsistence lifestyles above Shasta Dam in California

S17. Part 2: Advancing watershed science using machine learning, diverse data, and mechanistic modeling from the summit to the sea - Machine Learning Applications ◆

Moderator(s):	**Xingyuan Chen**, **Anna Jalowska**, Dipankar Dwivedi, Alex Sun, Dev Niyogi, and Geneva Gray			
Room	Agriculture Production			
Time	*ID*	*Presenter*	*Authors*	*Presentation title*
9:30 - 9:45 AM	S17-1	Jared Bowden	Jared Bowden*, Tanya Spero, Anna Jalowska, Geneva Gray	Developing Future Intensity, Duration, and Frequency (IDF) Curves: Example of lessons learned from comparing downscaling methods
9:45 -10:00 AM	S17-2	Utkarsh Mital	Utkarsh Mital*, Dipankar Dwivedi, James Brown, Carl Steefel	Spatial downscaling of future climate projections using GPU-assisted deep learning
10:00 - 10:15 AM	S17-3	Xingyuan Chen	Xingyuan Chen*, Peishi Jiang, Pin Shuai, Alex Sun	Improving process-based watershed models through machine learning based parameter estimation
10:15 - 10:30 AM	S17-4	Ward Sanford	Ward Sanford*, Wes Zell, Ken Belitz, Paul Stackelberg	A process-based machine learning project to predict water quality in base flow across the conterminous United States
10:30 - 10:45 AM	S17-5	James Latimer	James Latimer*, Marguerite Pelletier, Brenda Rashleigh, Michael Charpentier	The use of random forest modeling to determine important watershed and estuarine drivers/pressures/modulating factors on estuarine eutrophication response in Northeast estuaries
10:45 - 11:00 AM	S17-6	Jonathan D. Burnett	Jonathan D. Burnett*, Kristin L. Jaeger, Brooke E. Penaluna, Sherri L. Johnson	The advantages and limitations of using machine learning models to predict streamflow permanence and fish distribution for informing the size of riparian buffers

S18. Learning Through Doing: River valley restoration to a Stage 0 condition ◆

Moderator(s):	**Rebecca Flitcroft**, **William Brignon**, and Kate Meyer			
Room	Agriculture Science			
Time	*ID*	*Presenter*	*Authors*	*Presentation title*
9:30 - 9:45 AM	S18-1	Paul Powers	Paul Powers*, Kate Meyer	Evaluating fluvial process domains within unconfined and partially confined river valleys using the Geomorphic Grade Line methodology
9:45 -10:00 AM	S18-2	William R. Brignon	William R. Brignon*, Rebecca Flitcroft, Brian Staab	Towards a programmatic monitoring plan for restoration to Stage 0/8
10:00 - 10:15 AM	S18-3	Lauren Mork	Lauren Mork*, Mathias Perle	Evolution of Stage 0 restoration effectiveness monitoring on Whychus Creek, Oregon
10:15 - 10:30 AM	S18-4	Luke Whitman	Luke Whitman*, Brian Cannon, Michael Hogansen	Distribution of spring Chinook redds in the South Fork McKenzie River

S18. Learning Through Doing: River valley restoration to a Stage ◆ **continued**

10:30 - 10:45 AM	S18-5	Brian Cluer	Brian Cluer*	Tenfold Increase in Rearing Habitat: Model results for a Stage 0 restoration project on Whychus Creek, Oregon
10:45 - 11:00 AM	S18-6	Colin Thorne	Colin Thorne*, Paul Powers, Ben Eardley, Matt Parr	Experience gained from a decade of restoring streams to 'Stage Zero' in the US and UK

S19. Long-term data and flow processes on experimental watersheds: Implications to ecohydrologic studies to address climate change ◆

Moderator(s): **Devendra Amatya**, Bhavna Arora, John Campbell, Stephen Sebestyen, and Ben Gilbert

Room Wells Fargo Bank

Time	*ID*	*Presenter*	*Authors*	*Presentation title*
9:30 - 9:45 AM	S19-1	Jill Marshall	Jill Marshall*, Todd Dawson, Martha-Cary Eppes	Earth, wind, water, tree tap dancing, and implications for weathering and soil production rates
9:45 -10:00 AM	S19-2	Lucien Stoltze	Bhavna Arora, Lucien Stoltze*, Dipankar Dwivedi, Carl Steefel, Ben Gilbert	Impact of infiltration events and water table fluctuations on shale weathering in a mountainous watershed: Implications for hydrogeochemical export and river water quality
10:00 - 10:15 AM	S19-3	Zachariah Butler	Zachariah Butler*, Stephen Good, Marja Haagsma, Catalina Segura, Huancui Hu	Relationship between isotope ratios in precipitation and streamflow across watersheds of the National Ecological Observation Network
10:15 - 10:30 AM	S19-4	Elizabeth Keppeler	Elizabeth Keppeler*, Joe Wagenbrenner	Streamflow response to drought and climate variation in a managed coast redwood catchment
10:30 - 10:45 AM	S19-5	Brent Aulenbach	Brent Aulenbach*, Jeffrey W. Riley	Climatic variability in recharge and streamflow generation from riparian and hillslope landscapes in a forested headwater catchment, Panola Mountain Research Watershed, Georgia
10:45 - 11:00 AM	S19-6	Johnny Boggs	Johnny Boggs*, Ge Sun, Steve McNulty	Converting naturally regenerated mixed pine-hardwood to loblolly pine plantation forests reduces streamflow in the Piedmont of North Carolina

S20. GIS Part 1: Watershed assessment through a combined partnership prioritization and GIS modeling approach

Moderator(s): **Kristen Koch**, Katie Bartling, Jennifer Fetter, Matthew Royer and Ben Maus

Room Construction and Engineering Hall

Time	*ID*	*Presenter*	*Authors*	*Presentation title*
9:30 - 9:45 AM	S20-1	Kristen Koch	Kristen Koch*, Kathryn Bartling, Matthew Royer, Jennifer Fetter, Benjamin Maus	Penn State's Lower Susquehanna Partnership Initiatives
9:45 -10:00 AM	S20-2	Jennifer Fetter	Jennifer Fetter*, Kathryn Bartling, Matthew Royer, Kristen Koch, Benjamin Maus	Windshield Surveys Provide Dual Benefits: Project verification and watershed familiarity

S20. GIS Part 1: Watershed assessment through a combined partnership prioritization and GIS modeling approach◆ **continued**

10:15 - 10:30 AM	S20-4	Benjamin Maus	Benjamin Maus*, Matthew Royer, Kristen Koch, Jennifer Fetter, Kathryn Bartling	Introduction to the Agricultural Conservation Planning Framework (ACPF) as a project siting tool
10:00 - 10:15 AM	S20-3	Kathryn Bartling	Kathryn Bartling*, Matthew Royer, Kristen Koch, Jennifer Fetter, Benjamin Maus	A streamlined approach to GIS desktop review, field survey, and water quality monitoring on a watershed-wide planning scale
10:30 - 10:45 AM	S20-5	Matthew Royer	Matthew Royer*, Kristen Koch, Jennifer Fetter, Kathryn Bartling, Benjamin Maus	From Plan to Action: How thorough watershed assessment leads to action
10:45 - 11:00 AM	S20-6	D. Max Smith	D. Max Smith*, Megan M. Friggens, Chelcy F. Miniat	Co-production of vulnerability assessments for aquatic and riparian ecosystems in the Southwestern U.S.

Thursday, June 8, 12:00-1:30 PM

S21. The Walla Walla River Basin: Characterizing the integrated groundwater and surface water system and impacts of water use

Moderator(s): **Adel Haj**

Room Agriculture Leaders

Time	*ID*	*Presenter*	*Authors*	*Presentation title*
12:00 - 12:15 PM	S21-1	C. Amanda Garcia	C. Amanda Garcia*, Andrew J. Long, Jennifer L. Woody, Stephen B. Gingerich, Joseph J. Kennedy	Overview of groundwater resources, water use, and hydrologic trends in the Walla Walla River Basin of Washington and Oregon
12:15 - 12:30 PM	S21-2	Jackson Mitchell	Jackson Mitchell*, Wendy B. Welch, Jennifer E. McLean	Development of a hydrogeologic-framework model for the Walla Walla River Basin, Washington and Oregon
12:30 - 12:45 PM	S21-3	Jennifer Woody	Jennifer Woody*, Joseph Burns Kemper	Construction and application of improved hydrostratigraphic and conceptual groundwater flow models for the Walla Walla River Basin
12:45 - 1:00 PM	S21-4	Adel E. Haj	Adel E. Haj*, Parker Norton	Interpretation of recharge estimates from the USGS National Hydrologic Model for the Walla Walla River Basin
1:00 - 1:15 PM	S21-5	Henry M. Johnson	Henry M. Johnson*, C. Amanda Garcia, Adel E. Haj, Andrew J. Long, Anna-Turi Maher, Stephen B. Gingerich	Geochemical constraints on groundwater recharge, Walla Walla River Basin, Oregon-Washington
1:15 - 1:30 PM	S21-6	Anna-Turi Maher	Anna-Turi Maher*, Esther Pischel, Andrew J. Long, C. Amanda Garcia, Henry M. Johnson	Quantifying high-resolution and long-term groundwater and surface-water interactions throughout the Oregon and Washington Walla Walla River Basin

S22. Part 3: Advancing watershed science using machine learning, diverse data, and mechanistic modeling from the summit to the sea - Biological and Physical Watershed Processes ◆

Moderator(s):	**Xingyuan Chen**, **Anna Jalowska**, Dipankar Dwivedi, Alex Sun, Dev Niyogi, and Geneva Gray			
Room	Agriculture Production			
Time	*ID*	*Presenter*	*Authors*	*Presentation title*
12:00 - 12:15 PM	S22-1	Dawn R. URycki	Dawn R. URycki*, Stephen P. Good, Byron C. Crump, Natalie Ceperley, J. Renée Brooks	Microbial communities reveal sources of streamflow in response to early-season storm event
12:15 - 12:30 PM	S22-2	Marguerite C. Pelletier	Marguerite C. Pelletier*, Michael Charpentier	Identification of ecoregion-specific watershed and estuary variables affecting benthic invertebrate condition
12:30 - 12:45 PM	S22-3	Hannah Steele	Hannah Steele*, Mark S. Raleigh	Demonstrating Physics Guided Machine Learning for Snow Hydrology Estimations in the Western United States
12:45 - 1:00 PM	S22-4	David Goodrich	Haiyan Wei, David Goodrich*, I. Shea Burns, Carl Unkrich, J.J. Gourley, Efrat Morin, Francesco Marra, Yuval Shmilovich	Evaluation of NOAA radar-rainfall products and their impact on runoff predictions over the USDA-ARS Walnut Gulch Experimental Watershed
1:00 - 1:15 PM	S22-5	Sudhanshu Panda	Sudhanshu Panda*, Devendra M. Amatya, John L. Campbell, Shawna Reid, Sourav Mukherjee, Anna M. Jalowska, Sherri L. Johnson, Kelly Elder, Johnny M. Grace	Forest road/stream crossings structure vulnerability determination using hydro-geomorphologic analysis-supported geospatial modeling approach
1:15 - 1:30 PM	S22-6	Gabriel Barinas	Gabriel Barinas*, Stephen P. Good, Desiree Tullos	Mapping of floodplain roughness and its seasonal variation with machine learning approaches

S23. Modeling developments in reservoirs and regulated rivers

Moderator(s):	**Stewart Rounds**			
Room	Agriculture Science			
Time	*ID*	*Presenter*	*Authors*	*Presentation title*
12:00 - 12:15 PM	S23-1	Graham Markowitz	Graham Markowitz*, Luanne Y. Steffy	Assessing flow reduction effects on aquatic communities in the Susquehanna River Basin
12:15 - 12:30 PM	S23-2	Todd E. Steissberg	Todd E. Steissberg*, Zhonglong Zhang, John DeGeorge, Leila Ostadrahimi, Billy E. Johnson	One-Dimensional reservoir system simulation of water quality using HEC-ResSim for multi-objective decision-making and ecosystem management and restoration

S23. Modeling developments in reservoirs and regulated rivers◆ **continued**

12:30 - 12:45 PM	S23-3	Meryl Storb	Meryl Storb*, Bob Hirsch, Travis Schmidt, Ashley Bussell, Sara Eldridge	Canadian coal mines contribute tons of mine waste derived solutes into waters of the United States: Retrospective analysis of trends and load estimates into a transboundary reservoir
12:45 - 1:00 PM	S23-4	Zhonglong Zhang	Zhonglong Zhang*, Todd E. Steissberg, Scott A. Wells, Billy E. Johnson	CE-QUAL-W2 – Two-Dimensional Reservoir Water Quality Simulation
1:00 - 1:15 PM	S23-5	Taylor Dudunake	Taylor Dudunake*, Laurel Stratton Garvin, Seth Siefken, Katherine J. Chase, Stewart Rounds	Developing CE-QUAL-W2 models of Koocanusa Reservoir and the Kootenai River, Montana and Idaho
1:15 - 1:30 PM	S23-6	Stewart Rounds	Stewart Rounds*, Laurel Stratton Garvin, Taylor Dudunake, Seth Siefken, Ryan Fosness	CE-QUAL-W2 code changes to simulate selective withdrawal from Libby Dam at Koocanusa Reservoir on the Kootenai River, Montana

S24. Watershed evapotranspiration in a changing environment ◆

Moderator(s):	**Ge Sun** and **Devendra Amatya**			
Room	Wells Fargo Bank			
Time	*ID*	*Presenter*	*Authors*	*Presentation title*
12:00 - 12:15 PM	S24-1	Ge Sun	Ge Sun*	Evapotranspiration: Key to understanding watershed functions and their response to disturbances
12:15 - 12:30 PM	S24-2	Devendra M. Amatya	Henrique Haas, Devendra M. Amatya*, Ning Liu, Ge Sun , Latif Kalin, Daud Hamidi	Modeling the hydrology of a loblolly pine dominated watershed in South Carolina: A multiple model comparison study
12:30 - 12:45 PM	S24-3	Katy Smith	Katy Smith*, Terri Hogue, Katie Schneider, Bob Prucha	Understanding the impact of forest treatments on surface water runoff in a Sierra Nevada watershed
12:45 - 1:00 PM	S24-4	Safeeq Khan	Safeeq Khan*, Aliva Nanda, Peter Hartsough, Martha Conklin, Roger Bales	Investigating tree and stand level transpiration in the Sierra Nevada using complex network theory
1:00 - 1:15 PM	S24-5	Dawn R. URycki	Dawn R. URycki*, Allison E. Goodwell	Characterizing causality of landscape and meteorological drivers of evapotranspiration in heterogeneous landscapes
1:15 - 1:30 PM	S24-6	John Kim	John Kim*, Henrique Duarte, Ge Sun, Jingfeng Xiao, Steve McNulty	Simulating climate change impacts on basin scale water yield across the CONUS

S25. GIS Part 2: Closing the Gaps: Utilizing GIS and machine learning for watershed-based inventory and analysis				
Moderator(s):	**Katie Bartling**, Kristen Koch, Jennifer Fetter, Matthew Royer and Ben Maus			
Room	Construction and Engineering Hall			
Time	*ID*	*Presenter*	*Authors*	*Presentation title*
12:00- 12:15 PM	S25-1	Richard Thaxton	Richard Thaxton*, Grant Harley, Matthew Therrell	Characterizing drought in the SE United States with longleaf pine (Pinus palustris)
12:15 - 12:30 PM	S25-2	Adam Cummings	Adam Cummings*, Karen Pope	Rewinding the shifting baseline: using machine learning to identify potential historical meadows
12:30 - 12:45 PM	S25-3	Charles Lane	Adnan Rajib*, Arushi Khare, Qianjin Zheng, Qiusheng Wu, Heather E. Golden, Charles R. Lane, Jay R. Christensen, Travis A. Dahl, Jodi L. Ryder, Brian C. McFall	Mapping and modeling the effects of small surface waters in the Mississippi River Basin
12:45 - 1:00 PM	S25-4	Roger Barlow	Roger Barlow*, Jeffrey J. Danielson, John A. Young, Cherie Schultz	Airborne topobathymetric lidar collection of the non-tidal Potomac River 2019 and 2021: USGS in partnership with the Interstate Commission on the Potomac River Basin
1:00 - 1:15 PM	S25-5	Qiusheng Wu	Qiusheng Wu*, Adnan Rajib, Charles R. Lane, Jay R. Christensen, Heather E. Golden	Developing a national dataset of surface depressions and potential water storage
1:15 - 1:30 PM	S25-6	Jay Christensen	Jay Christensen*, Heather Golden, Laurie Alexander, Charles Lane, Ken Fritz, Marc Weber, Rose Kwok, Brian Pickard, Madeline Keefer	Mapping Headwater Streams and Inland Wetlands: Status and future directions

Poster Session Program

** Presenting author; ⚡ Lightning Talk*

Tuesday, June 6, 7:00-9:00 PM

Room: Giustina Gallery

P01. Partnering science, decision makers, and industry in catchment studies			
ID	*Presenter*	*Authors*	*Presentation title*
P01-1	Valentin Tembe Mwela	Valentin Tembe Mwela*, Donat Nsewanga Nkomele, Urbain Sinagoki, Victor Kanama Kimongo Ebo	Evaluation of water resources of the rivers of the city of Bandundu
P01-2	Andrés Iroumé	Andrés Iroumé*, Julia Jones, Rebeca Sanhueza	Flow intermittency in experimental catchments in south central Chile: The effects of morphometry, or forest plantation growth, or drought, or all together? ⚡
P01-3	Felipe Cisneros	Felipe Cisneros*	Instruments for the integrated management of water resources from scientific research ⚡
P01-4	David Blodgett	David Blodgett*, Andy Bock	What we call the things we study matters – toward greater consistency and precision in water science ⚡
P01-5	Krista Jones	Heather Bervid, Rose Wallick, Krista Jones*, Elena Nilsen, Alexandra Etheridge, Marc Stewart, James King	The USGS Willamette Integrated Water Science (IWS) Program: Overview of upcoming research and gaging in the Willamette Basin 2023-2031
P01-6	Hilary McMillan	Hilary McMillan*, Amelia Vankeuren, Jasper Oshun	Training the next generation of hydrologists through an undergraduate hydrological research experience in a coastal California watershed

P02, P07. Low-Flows: Consequences of climate change and management on streamflow			
ID	*Presenter*	*Authors*	*Presentation title*
P02-1	Sudip Gautam	Sudip Gautam*, Alok Smantaray, Meenu Ramadas, Meghna Babbar-Sebens	Characterization of historical and projected short-term droughts in the Umatilla River Basin for IPCC AR5 scenarios
P02-2	Sonali Chokshi	Sonali Chokshi*, Robert McKane, Jonathan Halama, Allen Brookes, Kevin Djang, Guillaume Mauger, Phillip North, Michelle Totman, Jacob McDermott, Philip Murphy	Modeling watershed response to climate change and snow dynamics in the Puget Sound Basin
P02-3	Garrett Pignotti	Garrett Pignotti*, Sherri Johnson, John Mallard, Steve Wondzell, Becky Fasth, Gordon Grant	Influence of snowpack and snowmelt on seasonal stream temperatures in the H. J. Andrews Experimental Forest
P02-4	Skuyler P. Herzog	Skuyler P. Herzog*, Josiah Chan, Matt Orr, Ron Reuter	Can artificial floodplain connectivity lead to greater baseflow in an incised river?

P03. Protective water temperature regimes and standards in a hot, dry future: Science needs and policy challenges			
ID	*Presenter*	*Authors*	*Presentation title*
P03-1	Kara Lewis	Kara Lewis*, Joleena De La Fe, Samantha Alcantara-Edolmo, Fernanda Portilla, Kaarina Thompson, Lauren Bolotin, Hilary McMillan, Jasper Oshun, Amelia Vankeuren	Spatial distribution of water temperature and dissolved oxygen in the Angelo Coast Range Reserve, Eel River Watershed
P05. Retrospective and prospective catchment studies at the H.J. Andrews Experimental Forest			
ID	*Presenter*	*Authors*	*Presentation title*
P05-1	Charlie Wright	Charlie Wright*, Julia Jones, Frederick Swanson	Effects of forest harvest, floods, and wildfire on bedload export from headwater catchments in the H.J. Andrews Experimental Forest, 1957 to present
P05-2	Zachary Perry	Zachary Perry*, Catalina Segura	The effects of physiography on flow paths and water storage in a mountainous catchment
P05-3	Jaime Ortega	Jaime Ortega*, Catalina Segura, Pamela L. Sullivan	Drivers of relative streamflow contributions and flow paths in mountainous headwater streams
P05-4	Paige Becker	Paige Becker*, Adam Ward, Steve Wondzell, Skuyler Herzog	Reach to Segment Upscaling: What goes missing when we upscale our hyporheic studies?
P08. Emerging methods in the geomorphology of river corridors			
ID	*Presenter*	*Authors*	*Presentation title*
P08-1	Angus Vaughan	Angus Vaughan*, Faith A. Fitzpatrick, Jayme M. Strange, Molly Van Appledorn	Mapping potential sensitivity to hydrogeomorphic change in the UMRS riverscape
P08-2	Amanda Whaling	Amanda Whaling*, Jeffrey Riley, Charles Stillwell	Geomorphic change detection from bathymetric and topographic surveys of the French Broad River at a highway construction site near Asheville, NC
P08-3	Marina Metes	Marina Metes*, Andrew Miller, Matthew Baker, Kristina Hopkins, Daniel Jones	Measuring headwater stream incision over time using lidar-derived topographic metrics
P08-4	Labeeb Ahmed	Labeeb Ahmed*, Marina Metes, Tristan Mohs, Peter Claggett, Kristina Hopkins, Sam Lamont, Greg Noe	Mapping stream and floodplain geomorphic characteristics with the Floodplain and Channel Evaluation Tool (FACET) in the Mid-Atlantic Region, United States
P08-5	Alisa W. Coffin	Alisa W. Coffin*, Andrea Albright, David D. Bosch, Oliva Pisani, Tim C. Strickland	Understanding surface water storage using fused topobathy datasets of small agricultural ponds of the southern Coastal Plain of Georgia
P08-6	Julia Grabowski	Julia Grabowski*, Brandon Overstreet, James White, Karen Bartelt, Max Schwid	Techniques for collection, visualization, and interpretation of multiscale riverscape geospatial data
P08-7	Mike Shasko	Mike Shasko*	Hexagonal-based 1m LiDAR surface flow model

P09. Improved groundwater and surface-water science for water management and restoration in the semiarid Western U.S.: Insights from the Harney Basin, OR and Salton Sea, CA			
ID	*Presenter*	*Authors*	*Presentation title*
P09-1	Jason Dunham	Jason Dunham*	A brief tour of studies relating hydrologic processes to vulnerability of native fish and control of introduced fish in Oregon's Harney Basin
P10, P15. Wildfire Effects on Watersheds: Implications for water security, water quality, aquatic habitats, and aquatic species			
ID	*Presenter*	*Authors*	*Presentation title*
P10-1	Lauren L. Melendez	Lauren L. Melendez*, Kathleen E. Inman, Mary-Lynn B. Spiers, Jodi L. Ryder, Stephen W. Brown	A geospatial analysis of post-fire water quality impacts to salmon habitat
P10-2	Katherine McCredie	Katherine McCredie*, Kevin D. Bladon, Thomas H. DeLuca	Wildfire effects on soil health and stream water quality in a western Oregon watershed
P10-3	Hyunwoo Kang	Hyunwoo Kang*, Katie Wampler, Monireh Faramarzi, Allison N. Myers-Pigg, Cameron E. Naficy, Kevin D. Bladon	Modeling wildfire effects on hydrology and dissolved organic carbon yields in Oregon
P10-4	Cedric Pimont	Cedric Pimont*, Kevin Bladon	Sediment yields and soil properties following wildfire in the Western Cascades
P10-5	Sidney A. Bush	Sherri L. Johnson, Sidney A. Bush*, Pamela L. Sullivan, Kevin D. Bladon, Adam S. Ward, Steven M. Wondzell	Stream biogeochemical response to mixed-severity fire and increasing storm magnitudes at H.J. Andrews Experimental Forest during the Holiday Farm Fire ϟ
P10-6	Morgan Barnes	Morgan Barnes*, John Bailey, Kevin D. Bladon, Samantha Grieger, Maggi Laan, J. Alan Roebuck Jr., Timothy Scheibe, Joshua M Torgeson, Allison N. Myers-Pigg	Vegetation burn severity alters carbon, nitrogen, and phosphorus composition of chars and leachates: Implications for watershed biogeochemical cycling ϟ
P10-7	Katie Wampler	Katie Wampler*, Kevin D. Bladon, Allison N. Myers-Pigg	Drivers of carbon concentration and character through a river network following a 2020 Oregon wildfire ϟ
P10-8	Amy Mayedo	Amy Mayedo*, Kate Lajtha	Small watershed stream chemistry response to fire in a Pacific Northwest temperate rainforest ϟ
P11. Understanding and predicting harmful algal blooms			
ID	*Presenter*	*Authors*	*Presentation title*
P11-1	Daniel Sobota	Daniel Sobota*, Yuan Grund, Erin Costello, Brian Fulfrost	A web-based application for detecting and monitoring cyanobacteria blooms in Oregon lakes and reservoirs
P11-2	Stuart Dyer	Stuart Dyer*, Kale Clauson, Nathan Reetz, Jeremy Unrau, Aaron Borisenko	Strange Brew: Co-occurring toxins, genes, and genera detected in a small artificial impoundment
P11-3	Theo W. Dreher	Theo W. Dreher*	The Future of CyanoHABs Monitoring: Genomics and toxin congener assays in strain-specific monitoring
P11-4	Kerry Caslow	Kerry Caslow*, Bill Mann	Monitoring for associations between climate change and algal bloom growth

P11. Understanding and predicting harmful algal blooms (Poster) **continued**

P11-5	Christopher McLimans	Christopher McLimans*, Haiyuan Cai, K. David Hambright	Genomic analysis of microcystis species reveals distinct gene signatures and improved understanding of microcystis ecology
P11-6	Oliva Pisani	Oliva Pisani*, David D. Bosch, Alisa W. Coffin, Tim C. Strickland	Understanding land use impacts on water quality in small agricultural ponds of the southern Coastal Plain of Georgia
P11-7	Stephanie Gordon	Stephanie Gordon*, Rachel Atkins, Brianna Williams	Developing a national geospatial estimate of septic tank densities
P11-8	Jodi L. Ryder	Jodi L. Ryder*, Emily J. Summers	A modified stratification index to analyze reservoir bloom trends and make informed management decisions

P12, P17, P22. Advancing watershed science using machine learning, diverse data, and mechanistic modeling from the summit to the sea

ID	*Presenter*	*Authors*	*Presentation title*
P12-1	Bonan Li	Bonan Li*, Matthias Sprenger, Tianfang Xu, John Nimmo, Hoori Ajami, Ryoko Araki, Octavia Crompton, Daniel Gimenez, Jannis Groh, Daniel Hirmas, Nitin Singh, Briana Wyatt, Pamela L. Sullivan	Inferring spatial and temporal drivers of subsurface preferential flow using machine learning based on high-frequency multi-depth soil moisture observations
P12-2	Jonathan Maynard	Jonathan Maynard*, Dylan Beaudette, Amanda Pennino, Carlos Quintero, Skye Wills	Generating high-resolution probabilistic soil datasets for estimating soil hydraulic properties with propagated uncertainties
P12-3	Sean W. Fleming	Sean W. Fleming*, Olaf David, Angus G. Goodbody, Francesco Serafin, David C. Garen, Mikka Tully, Cara S. McCarthy, David A. Patterson, Rashawn Tama, Brandon Hua, Deb Harms	Democratizing artificial intelligence for applied watershed hydrology through user needs-driven design of prediction engines and operational platforms
P12-4	Chuyang Liu	Chuyang Liu*, Dipankar Dwivedi	Vulnerability of coast regions across the continental United States to future climate change and sea-level rise

P13. Small Streams and Big Changes: Headwater streams in a rapidly changing climate

ID	*Presenter*	*Authors*	*Presentation title*
P13-1	Roy Sando	Roy Sando*, Kristin Jaeger, Konrad Hafen, Toby Welborn, Ryan McShane, Nathan Chelgren, Kendra Kaiser, Jason Dunham, Kyle Blasch	Regional mapping of streamflow permanence in the headwaters using the PROSPER Models
P13-2	Charles R. Lane	Charles R. Lane*, Irena F. Creed, Heather E. Golden, Scott G. Leibowitz, David M. Mushet, Mark C. Rains, Qiusheng Wu, Ellen D'Amico, Laurie C. Alexander, Genevieve A. Ali, Nandita B. Basu, Micah G. Bennett, Jay R. Christensen, Matthew J. Cohen, Tim P. Covino, Ben DeVries, Ryan A. Hill, Kelsey Jencso, Megan W. Lang, Daniel L. McLaughlin, Donald O. Rosenberry, Jennifer Rover, Melanie K. Vanderhoof	Vulnerable waters – headwater streams and non-floodplain wetlands are essential to watershed resilience
P13-3	Nathan Chelgren	Francine H. Mejia, Nathan Chelgren*, Kristin L. Jaeger, Jonathan D. Burnett, Emily D. Heaston, Jason Dunham	Application of a Bayesian framework to assess streamflow permanence
P13-4	Lauren Giggy	Lauren Giggy*, Margaret Zimmer	Climatic and lithologic controls on streamflow activation and persistence in a central coastal California headwater catchment

P13. Small Streams and Big Changes: Headwater streams in a rapidly changing climate (Poster) continued

P13-5	Brooke E. Penaluna	Brooke E. Penaluna*, Jonathan D. Burnett, Kelly Christiansen, Ivan Arismendi, Sherri L. Johnson, Kitty Griswold, Brett Holycross, Sonja H. Kolstoe	UPRLIMET: UPstream Regional LiDAR Model for Extent of Trout in stream network
P13-6	Susan Hilton	Susan Hilton*, Katherine Lininger	Large Wood in Small Channels: A 20-year study

P14. Hydrological and biogeochemical connectivity along the hillslope-riparian-stream continuum

ID	*Presenter*	*Authors*	*Presentation title*
P14-1	Billy E. Johnson	Billy E. Johnson*, Charles W. Downer, Todd E. Steissberg, Nawa Raj Pradhan, Aaron R. Byrd, Zhonglong Zhang	Gridded Surface Subsurface Hydrologic Analysis (GSSHA) – eco-hydrology engineering design tool

P16. Tribal watershed science and management

ID	*Presenter*	*Authors*	*Presentation title*
P16-1	Sevval Sare Gulduren	Sevval Sare Gulduren*, Danielle Squeochs, John S. Selker	Hydrologic modeling to inform placement and design of low head check structures in Toppenish Creek watershed – White Swan, Washington

P18. Learning Through Doing: River valley restoration to a Stage 0 condition

ID	*Presenter*	*Authors*	*Presentation title*
P18-1	Dakota Whitman	Dakota Whitman*, Arian Brazenwood	Geomorphic response to low tech process-based restoration techniques on an incised, fourth order intermittent stream in northwest Montana
P18-2	Jay Munyon	Jay Munyon*, Rebecca Flitcroft	Monitoring floodplain rehabilitation using accessible NAIP imagery: A comparative study
P18-3	Jonathan D. Burnett	Jonathan D. Burnett*, Matt Barker, Steve Wondzell, Kate Meyer	A candid cost-benefit analysis evaluating the efficacy of using Small UAS for stream restoration effectiveness monitoring
P18-4	Aleah Hahn	Aleah Hahn*, Desiree Tullos, Steve Railsback	Individual based modeling of Stage 0 treatment on juvenile Chinook
P18-5	Shannon Claeson	Shannon Claeson*, Rebecca Flitcroft, Kate Meyer	Benthic macroinvertebrate responses following river restoration to Stage-0 conditions

P19. Long-term data and flow processes on experimental watersheds: Implications to ecohydrologic studies to address climate change

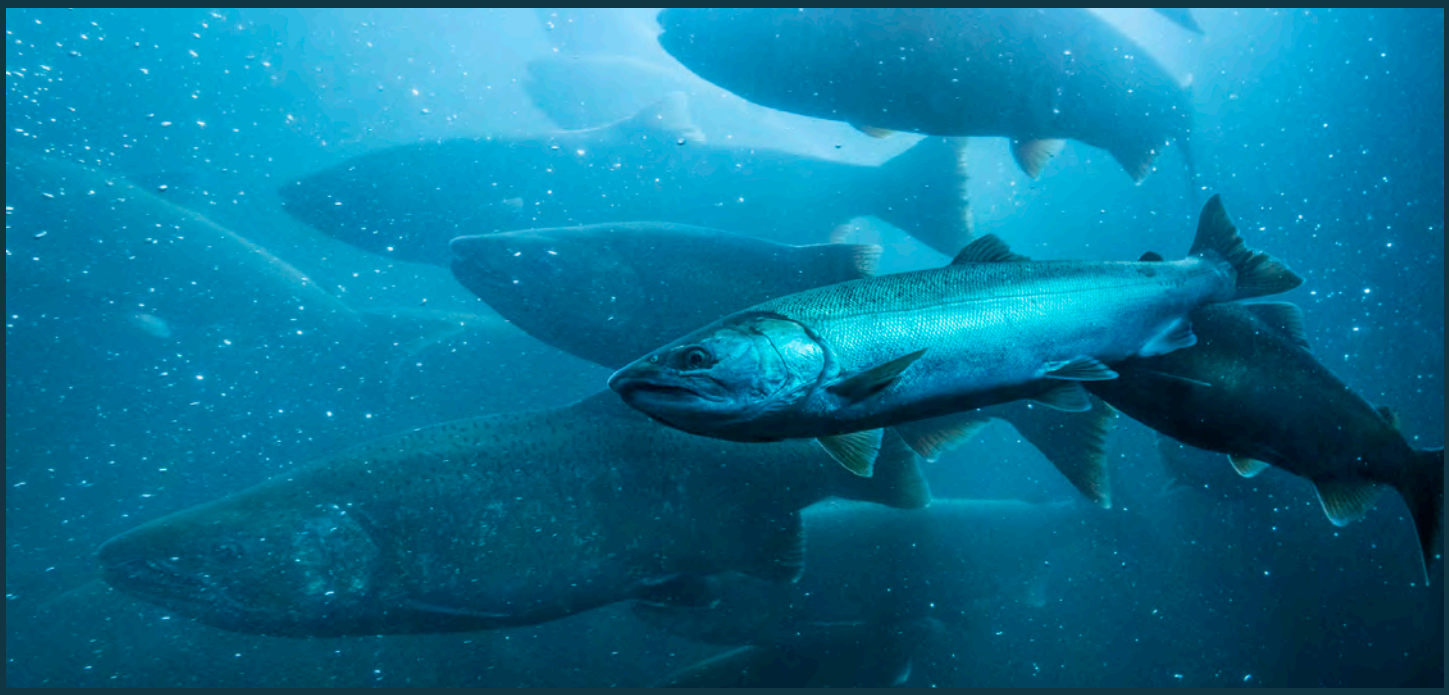
ID	*Presenter*	*Authors*	*Presentation title*
P19-1	Karla M. Jarecke	Karla M. Jarecke*, Kamini Singha, Jesse B. Nippert, Victoria Moreno, Daniel R. Hirmas, Hoori Ajami, Julio C. Pachon, Rachel M. Keen, Sharon Billings, Li Li, Alejandro N. Flores, Kayalvizhi Sadayappan, Xi Zhang, Pamela L. Sullivan	Illuminating soil hydrologic processes in a woody-encroached tallgrass prairie using electrical resistivity imaging and soil moisture data
P19-2	Jim Coloso	Jim Coloso*, Kaelin M. Cawley, Bobby Hensley, Kelly S. Aho, Robert O. Hall, Keli Goodman	Methods and estimates of gas exchange for National Ecological Observatory Network (NEON) streams
P19-3	Richard M.T. Webb	Richard M.T. Webb*, David L. Parkhurst	Temporal variations of discharge and water quality observed and simulated from 1992 to 2015 for two watersheds: Andrews Creek, Colorado, and the Río Icacos, Puerto Rico

***P19. Long-term data and flow processes on experimental watersheds: Implications to ecohydrologic studies to address climate change (Poster)* continued**

P19-4	Guadalupe Ferreyra	Guadalupe Ferreyra*, Danny Cabral, Sonja Dreuth, Vanessa Gonzalez, Mariana Gorceac, Hailey Odell, Corrine Sanford, Callie Summerlin, Krista Van Der Velde, Hilary McMillan, Jasper Oshun, Amelia Vankeuren	Surface water and groundwater chemistry in the Angelo Coast Range Reserve, Eel River Watershed
P19-5	Jeffrey Riley	Jeffrey Riley*, Brent Aulenbach	Forest response to drought in the Southeastern United States over the last 37 years
P19-6	David D. Bosch	David D. Bosch*, Tim C. Strickland, Alisa W. Coffin, Oliva Pisani, Kathryn Pisarello	Implications of climate change on hydrology in the Southeastern United States
P19-7	Sourav Mukherjee	Sourav Mukherjee*, Devendra M. Amatya, Anna M. Jalowska, John L. Campbell, Sherri L. Johnson, Kelly Elder, Sudhanshu Panda, Johnny M. Grace, Duncan Kikoyo	Extreme precipitation intensity-duration-frequency and design-discharge estimates for forest road-stream crossings design and ecological applications
P19-8	Andrzej Walega	Andrzej Walega*, Jakub Wojkowski, Devendra M. Amatya, Dariusz Mlynski	Exploiting satellite data for total direct runoff prediction using CN-based MSME model
P19-9	Carlos Ochoa	Carlos Ochoa*, Tim Deboodt, Mike Fisher, John Buckhouse, Todd Jarvis, Derek Godwin	A long-term study on the ecohydrology of juniper/sagebrush rangeland ecosystems
P19-10	Matthew Tippett-Vannini	Matthew Tippett-Vannini*, John Selker	Ecological accommodation of soil hydraulic properties in the Willamette Valley
P19-11	Lena C. Wang	Lena C. Wang*, P.L. Sullivan, S. Billings, H.R. Barnard, L. Li, D.R. Hirmas, J. Spect, J.C. Pachon, V. Varikuti, K. Johnson, K.M. Jarecke, A. Mollhagen	How does the distribution of aspen and conifer stands influence soil organic carbon and hydrological dynamics at the watershed scale in Mid-Latitude montane ecosystems?

P24. Watershed evapotranspiration in a changing environment

ID	*Presenter*	*Authors*	*Presentation title*
P24-1	William Miller	William Miller*, Gerardo Fratini, Johnathan McCoy, Ryan Walbridge, Derek Trutna, Andrew Parr, Katie Gerot, Alex Frodyma, Isaac Fuhrman, Liukang Xu, George Burba	Prospects of direct evapotranspiration measurements for immediate societal benefits
P24-2	William Miller	William Miller*, Gerardo Fratini, Johnathan McCoy, Ryan Walbridge, Derek Trutna, Andrew Parr, Katie Gerot, Alex Frodyma, Isaac Fuhrman, Liukang Xu, George Burba	A solution to address the need for direct evapotranspiration measurements for immediate societal benefits
P24-3	Cheng-Wei Huang	Cheng-Wei Huang*, Samantha Hartzell	Dynamic interactions between groundwater level and transpiration by phreatophytes
P24-4	Samantha Hartzell	Samantha Hartzell*, Danlyn Brennan, Cheng-Wei Huang	Modeling undersaturation in the leaf internal air space and its effect on the soil-plant-atmosphere continuum



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Adaptive Watershed Science and Ecosystem Management in a Changing Climate

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