

THE 10TH ANNUAL

An illustration of a floating island in a teal ocean. The island features a snow-capped mountain peak, a large orange sun, and stylized clouds. The island's base is submerged, showing a dark blue, irregular shape. The text 'NORTHWEST CLIMATE CONFERENCE' is overlaid in large white letters.

NORTHWEST CLIMATE CONFERENCE

OCTOBER 8 - 10, 2019 | PORTLAND, OR

www.nwclimateconference.org



WELCOME TO THE 10TH ANNUAL NORTHWEST CLIMATE CONFERENCE

Dear Colleagues,

On behalf of Portland State University and the conference Program Committee, it is my pleasure to welcome you to the 2019 Northwest Climate Conference.

This year we celebrate the 10th annual Northwest Climate Conference and a return of the conference to Portland. The first conference was held in June of 2010 on the campus of Portland State University. A lot has happened in the climate change space since 2010. Record breaking heat, smoke-filled skies, and one particularly notable snow drought have all acted as vivid examples of the changes taking place and risks they pose to our region. However, like the temperature, the level of engagement and action towards addressing the challenges climate change poses to the Northwest has been rising. Nothing illustrates this level of regional interest and commitment more than the Northwest Climate Conference and its progression over the last decade. This year's conference showcases a vast diversity of knowledge, bringing together experts from regional universities, tribal communities, governments, industries, and more.

We are grateful to all attendees for joining us in Portland and sharing their knowledge and expertise. Each year's conference provides a unique opportunity to learn and network across disciplinary, occupational, and cultural boundaries, working together on common goals. We look forward to contributing to this continued progress towards building a more climate change resilient Northwest in Portland this year.

We would like to give a special thanks to our partners at Oregon State University and their Conference Services team, University of Washington, and University of Idaho for continuing to support this conference tradition. We also thank our 25 sponsors for making this event possible, and the volunteer-led Program Committee who have been working for months to make this conference a success. I would like to extend an extra special thank you to Arielle Catalano, this year's conference coordinator.

Sincerely,

Paul Loikith

2019 Conference Chair

Assistant Professor

Department of Geography, Portland State University

The Program Committee for the 10th annual Northwest Climate Conference would like to thank its sponsors



Department of Geography

Department of Physics

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WEST BEARING INVESTMENTS



SAVING THE LAND THAT SUSTAINS US



Conference Organization

Paul Loikith, Portland State University, Conference Chair; Arielle Catalano, Portland State University, Conference Coordinator; Jill Soth, Oregon State University, Conference Services; Jen Hinds, University of Idaho, website management

The conference chair and conference coordinator want to express our deepest gratitude to the all-volunteer conference program committee. This conference would not have been possible without them, their diverse perspectives knowledge and expertise, and commitment to climate change action and resilience in the Northwest.

Program Committee (Name, Affiliation)

Amelia Marchand, Colville Tribes
Andrew Martin, Portland State University
Bobbak Talebi, Washington State Department of Ecology
Chas Jones, Affiliated Tribes of Northwest Indians and NW Climate Adaptation Science Center
Christina Aragon, Oregon State University
Crystal Raymond, University of Washington, Climate Impacts Group
Jack Newman, Sazan
Jeff Hicke, University of Idaho
Jennifer Adam, Washington State University
Jennifer Moore-Kucera, American Farmland Trust
Julie Sifuentes, Oregon Health Authority
Kathleen Johnson, Washington County Department of Health and Human Services
Kavita Heyn, Portland Water Bureau
Lara Whitely Binder, King County
Marnie Boardman, Washington Department of Health
Matt Glazewski, Clackamas County, Water Environment Services
Max Nielsen-Pincus, Portland State University
Nathan Marshall, Portland Community College
Nicole DeCrappeo, Northwest Climate Adaptation Science Center
Phil Mote, Oregon State University
Scott Hauser, Upper Snake River Tribes Foundation
Sean Finn, U.S. Fish and Wildlife Service
Sharon Delcambre, University of Portland
Vivek Shandas, Portland State University

A special thanks to Robert Liberty (Portland State University, Institute for Sustainable Solutions), Cristina Rojas (Portland State University), and Kenny Ma (Portland State University)

10th Annual Northwest Climate Conference

October 8-10, 2019

The Sentinel Hotel, Portland, Oregon

Tuesday, October 8, 2019

7:00 PM	Evening Plenary and Reception (open to all)
<i>Agriculture and Climate Change in the Pacific Northwest – Success, Opportunities, and Challenges</i> Panel Moderator – Jennifer Moore-Kucera (American Farmland Trust) Panelists: Gayle Goschie (Goschie Farms), Chad Kruger (Washington State University), Hannah Clark (American Farmland Trust), Risa Demasi (Grassland Oregon)	

Wednesday, October 9, 2019

7:00 AM	Breakfast (provided)
8:30 AM	Opening Plenary
	Opening Remarks, Paul Loikith, Conference Chair, Portland State University
	Invocation, TBD
9:15 AM	State of the Pacific Northwest Climate 2019, John Abatzoglou, University of Idaho
10:00 AM	BREAK
10:15 AM	Concurrent and Special Sessions
	Climate Change and Water Quality Impacts Agriculture Wildlife Ecology Movement Building for Equity: Justice Based Approaches to Climate Action and Resilience – Special Session State Adaptation Planning Across Sectoral Boundaries in Oregon: Integration Challenges and

11:45 AM	Lunch (provided)
12:45 PM	Concurrent and Special Sessions
	Climate Extremes and Dynamics Cities, Communities, and Climate Change Public Perception of Climate Change (12:45-1:25) Mental Health Resilience (1:35-2:15) Tribal Communities Final Results and Products of the Washington Coastal Resilience Project – Special Session
2:15 PM	BREAK
2:30 PM	Afternoon Plenary
	<i>Stories of Change: Community-led, justice based approaches to climate resilience</i> Panel Moderator: Jamie Stroble (King County) Panelists: Jill Mangaliman (Got Green), Maureen Darras (Community 2 Community), Katrina Peterson (Pugent Sound Sage)
3:15 PM	BREAK
3:30 PM	Concurrent and Special Sessions
	Climate change and Equity Coastal and Marine Science Building climate resilience and adaptation at the municipal level: Leading-edge case studies from the City of Portland – Special Session Sharing and Exploring Cross Jurisdictional Approaches to Forest Management Under Climate Change: Implementing the CA, WA, & BC Forest Management MOU – Special Session Communicating your science by distilling what you know and why it matters – Special Session
6:00 PM	Poster Session and Reception

Thursday, October 10, 2019

7:00 AM	Breakfast (provided)
8:30 AM	Opening Plenary
	Morning Announcements , Paul Loikith, Conference Chair, Portland State University
	Invocation , Tanna Engdahl, Tribal Elder, Cowlitz Tribe
8:45 AM	Keynote , Don Sampson, Chief of the Walla Walla Tribe, Affiliated Tribes of Northwest Indians
9:30 AM	BREAK
9:45 AM	Concurrent and Special Sessions
	Atmospheric Rivers and Precipitation
	Wildfire Impacts
	Tribes & Indigenous Peoples Engagement for the National Climate Assessment – Special Session
	Greening and Health: Neighborhoods Adapting to Climate Stressors – Special Session
	Resilient Water Resource Governance in the Pacific Northwest – Special Session
11:15 AM	LUNCH BREAK
12:45 PM	Concurrent and Special Sessions
	Forest Ecology
	River Hydrology
	The Clackamas Watershed Resilience Project: An Interdisciplinary Partnership Model for Conducting Climate Impact Assessment – Special Session
	Communicating Climate Change in the Pacific Northwest: Engaging Students in the Long Story – Special Session
	Envisioning Coastal Resilience through Alternative Futures Modeling – A Graduate Student Perspective – Special Session

2:15 PM	BREAK
2:30 PM	Afternoon Plenary
	<i>Emerging climate risks and liability: Understanding risk exposure in the insurance, legal, and water sectors</i> Panel Moderator – Kavita Heyn (Portland Water Bureau) Panelists: Paul Fuller (Allied Public Risk), Deanna Moran (Conservation Law Foundation), Edward Campbell (Portland Water Bureau)
3:15 PM	BREAK
3:30 PM	Concurrent and Special Sessions
	Resilience and Risk Climate Change and Public Health Snow and Ice Decision-Making Tools Climate Change and Stormwater Management: Notes from the Field – Special Session
5:00 PM	Conference Adjourns

Plenary Speakers

Tues Oct. 8, 7:00 PM: Grand Ballroom



Chad Kruger directs Washington State University's Center for Sustaining Agriculture and Natural Resources (WSU-CSANR). He has served on the 2007/2008 Washington State Climate Action Team, co-chairing the Agriculture Sector Carbon Market Workgroup; the 2010 Washington State Climate Change Working Lands Technical Advisory Group; the Washington State Energy Strategy Technical Experts Panel; the Northwest Regional Biocarbon Initiative, member of the Washington Department of Natural Resources Expert Council on Climate Change and was a Commissioner on the Douglas County Water Conservancy Board. He is currently a board member for the Northwest Ag Business

Center, the Advisory Board of the Northwest Environmental Forum, the WSDA Dairy Nutrient Advisory Committee, and the WDNR Climate Resilience Advisory Panel. He was raised in Washington State and has family roots in agriculture in both Eastern (wheat and cattle near Spokane) and Western Washington (berries in Whatcom County).



Hannah Clark leads American Farmland Trust's programs in the Pacific Northwest. Before joining AFT, she served as the executive director of the Washington Association of Land Trusts, a statewide coalition of 28 land conservation organizations dedicated to private voluntary land protection, where she led policy development and advocacy efforts to increase funding and tools for land protection and developed new and innovative programs to advance the land trust movement. Before that, Hannah was the federal policy director for the Washington Wildlife and Recreation Coalition, where she advanced bipartisan efforts to support

conservation funding through the federal Land and Water Conservation Fund. She was a member of Class 39 of Washington's AgForestry Leadership Program. She holds a Bachelor of Arts in public policy, environmental policy, and sustainable development from the University of Michigan.



Risa Demasi, a native Oregonian, grew up on a farm in the heart of the Willamette Valley and remains involved in the stewardship of its soil resources. She is a Co-founder of Grassland Oregon, and in addition to her active role in the company, she has provided leadership and insight on numerous boards throughout the US seed industry, including serving as Chair of the American Seed Trade Association. Grassland Oregon is the leading Cover Crop research company in the US. Working with nature to increase productivity is how they continue to provide novel solutions for today's growing concerns.

Gayle Goschie is a fourth generation Oregon farmer at Goschie Farms, Inc. The family is celebrating this season 115 years of growing hops. They grow 500 acres of hops, 150 acres of wine grapes and 200 acres of rotational crops including malting barley. In 2009, Gayle became the first woman grower to be awarded the International Order of the Hop, the highest honor in the hop growing community. Goschie Farms was the first hop grower to be certified as Salmon-Safe, which means they have adopted multiple conservation practices that protect water quality and native salmon. Today, every acre they farm is certified Salmon-Safe and their vineyards have achieved LIVE certification for sustainability. Other sustainable practices they utilize include being the first hop growers in the state to practice micro-irrigation farming techniques and are leaders in promoting beneficial insect activity there by limiting the use of chemical controls and they use solar power to partially operate their facilities. "Our soil is the true foundation of our multigenerational business. Protecting and enhancing our growing environments brings sustainability to our family business."





Wed Oct. 9, 9:15 AM: Grand Ballroom

Dr. John Abatzoglou is an Associate Professor of Geography at the University of Idaho, after receiving his bachelor's degree in Atmospheric Science from UC Davis and doctorate in Earth Systems Science from UC Irvine. John's academic interests are primarily focused around climate science and climate impacts in the American West. John and members of his Climatology Lab work on a diverse set of research questions spanning climate

science and meteorology as well as their impacts on water resources, wildfire, and agriculture. The research group also develops web-based climate services to help scientists and practitioners improve climate readiness of societies and ecosystems. He teaches classes in Climatology, Meteorology, Global Climate Change, and with his spare time enjoys gardening and exploring the wildlands of the American West with his wife, twin boys and his dog, Doppler.



Thurs Oct. 10, 8:45 AM: Grand Ballroom

Don Sampson is the Chief of the Walla Walla Tribe and Climate Change Program Director for Affiliated Tribes of Northwest Indians. Mr. Sampson is the Climate Change Project Director for the Affiliated Tribes of Northwest Indians, a consortium of 57-tribes in the Pacific Northwest. In 2015 he was one of 15 Indigenous representatives from North America at the Paris Climate Accords (COP21). Don was also the former Executive Director of the Institute of Tribal Government (2012-2017) part of the Center for Public Service at Portland State University. Mr. Sampson was the former Executive Director (2003-2010) and Chairman (1994-1997) of the Confederated Tribes of the Umatilla

Indian Reservation in Oregon; overseeing all tribal government and business operations with over 1500 employees. He was the Executive Director of the Columbia River Inter-Tribal Fish Commission from 1997-2003. He is an enrolled citizen of the Umatilla Tribe.

Thurs Oct. 10, 2:30 PM: Grand Ballroom



Paul Fuller is on the board of directors for the American Association of Water Distribution & Management (AAWD&M) and academic advisor for the Certified Public Risk Professional – Water (CPRP-W) designation through Appalachian State University. Mr. Fuller is CEO of Allied Public Risk, LLC, which is a national Managing General Underwriter exclusively focused on public entities and public water systems and Insurance Administrator for the California Association of Mutual Water Companies' Joint Powers Risk & Insurance Management Authority (JPRIMA). Paul earned his Bachelor of Business Administration from University of San Diego and Master of Science in Risk Management & Insurance from Georgia State University. He holds the Chartered Property Casualty Underwriter (CPCU) designation and a California Water Operator license (D2/T1).



As Director of Environmental Planning at Conservation Law Foundation (CLF), **Deanna Moran's** work focuses on identifying and implementing solutions to a variety of environmental problems that lie at the intersection of planning, development, and regulation. Deanna oversees CLF's climate resiliency initiatives for Massachusetts and is the co-author of the CLF report Climate Adaptation and Liability. Deanna received a B.A. in Environmental Design from the University of Buffalo, a Master's in Public Policy and a Master's in City and Regional Planning from Rutgers University.

Edward Campbell is the Director of Resource Protection and Planning at the Portland Water Bureau. He is responsible for coordination with federal, state and local partners on source protection efforts for both of the Bureau's drinking water sources, long-term planning and policy development work, compliance with environmental regulations, and leading the Bureau's regulatory compliance efforts for the LT2 Rule and federal Endangered Species Act. Prior to coming to the Bureau, Mr. Campbell served as a senior policy advisor, sustainability coordinator and chief of staff to Portland City Commissioner Dan Saltzman and before that as communications director for Multnomah County Chair Beverly Stein. Mr. Campbell holds a Bachelor of Arts degree in English Literature from the University of Southern California and a Master of Arts degree in English Literature from the University of Virginia.



2019 Northwest Climate Conference Detail

Tuesday, October 8

7:00 PM	Evening Plenary and Reception (open to all) – Governor Ballroom
	<i>Agriculture and Climate Change in the Pacific Northwest – Success, Opportunities, and Challenges</i> Panel Moderator – Jennifer Moore-Kucera (American Farmland Trust) Panelists: Gayle Goschie (Goschie Farms, Inc.), Chad Kruger (Washington State University), Hannah Clark (American Farmland Trust), Risa Demasi (Grassland Oregon)

Wednesday, October 9

7:00 AM	Breakfast (provided)				
8:30 AM	Opening Plenary – Governor Ballroom				
	Opening remarks, Paul Loikith, Conference Chair, Portland State University Invocation, TBD				
9:15 AM	State of the Pacific Northwest Climate 2019, John Abatzoglou, University of Idaho				
10:00 AM	BREAK				
10:15 AM	Concurrent and Special Sessions				
	Governor Ballroom	Renaissance Room	Grand Ballroom	Library	Billiard Room
	Climate Change and Water Quality Impacts	Agriculture	Wildlife Ecology	Movement Building for Equity: Justice Based Approaches to Climate Action and Resilience	State Adaptation Planning Across Sectoral Boundaries in Oregon: Integration Challenges and Opportunities

10:15 AM	Modeling the effects of climate change on hydrology and stream temperature in the South Fork of the Stillaguamish River	Agricultural Policy and Practices to Support USCA States' Climate Mitigation Goals: Examples from Western USA	Forecasting Species Assemblages under Projected Climate Scenarios: Implications for Wildlife Agencies as Species Colonize across State and International Borders	Presenters: Jill Mangaliman (Got Green), Maureen Darras (C2C), Jamie Stroble (King County Climate Action Team), Lili Allala (Environment &Equity Initiative, City of Seattle), Joyce Xi , (Union of Concerned Scientists), Debolina Benerjee (Puget Sound Stage)	Special Session [10:15-11:45]
	Katherine M. Clarke (Western Wash. Univ.), Robert J. Mitchell , John R. Yearsley	Jennifer Moore-Kucera (American Farmland Trust), Jimmy Daukas , Thayer Tomlinson , Anna Harmon, Hannah Clark	David S. Piliiod (U.S. Geological Survey), Michelle I. Jeffries , Robert S. Arkle , Deanna H. Olson		
10:35 AM	The influence of climate change on the distributions of native and nonnative trout species across Montana	Opportunities and obstacles for Northwest specialty crops in a changing climate	Evaluating the effectiveness of engineered log jam projects at improving salmon habitat		
	Donovan Bell (Univ. of Montana), Clint C. Muhlfeld , Robert Al-Chokhachy , David A. Schmetterling , Diane C. Whited , Ryan P. Kovach Andrew R. Whiteley	Lauren E. Parker (USDA California Climate Hub, UC Davis), John Abatzoglou , Katherine Hegewisch	Caroline J. Walls (Western Washington University), James M. Helfield		Presenters: Christine Shirley (Oregon Department of Land Conservation and Development), Geoff Crook (Oregon Department of Transportation), Shaun Clements (Oregon Department of Fish and Wildlife), Ali Hamade (Oregon Health Authority), Lesley Jantarasami (Oregon Department of Energy)

10:55 AM	The climate sensitivity of water quality in the Pacific Northwest: Linking anticipated shifts in hydrologic regime to riverine nitrogen sources in Puget Sound watersheds	Farmer Adaptation to Reduced Groundwater Availability in Idaho Katrina Running (Idaho State University), Morey Burnham	Non-native introgression from rainbow trout alters seasonal growth and migratory patterns of native westslope cutthroat trout in three wild populations		
	Elizabeth J. Elmstrom (University of Washington), Gordon Holtgrieve, Karrin Leazer Andrew Schauer		Jeffrey T. Strait (University of Montana), Lisa Eby, Ryan Kovach, Clint Muhlfeld, Matt Boyer, Stephen Amish, Gordon Luikart		
11:15 AM	Evaluating Climate Resilience of a Public Stormwater and Wastewater Utility using the EPA's CREAT Tool	Pest pressures under climate change: management implications for apple production	Effects of climate change and forest governance on large-scale insect outbreaks		
	Matt Glazewski (Water Environment Services of Clackamas County, Oregon)	Kirti Rajagopalan (Washington State University), Hossein Noorazar, Vincent Jones, Sonia Hall, Georgine Yorgey, Matt Jones, Chad Kruger	Dongmei Chen (University of Oregon)		
11:45 AM	Lunch (provided)				

12:45 PM	Concurrent and Special Sessions			
	Governor Ballroom	Renaissance Room	Grand Ballroom	Library
	Climate Extremes and Dynamics	Cities, Communities, and Climate Change	Public Perception of Climate Change	Tribal Communities
				Final Results and Products of the Washington Coastal Resilience Project
12:45 PM	Cold-air drainage and potential refugia in a basin in the western Cascade Range of Oregon	Triple exposure: mapping climatic, economic and socio-spatial drivers of risk and resilience in a 'sustainable city'	Assessment of Oregon public's risk perception of climate change impacts to water resources	Pacific Northwest Tribal Climate Change Project
	<i>Sarah J. K. Frey (Oregon State University), David Rupp, Sarah Shafer, Chris Daly, Julia Jones</i>	<i>Idowu Ajibade (Portland State University)</i>	<i>Monica L. Hubbard (Boise State University)</i>	<i>Haley E. Case-Scott (Pacific Northwest Tribal Climate Change Project, USDA Northwest Climate Hub)</i>
1:05 PM	High-resolution climate modeling for Southeast Alaska	Beyond the CIRCus – Communities Level up	Believing is Seeing: How Climate Change Beliefs Predict Perceptions of Extreme Weather in Oregon	Tribal Climate Camp: Tribes engaging Tribes to achieve their climate programming goals
	<i>Rick T. Lader (University of Alaska Fairbanks, AK CASC)</i>	<i>Ann K. Mooney (Climate Impacts Research Consortium), Katherine Hegewisch, Kara Odegard, Brian Henning, Levi Keesecker, Mike Petersen, Karl Rains</i>	<i>Brianne M. Suldovsky (Portland State University), Daniel Taylor-Rodriguez</i>	<i>Chas Jones (Affiliated Tribes of NW Indians, NW Climate Adaptation Science Center)</i>
				Presenters: <i>Ian Miller (Washington Sea Grant), Paige D. Lavin (University of Washington), Heidi A. Roop (University of Washington), Nicole Faghin (Washington Sea Grant), Bobbak Talebi (Washington State Department of Ecology), Lara Whitely Binder (King County)</i>

1:25 PM	The meteorological conditions associated with lightning outbreaks in the western United States	Climate Adaptation in Spokane, Washington	Mental Health Resilience	Let's Talk about Hopelessness, Fear, Depression & Grief! Why Psychology and Mental Health are Essential Components of Climate Resilience	Andrew J. Bryant (Climate & Mind)	Understanding Climate Change Impacts on the Nutrition and Cultural Benefits of the Makah Tribe's Traditional Seafood Species	Laura K. Nelson (University of Washington)
1:35 PM							
1:45 PM	Characterizing Trends in the Atmospheric Circulation of the Pacific Northwest with Self-Organizing Maps (SOMs)	Community Outreach-Livability Ambassador Program	Ecoanxiety: From Grief to Action	Tribal Climate Adaptation in R10: Assessment of Needs and Tools to Support Action			
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3:15 PM	BREAK			
3:30 PM	Concurrent and Special Sessions			
	Governor Ballroom	Renaissance Room	Grand Ballroom	Library
	Climate Change and Equity	Coastal and Marine Science	Building Climate Resilience and Adaptation at the Municipal Level: Leading-Edge Case Studies From the City of Portland	Sharing and Exploring Cross Jurisdictional Approaches to Forest Management Under Climate Change: Implementing the CA, WA, & BC Forest Management MOU
3:30 PM	Understanding Sociodemographic Inequity: Disproportionate Exposure to Climate-driven Detriments Across Kaiser Permanente Members	Positive Temperature Anomalies in Washington's Olympic Coast Nearshore Waters during the 2013-2015 Northeast Pacific Marine Heat Wave	Special Session [3:30-5:00] <i>Facilitator: Alice Brawley-Chesworth</i> (Portland Bureau of Environmental Services) <i>Presenters: Kavita Heyn</i> (Portland Water Bureau), <i>Nishant Parulekar</i> (Bureau of Environmental Services), <i>Nicholas McCullar</i> (Bureau of Environmental Services), <i>Kaitlin Lovell</i> (Bureau of Environmental Services), <i>Jonna Papaefthimiou</i> (Portland Bureau of Emergency Management)	Special Session [3:30-5:00] <i>Presenters: Dan Siemann</i> (Washington State Department of Natural Resources), <i>Taye Ayele</i> (British Columbia Ministry of Forests, Lands, Natural Resource Operations & Rural Development), <i>Loretta Moreno</i> (California Natural Resources Agency)
3:50 PM	Social Relationships, Resilience, and Equity	Oregon's Coordinating Council on Ocean Acidification and Hypoxia: Why We Need It, Where We Are		
	<i>Julie Early Sifuentes</i> (Oregon Health Authority), Edna Nyamu, Angie Kuzma	<i>Charlotte Regula-Whitefield</i> (Oregon Dept. of Fish & Wildlife), Caren Braby, Jack Barth		
				Communicating Your Science by Distilling What You Know and Why it Matters
				Special Session [3:30-5:00] <i>Presenters: Estelle Robichaux</i> (COMPASS Science Communication)

4:10 PM	Centering Equity and Culture within Tribal Climate Resilience Planning	Acid in the Intertidal: Possible benefits of ocean acidification to anemone-algal symbiosis		
	Michael H. Chang (Makah Tribe), Katie Wrubel, Haley Kennard	Natalie B. Coleman (Western Washington University)		
4:30 PM	Local Climate Change Adaptation Planning in Washington State: A Comparative Analysis of Intersectional Equity Considerations	Salt Marsh Response to Sea Level Rise		
	William M. Golding (Evergreen State College)	Martin Lofrenz (Portland State University), Catherine de Rivera, Sarah Eppley		

6:00 PM	Poster Session and Reception – Grand Ballroom			
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Thursday, October 10

7:00 AM	Breakfast (provided)			
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	Morning Announcements, Paul Loikith, Conference Chair, Portland State University Invocation, Tanna Engdahl, Tribal Elder, Cowitz Tribe			
8:45 AM	Keynote , Don Sampson, Chief of the Walla Walla Tribe, Affiliated Tribes of Northwest Indians			
9:30 AM	BREAK			

9:45 AM	Concurrent and Special Sessions				
	Governor Ballroom	Renaissance Room	Grand Ballroom	Library	Billiard Room
	Atmospheric Rivers and Precipitation	Wildfire Impacts	Tribes and Indigenous Peoples Engagement for the National Climate Assessment	Greening and Health: Neighborhoods Adapting to Climate Stressors	Resilient Water Resource Governance in the Pacific Northwest
9:45 AM	A Climatology of Atmospheric Rivers and Associated Heavy Precipitation over the Northwest United States Emily A. Slinsky (Portland State University), Paul C. Loikith, Duane E. Waliser, Bin Guan	Climate, Wildfires, and Air-Quality in the Pacific Northwest Deepthi Singh (Washington State University Vancouver), Kesondra Key	Special Session [9:45-11:15] <i>Presenters: Michael Chang</i> (Makah Tribe), <i>Lesley Jantarasami</i> (Oregon Department of Energy), <i>Elizabeth Marino</i> (Oregon State University)	Special Session [9:45-10:45] <i>Presenters: Bobby Cochran</i> (Willamette Partnership), <i>Vivek Shandas</i> (Portland State University), <i>Ryan Petteway</i> (OHSU-PSU School of Public Health)	Special Session [9:45-11:15] <i>Facilitators: Alida Cantor and Melissa Haeffner</i> (Portland State University) <i>Presenters: Colleen Sanders</i> (Confederated Tribes of the Umatilla Indian Reservation), Roy Iwai (Multnomah County), Kim Swan (Clackamas River Water Providers), Jamie McLeod-Skinner (Oregon Watershed Enhancement Board), Anne MacDonald (Clean Water Services)
10:05 AM	Multi-model performance of forecasted AR landfall and precipitation in the Pacific Northwest, 2017 - 2019 Andrew C. Martin (Portland State University), Laurel DeHaan	Climatic and Human Influences on the Changing Wildfire Regimes of the Eastern Washington Cascades Megan K. Walsh (Central Washington University)			

10:25 AM	Changes to the frequency of meteorological patterns associated with atmospheric rivers Naomi Goldenson (University of California Los Angeles), Alex Hall	Fires with benefits: assessing the economic impact of suppression and repair spending of the 2017 Eagle Creek Fire, Oregon Daniel J. Politoski (University of Portland), Ruth Dittrich			
10:45 AM	Evaluation of CMIP5 model fidelity at capturing wet season large-scale meteorological patterns over the Pacific Northwest using self-organizing maps Christina M. Aragon (Oregon State University), Paul Loikith, Arielle Catalano, Kavita Heyn, Kristin Anderson, Benjamin Beal	How post-fire weather variability affects the balance between sagebrush, exotic annual grasses, and perennial grasses and what it means for climate change Cara V. Applestein (US Geological Survey), Matthew Germino, Trevor Caughlin			
11:15 AM	LUNCH BREAK (not provided)				

12:45 PM						Concurrent and Special Sessions			
Governor Ballroom		Renaissance Room		Grand Ballroom		Library		Billiard Room	
Forest Ecology		River Hydrology		The Clackamas Watershed Resilience Project: An Interdisciplinary Model for Conducting Climate Impact Assessment		Communicating Climate Change in the Pacific Northwest: Engaging Students in the Long Story		Envisioning Coastal Resilience through Alternative Futures Modeling – A Graduate Student Perspective	
12:45 PM		Drought and Moisture Availability and Recent Western Spruce Budworm Outbreaks in the Western United States		Quantifying and Managing Groundwater Spring Flows for Climate Change Adaptation on the Henry's Fork Snake River		Special Session [12:45-2:15]		Special Session [12:45-2:15]	
		Jeffrey A. Hicke (University of Idaho), Bingbing Xu, John T. Abatzoglou		Christina N. Morrisett (Henry's Fork Foundation), Rob Van Kirk, Sarah Null, Bryce Contor		Presenters: Max Nielsen-Pincus (Portland State University), Arielle Catalano (Portland State University), Junjie Chen (PSU), Matt Glazewski (Clackamas County, Water Environment Services), Beth Gilden (PSU, Institute for Sustainable Solutions), Andres Holz (PSU), Paul Loikith (PSU), Andy McEvoy (PSU), Kim Swan (Clackamas River Water Providers), Erin Upton (PSU)		Presenters: Mark Blaine (University of Oregon), Hollie Smith (University of Oregon), Torsten Kjellstrand (University of Oregon), Deb Morrison (University of Oregon), Dan Morrison (University of Oregon), Kim Sheehan (University of Oregon)	
1:05 PM		Coupled ecohydrology and plant hydraulics modeling predicts ponderosa pine seedling mortality and lower treeline in the inland Northwest		Assessment of Columbia and Willamette River flood stage on the Columbia Corridor Levee System at Portland, OR in a future climate					
		Solomon Dobrowski (University of Montana), Marco Maneta, Zack Holden, Caelan Simeone		Susan A. Wherry (US Geological Survey-Oregon Water Science Center), Tamara Wood, Hans Moritz, Keith Duffly					

1:25 PM	Forest Thinning and Climate Change in the Interior Northwest Ryan Niemeyer (University of California Santa Barbara), <i>Christina (Naomi) Tague, Jennifer Adam, Chris Schnepf, Andrew Perleberg, Will Burke</i>	Collaborative development of future streamflow projections for the Columbia River Basin: following the chain of modeling from emissions scenario down to system regulated streamflow Chris D. Frans (U.S. Army Corps of Engineers), and <i>coauthors</i>			
1:45 PM	Urban heat island gradients help in assessing climate resilience of <i>Pseudotsuga menziesii</i> and <i>Sequoiadendron giganteum</i> trees in Portland, Oregon Hannah M. Prather (Reed College), Mark E. De Guzman, Jack Aldrich, Claire E. Brase, Vivek Shandas, Todd N. Rosenstiel, Aaron R. Ramirez	Quantifying the role of forest management in maintaining and facilitating watershed hydrologic resilience in the face of climate change in the South Fork Nooksack River watershed, Washington Oliver J. Grah (Nooksack Indian Tribe), Susan Dickerson-Lange, <i>Christina Bandaragoda, Nicoleta Cristea, Jason Hatch</i>			

2:15 PM	BREAK				
2:30 PM	Afternoon Plenary – Governor Ballroom				
	<i>Emerging climate risks and liability: Understanding risk exposure in the insurance, legal, and water sectors</i> Panel Moderator – Kavita Heyn (Portland Water Bureau) Panelists: Paul Fuller (Allied Public Risk), Deanna Moran (Conservation Law Foundation), Edward Campbell (Portland Water Bureau)				
3:15 PM	BREAK				
3:30 PM	Concurrent and Special Sessions				
	Governor Ballroom	Renaissance Room	Grand Ballroom	Library	Billiard Room
	Resilience and Risk	Climate Change and Public Health	Snow and Ice	Decision-Making Tools	Climate Change and Stormwater Management: Notes from the Field
3:30 PM	Increasing Resilience by Crossing Disciplinary Lines Inside Your Organization Alice Brawley-Chesworth (Portland Bureau of Environmental Services), Kaitlin Lovell	Tri-County Collaboration Identifies Health Impacts of Climate Change Kathleen Johnson (Washington County Department of Health and Human Services), Abraham Moland, Brendon Haggerty, Ahmed Mohamed, Jamie Zentner	Four-fold increase in solar forcing on snow in western U.S. burned forests since 1999 Kelly E. Gleason (Portland State University), Joseph R. McConnell, Monica M. Arienzo, Nathan Chellman, and Wendy M. Calvin	Visualizing climate change Katherine Hegewisch (University of Idaho), John Abatzoglou, Solomon Dobrowski, Sean Parks	Special Session [3:30-4:30] <i>Presenters: Guillaume Mauger (University of Washington), Jeff Burkey (Dept. of Natural Resources and Parks), Ani Jayakaran (Washington State University), Jordan Jobe (Washington State University)</i>

3:50 PM	<p>Washington State Department of Natural Resources' Agency-wide Climate Resilience Strategy: Methods, Results, and Lessons Learned</p> <p>Dan Siemann (Washington State Department of Natural Resources), Lenny Young, Dan Stonington</p>	<p>Optimizing the health co-benefits of climate change policies using health impact assessment</p> <p>Andrew L. Dannenberg (University of Washington), Bethany Rogerson, Linda Rudolph</p>	<p>Community Snow Observations (CSO): Using Citizen Science to Improve Snow Modeling</p> <p>Gabriel J. Wolken (University of Alaska Fairbanks, Alaska Geological Survey), Ryan Cumley, David Hill, Katreen Wikstrom Jones, Anthony Arendt, Jonah Joughin, Landung Setiawan</p>	<p>The Climate Adaptation Integration Tool (CAIT): A Decision Support Framework for Integrating Climate Considerations into Natural Resource Planning and Management</p> <p>Jessi M. Kershner (EcoAdapt), Andrea Woodward, Alicia Torregrosa</p>	
4:10 PM	<p>Assessing Climate Risks at the Provincial Scale – The BC Example</p> <p>Johanna Wolf (BC Ministry of Environment and Climate Change Strategy)</p>	<p>Stress Testing the Capacity of Health Systems to Manage Climate Change-Related Shocks and Stresses: A potential tool for the Pacific Northwest</p> <p>Christopher J. Boyer (University of Washington), Kristie L. Ebi, Peter Berry, Katie Hayes, Samuel Sellers, Paddy M. Enright, Jeremy J. Hess</p>	<p>Modelling future snowpack at high resolution with a process-based energy model in southwestern British Columbia</p> <p>Stephen R. Sobie (University of Victoria), Trevor Murdock</p>	<p>InterACTWEL: A Decision Support System for Adaptation Planning in Food-Energy-Water Sectors of Local Communities</p> <p>Samuel J. Rivera (Oregon State University), Nicholas Alan Giles, Jeff Reimer, Ganti Murthy, Snehasis Mukhopadhyay, Arjan Durrezi, Jenna Tilt, Meghna Babbar-Sebens, Suresh Marru</p>	

4:30 PM	<p>Insurance and Climate Change - the role of insurance regulators in managing climate risk</p> <p>Joy L. Bruns III (Washington State Office of the Insurance Commissioner)</p>	<p>Health Impacts of Climate Change in British Columbia: Challenges and Opportunities for Public Health and Policy</p> <p>Sally J. Maguet (Simon Fraser University), Tim Takaro</p>	<p>Glacier Change in the Olympic Mountains, WA over the past and future 100 years</p> <p>Andrew G. Fountain (Portland State University), Bryce Glenn, Christina Gray, Brian Menounos</p>	<p>Climate Change Adaptation Certification Tool: a method to implement climate-informed planning goals and policies</p> <p>Lara J. Hansen (EcoAdapt) and Stacey Justus Nordgren (Foresight Partners Consulting)</p>	
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Poster Session [6:00-8:00, October 9th]

1	Erin Upton	New perspectives: examining the nexus of water governance and climate change adaptation in global wine regions
2	Meridith McClure	A regional standard to guide tree seed source choices for a changing climate
3	Gabrielle Roesch-McNally	Building Resilient Agroecosystems in the NW and Beyond: What it will take?
4	Joseph Zagrodnik	Attribution of extreme weather events to climate change in agricultural regions of Washington State
5	Jennifer L. Morse	Nitrous oxide emissions as a function of nitrogen fertilizer application in tall fescue in the southern Willamette Valley in Oregon
6	Christopher Still	Leaf temperatures: feedbacks and dynamics across a range of forest ecosystems
7	Sebastian Busby	High-Severity and Rapidly Repeated Wildfires Alter Forest Recovery in the Central Cascade Range
8	Robert L. Emmet	Developing an occupancy-based monitoring framework for wolverines in the Cascades
9	Rose Graves	Potential greenhouse gas reductions from Natural Climate Solutions in Oregon
10	Susan A. Wherry	Simulation of deep ventilation and ecological effects in Crater Lake, OR, 1951-2099
11	Drew S. Lyons	Satellite based vegetation optical depth data detects plant water status and its sensitivity to supply and atmospheric drivers of drought
12	Katherine B. Swensen	Moist Mixed-Conifer Seedling Hydraulic Performance Following Short-Interval Wildfire
13	Tim J. Sheehan	Combining Vegetation and Land Use Projections to Assess Climate-driven Environmental and Economic Threats
14	Peter A. Bieniek	Evaluating fire weather indices to support fire management decisions in Alaska
15	Dominique Bachelet	Did we know all this 30 years ago?
16	Logan J. Whiles	Is Climate Change Increasing Predation on Hoary Marmots in North Cascades National Park?
17	Maichael D. Farnacci	The Impact of Management Practices on Forest Sensitivity to Climate Variability in Oregon's Western Cascades
18	Sarah L. Shafer	Using past wildfire-vegetation-climate interactions to understand present-day controls on wildfire in the Pacific Northwest
19	Ignacio Falcón-Dvorsky	Assessing climate-establishment relationship of conifer species across the Muddy Rivers lahar at Mount St. Helens

20	Jianning Ren	What Is the Role of Bark Beetle Outbreaks in Driving Large Fires in Trail Creek Under Climate Change
21	Rebecca N. Gustine	Forest management and climate change effects on water quality of Cedar River Watershed
22	Sarah J. K. Frey	Effects of elevation and height within the canopy on air temperature patterns in young and old-growth trees in a forested mountain landscape
23	Schlyer Reis	How will Climate Change Affect Western Juniper Woodlands? Addressing this Issue across Scales, Methods, and Theories
24	Anna Roser	Semi-Arid Rangelands and Sensors: What Sensor Should You Use for Your Vegetation Measurements?
25	Kiara L. Anderson	Fire history reconstruction of a subalpine forest, eastern Cascades, Washington
26	Samantha M. Nurmi	Macroscopic charcoal as evidence of fire history in mid-elevation mixed-conifer forests, eastern Cascades, Washington
27	Olivia Finlay	Using the Spatial Distribution of Protalus Ramparts in the North Cascades, Washington to Predict the Presence of Permafrost
28	Julie Ann Koehlinger	Establishing an Ocean Acidification Sentinel Site on the Olympic Coast of Washington State
29	Rayna E. Koberstein	Arbuscular mycorrhizal fungi associations across multiple salt marsh plant species in mitigating the impacts of sea-level rise
30	Rachel M. Gregg	Assessing the state of climate adaptation in the marine and coastal United States
31	Megan M. Russell	Investigating the effects of elevated seawater temperature and ocean acidification on Surf Smelt embryo and larvae energy demands
32	Arielle J. Catalano	Spatiotemporal variability of twenty-first-century changes in site-specific snowfall frequency over the Northwest United States
33	Luke G. Reyes	Record Fall Warmth as an Analogue for Future Conditions in the Pacific Northwest
34	Ellen Koukel	Characteristics of springtime atmospheric ridging over the Pacific Northwest
35	Alexander D. Stambor	Stable isotope measurements of precipitation as a tool to understand climate change
36	James E. Powell	A study of urban-scale CO2 emissions in Portland, OR using high resolution emission inventories and meteorological modeling
37	Christopher Skypeck	Detecting Changes in Extreme Precipitation Events in the State of Oregon
38	Graham P. Taylor	Assessing Climate Change Impacts on Precipitation Over Bull Run Watershed

39	Andrew C. Martin	The Year of Water at Portland State University: Highlighting a commitment to research and teaching to protect water resources, ecosystem benefits, equity and justice
40	Ganelao Chao	Evaluating springtime atmospheric ridging over the Pacific Northwest in the HadAM3p large ensemble
41	Ian D. Connelly	Evaluating Meteorological Conditions Modeled by WRF in Portland, OR: A Study to Model Urban CO2 Emissions
42	Alexis E. Harris	Evaluating the Seasonal Cycle of Coastal Low Clouds in a New Hybrid High Resolution Downscaling for Current and Future Climates
43	Andrew L. Rice	Historic measurements of greenhouse gas mole fraction and isotopic composition from Cape Meares, Oregon (1978-1998) in samples from the OHSU-PSU Air Archive
44	Kristina A. Dahl	Twenty-first-century century projections of extreme heat frequency and severity in the Northwest
45	John Harrington Jr.	20 th Century Variations in Precipitation Seasonality
46	Jericho A. Bankston	Urban flood management through collaborative planning and design
47	Daniel Elefant	Climate Impacts to Groundwater in the Lower Snohomish and Stillaguamish Rivers
48	Jennifer L. Vanderhoof	There's a Beaver for That: Nature's Best Engineers are Allies in Climate Change Adaptation and Mitigation
49	Kendra E. Kaiser	Mechanisms for integrating water resource management into biophysical models
50	Oriana S. Chegwidden	Sensitivities of extreme hydrologic events to climate change in the Pacific Northwest
51	Samantha R. Grieger	Understanding Interactions Between Food Production, Water Provisioning, and Water Quality in the Yakima River Basin
52	Ashley M. Bagley	How Can Floodplain Restoration Lower Stream Temperatures and Improve Salmon Habitat in the Stillaguamish River basin, WA?
53	Rebecca A. Lofgren	Evaluating Future Water Supply Scenarios in Mount Rainier National Park
54	Kirti Rajagopalan	Technology for trade: a conceptual framework to improve water use for agriculture and beyond.
55	Adrian A. Jimenez	Evaluating the Efficacy of a Restoration Canal at Maintaining a Lake Habitat
56	Ryan C. Freeman	The Potential Impact of Permafrost in Rock Glaciers and Prolatus Ramparts and the Mountain Hydrologic Cycle in the Central Washington Cascades
57	Anthony Holmes	Developing a Granular Spatiotemporal Model of Carbon Storage and Flux in Multnomah County
58	Fiona Lo	Forecasting the Allergenic Pollen Season in the Pacific Northwest

59	Phyllis J. Eide	Environmental and Climate Change Initiatives in Nursing Education
60	Casey J. Mace Firebaugh	Climate Change and Mental Health Impacts: A Systematic Review
61	Margaret A. Kitchell	Health Co-Benefits of Climate Action
62	William A. Schuler	Air Quality and Respiratory Health Trends in Kittitas County, Washington
63	Viccy Salazar	Decision Integration for Strong Communities and Tools to Support Tribal Climate Adaptation
65	Martin Cenek	The data-science driven model construction of coupled socio-ecological system dynamics: development of the decision support tools to study the salmon and caribou subsistence harvest in Alaska.
65	Jason M. Vogel	Community-based Adaptation in the United States
66	J. Michael Hudson	Overview of climate science delivery and integration across programs in the U.S. Fish and Wildlife Service – Region 9
67	Nicholas A. Giles	A Sensitivity Analysis of Hierarchical Adaptation Planning in the Food, Energy, and Water Nexus impacted by Water Rights
68	Gail M. Sandlin	Climate Vulnerability and Homelessness
69	Ronda Strauch	Exploring the Skagit River Watershed by Modeling and Visualizing Historic and Future Streamflows
70	Sally J. Maguet	Planning for wildfire smoke events as part of a public health response to climate change in Canada, Oregon and California
71	Allison E. Osterberg	Better Together: Building a Multi-Jurisdictional Climate Mitigation Plan
72	Jessica M. Mueller	"Smoke Season": Impacts of Wildfire on Tourism Operations in Central Washington
73	Mathieu A. Renault	High-resolution modeling of heterogeneous land-surface features and their impacts on pollution dispersion, wildfire spread and renewable-energy availability
74	Michael R. Tarbert	Surface Transportation Vulnerability in the United States
75	Katherine C. Hegewisch	The Tribal Climate Tool
76	Kimberly Yazzie	Tailoring Climate Data to Tribal Needs Requires Intensive Engagement: An Example from the Tribal Climate Tool
77	Germaine Ng	Who's Afraid of Climate Change?

Sentinel Floorplan

