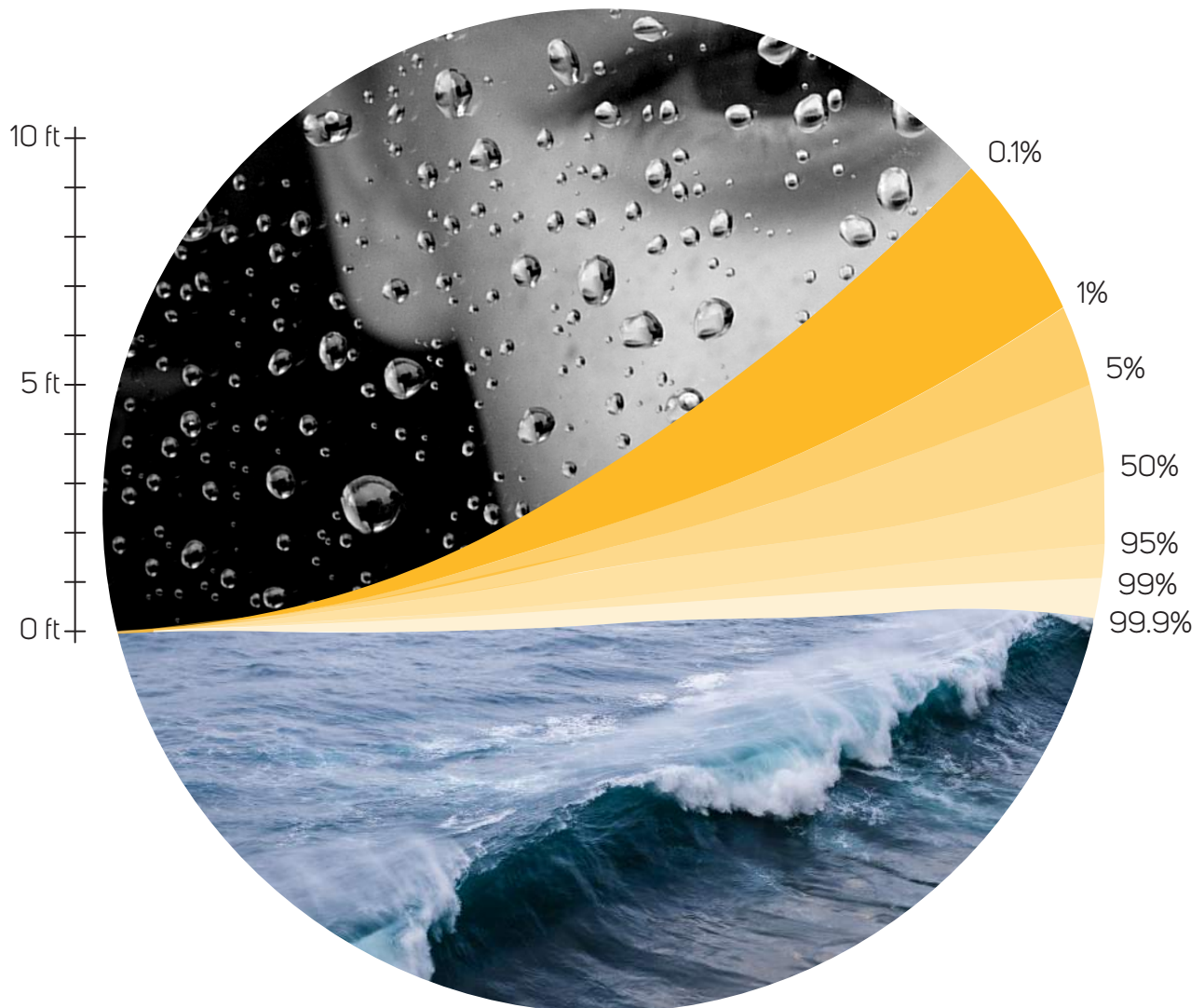


8th Annual

NORTHWEST CLIMATE CONFERENCE



October 9-11, 2017
Tacoma, Washington

MESSAGE FROM THE CONFERENCE CHAIR



Dear Colleagues,
On behalf of the Program Committee, it is my pleasure to welcome you to Tacoma for the Eighth Annual Northwest Climate Conference!

The Committee chose the theme “Working Together to Build a Resilient Northwest” to capture the spirit of collaboration that makes the Conference such an exciting event. The theme also calls attention to the strong commitment to connecting science and decision making that exists across our region. The theme was validated by the 150+ proposals for presentations and sessions that we received. These dynamic proposals provide an amazing snapshot of the researchers, managers, planners, and educators that are working across disciplines, sectors, and jurisdictions to advance our preparedness to climate impacts.

We thank all the attendees for making time to join us in Tacoma. We look forward to another round of stimulating discussions and exchanges of knowledge and experiences; of making new professional connections and catching up with old colleagues; and of taking stock of our collective accomplishments and articulating our next set of shared challenges.

A special thanks to Oregon State University and University of Idaho, who continue to serve as co-leads of this event with University of Washington’s Climate Impacts Group. Thank you to our sponsors, without whom this Conference could not be convened. Many thanks to the Program Committee, whose many hours of thoughtful input have created a vibrant and diverse program and laid the foundation for a successful Conference.

Sincerely,

Joe Casola
Program Committee Chair
Deputy Director
Climate Impacts Group, University of Washington

PLANNING COMMITTEE

John Abatzoglou, *University of Idaho*

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2017 NORTHWEST CLIMATE CONFERENCE OVERVIEW

MONDAY October 9, 2017

6:30 PM EVENING RECEPTION open to the public (Rooms 315, 316, 317)

TUESDAY October 10, 2017

8:30 AM **OPENING PLENARY (Ballroom)**

Opening comments from **Joe Casola**, *Conference Chair, UW Climate Impacts Group*
 Welcome from **Mayor Marilyn Strickland**, *Mayor of Tacoma*
 Blessing from **Connie McCloud**, *Puyallup Tribal Elder*

Morning Keynote - Sea-level Rise: Dealing With the Expected and Avoiding the Extreme
Richard Alley, *Pennsylvania State University*

9:45 AM BREAK

10:00 AM **CONCURRENT SESSIONS**

Agriculture (Rm 315)	Terrestrial & Aquatic Ecosystems 1 (Rm 316)	Communications 1 (Rm 317)	Pacific Northwest Climate/ Hydrology 1 (Rm 318)
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11:30 AM LUNCH (provided)

12:30 PM **CONCURRENT SESSIONS**

Infrastructure 1 (Rm 315)	Terrestrial & Aquatic Ecosystems 2 (Rm 316)	Equity/Human Health (Rm 317)	Pacific Northwest Climate/ Hydrology 2 (Rm 318)
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2:00 PM BREAK

2:30 PM **CONCURRENT SESSIONS**

Coastal & Marine Ecosystems 1 (Rm 315)	Terrestrial & Aquatic Ecosystems 3 (Rm 316)	Human Health (Rm 317)	Communications 2 (Rm 318)
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4:00 PM BREAK

4:15 PM **AFTERNOON PLENARY (Ballroom)**

Afternoon Keynote - Valuing Climate Damages: Policy Needs, Scientific Challenges, and a Path Forward
Kevin Rennert, *Resources for the Future*

Regional Climate Collaborative Launch, Facilitated by **Steve Adams**, *Institute for Sustainable Communities*

5:30 PM **RECEPTION & POSTER SESSION (Ballroom)**

WEDNESDAY October 11, 2017

8:30 AM **OPENING PLENARY (Ballroom)**

Climate Resiliency Planning: Turning Science into Action
 Facilitated by **Gretchen Greene**, *Maul Foster & Alongi*

9:45 AM BREAK

10:00 AM **CONCURRENT SESSIONS**

Working Across Boundaries 1 (Rm 315)	Tribal (Rm 316)	Infrastructure 2 (Rm 317)	Pacific Northwest Climate/ Hydrology 3 (Rm 318)
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11:30 AM LUNCH

Working Across Boundaries 2 (Rm 315)	Terrestrial & Aquatic Ecosystems 4 (Rm 316)	Infrastructure 3 (Rm 317)	Coastal & Marine Ecosystems 2 (Rm 318)
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2:00 PM BREAK

2:15 PM **CLOSING PLENARY (Ballroom)**

Discussion of the National Climate Assessment Draft and the Northwest Chapter
David Reidmiller, *U.S. Global Change Research Program* & **Kris May**, *Silvestrum Climate Associates*

Varying Actors, Varying Aspirations: Climate Change Policy and Native Nations
Nives Dolšak, *University of Washington*

Flooding, Warm Nights, and Wildfires:
 How Community Defined Critical Thresholds for Extreme Events Can Be Used to Build Climate Resilience
Sascha Petersen, *Adaptation International*

End 4 PM Closing Comments & Conference Close- **Joe Casola**, *UW Climate Impacts Group*

KEYNOTE ADDRESS

Sea-Level Rise: Dealing with the Expected and Avoiding the Extreme

Richard Alley, The Pennsylvania State University
Tuesday, October 10; 9:00-9:45 AM; Ballroom

Dr. Richard Alley is Evan Pugh University Professor of Geosciences at Penn State. He studies the great ice sheets to help predict future changes in climate and sea level, and has conducted three field seasons in Antarctica, eight in Greenland, and three in Alaska. He has been honored for research (including election to the U.S. National Academy of Sciences and Foreign Membership in the Royal Society), teaching, and service. Dr. Alley participated in the UN Intergovernmental Panel on Climate Change (co-recipient of the 2007 Nobel Peace Prize), and has provided requested advice to numerous government officials in multiple administrations including a U.S. Vice President, the President's Science Advisor, and committees and individual members of the U.S. Senate and House of Representatives. He has authored or coauthored over 290 refereed scientific papers. He was presenter for the PBS TV miniseries on climate and energy *Earth: The Operators' Manual*, and author of the book. His popular account of climate change and ice cores, *The Two-Mile Time Machine*, was Phi Beta Kappa's science book of the year. Dr. Alley is happily married with two grown daughters, two stay-at-home cats, a bicycle, and a pair of soccer cleats.



Photo courtesy of Richard Alley.

For his keynote address, Dr. Alley will describe how sea level is rising, as ice melts and ocean water expands in response to the ongoing warming that is being driven primarily by release of carbon dioxide from human burning of fossil fuels. Additional warming and sea-level rise are highly likely. Projections of sea-level rise from the United Nations Intergovernmental Panel on Climate Change still expect less than 3 feet of rise by near the end of the century. However, these projections include changes in the great ice sheets of Greenland and Antarctica that are very small compared to the total ice stored there, which could raise sea level more than 200 feet. Recent discoveries about ice sheets show that burning most or all of the known fossil fuels could melt all of that ice over much longer times, but include the possibility that burning only part of those fossil fuels might cause “collapse” of a notable fraction of the ice sheets (5-10%?) in a human lifetime. The science is developing rapidly, and uncertainties are large. Coastal communities are faced with the challenge of adapting to some sea-level rise that is almost unavoidable, and the additional possibility of much larger and greatly more expensive sea-level rise that becomes more likely as warming proceeds. Efficient response will involve both local and broader actions.

KEYNOTE ADDRESS

Valuing Climate Damages: Policy needs, scientific challenges, and a path forward

Kevin Rennert, Visiting Fellow at Resources for the Future
Tuesday, October 10 - 4:15-4:50 PM; Ballroom



Photo courtesy of Kevin Rennert.

Kevin Rennert is a Visiting Fellow at Resources for the Future (RFF), an independent, nonpartisan organization that conducts rigorous economic research and analysis to help leaders make better decisions and craft smarter policies about natural resources and the environment. Prior to his arrival at RFF, Rennert served as the Deputy Associate Administrator for the Office of Policy at the U.S. Environmental Protection Agency. Before that, he worked as senior advisor on Energy for the Senate Finance Committee, advising the committee's Chairman, Senator Ron Wyden (D-OR), on a range of topics related to clean energy, efficiency, and policies to reduce greenhouse gas emissions. From 2008 to 2014, Rennert worked on energy and climate legislation for the Senate Energy Committee. In that capacity, Rennert led the development of the Clean Energy Standard Act of 2012 (S. 2146), a presidential priority that would use market mechanisms to double the amount of electricity generated in the U.S. from low or zero carbon sources by 2035.

In his keynote address, Dr. Rennert will discuss the social cost of carbon—an economic tool that has informed billions of dollars of policy and investment decisions in the U.S. and abroad. The social cost of carbon takes into account both the benefits to society of reducing carbon dioxide emissions from the atmosphere and the harm to society from emitting more. Estimates of the social cost of carbon are increasingly used, and in many cases required, as a part of the policy evaluation process at various levels of government and within businesses. The requirements for calculating such estimates present challenges related to generating multi-century projections of variables such as income, population, and emissions, and understanding the costs associated with global climate impacts. In addition, the intergenerational nature of climate change requires value-based judgment to select appropriate rates for the economic discounting of future damages.

In January 2017 the National Academy of Sciences, Engineering, and Medicine (NAS) released a comprehensive review of options for addressing these challenges and updating the methodology for estimating the social cost of carbon. The NAS report made a number of key recommendations to ensure that the estimates reflect the best available science and to enhance their transparency. These were structured with the expectation of a partnership between the federal government and the broader academic community that would guide their implementation. Shortly after the report's release, the Trump administration moved by executive order to discredit the previously determined federal social cost of carbon estimates and dismantle the interagency working group responsible for the development and maintenance of the estimation process, generating uncertainty for decision-makers relying on the expertise of the federal government to inform their use of the estimates.

This talk will discuss the current set of policy needs requiring estimates of the social cost of carbon, highlight potential solutions to scientific challenges presented by the generation of the estimates, and describe the path forward for updating the estimates of the social cost of carbon in the absence of federal leadership.

SPECIAL SESSIONS & PLENARIES

COASTAL & MARINE ENVIRONMENTS

Technical Tools for Improving Sea Level Rise Risk Assessment in Washington State.

Tuesday, October 10 - 2:30 PM; Room 315

MODERATOR: **Ian Miller**, *Washington Sea Grant*

PRESENTERS:

Guillaume Mauger, *UW Climate Impacts Group*

Eric Grossman, *U.S. Geological Survey*

Zhaoging Yang, *Pacific Northwest National Laboratory*

Ray Weldon, *University of Oregon*

Tyler Newton, *University of Oregon*

Taiping Wang, *Pacific Northwest National Laboratory*

Harriet Morgan, *UW Climate Impacts Group*

Nathan Van Arendonk, *Western Washington University*

Mark Welch, *University of Washington*

David Schmidt, *University of Washington*

ABSTRACT:

This session describes progress to date to develop technical tools and information on sea level change, storm surges, wave impacts and vertical land motion that will be incorporated into an updated sea level rise assessment for Washington State. The work is conducted as part of a NOAA-funded Washington Coastal Resilience Project (WCRP) with additional support from EPA's National Estuarine Program, USGS and others. With a few notable exceptions (i.e. Swinomish Tribe, King County, etc.), planning for sea level rise at community-scales is nascent in Washington State, despite a history of regional sea level rise assessments dating back to 2008 (i.e. Mote and others, 2008). A variety of issues may be at play, including; 1) Sea level rise science and assessment information is not accessible (i.e. Mooney, 2014), 2) uncertainties are poorly described or characterized, or 3) the information included in assessments is not of adequate resolution and/or is not at appropriate scales for community planning. In order to address these issues and to advance planning for sea level rise in Washington State, the WCRP is developing an updated sea level rise assessment for Washington State that incorporates recently-developed probabilistic sea level rise models, accounts for variations in vertical land movement across Washing-

ton State, and improves the assessment of interactions between sea level change, storm surge, waves and other processes that drive extreme coastal events. The proposed session will synthesize our efforts to develop a probabilistic sea level rise model for Washington State, assess coastal vertical land motion, and advance our understanding and improve modelling of storm surges and wave impacts in the enclosed Salish Sea and on the outer coast of Washington. While an emphasis will be placed on the technical aspects of assessing changing risk, we will also touch on how our results can be effectively communicated and incorporated into resilience planning.

TERRESTRIAL & AQUATIC ENVIRONMENTS

Developing Climate-Smart Strategies to Conserve Species and Habitats Through Vulnerability Assessments

Tuesday, October 10 - 2:30 PM; Room 316

MODERATOR: **Lisa DeBruyckere**, *Columbia Basin Partner Forum*

PRESENTERS:

Jill Hardiman, *U.S. Geological Survey*

Tom Iverson, *Yakama Nation Fisheries*

Scott Hauser, *Upper Snake River Tribes Foundation*

Sean Finn, *Great Northern Landscape Conservation Cooperative*

ABSTRACT:

Ameliorating the impacts of climate change to species and habitats in the Pacific Northwest requires an articulation of key existing and projected vulnerability stressors. Projected changes in precipitation, air and water temperature, invasive species, seasons and phenology, soil moisture, plant community composition and structure, and other key stressors have the potential to profoundly impact native fish and wildlife populations and their habitats. A comprehensive understanding of systemic and species-specific vulnerabilities positions natural resource managers to characterize the range of threats, from most to least significant, and develop corresponding sets of strategies and actions to maintain ecosystem resilience and facilitate adaptation to future conditions. The Columbia Basin Partner Forum, Upper Snake River Tribes, Yakama Nation and Great Northern

Landscape Conservation Cooperative are working with partners throughout the interior Columbia River Basin to synthesize a series of vulnerability assessments for priority species and habitats and develop parallel, integrated decision support frameworks that guide and coordinate species and system-level resource management approaches and actions. The frameworks have a common structure enabling a consistent, collaborative approach to landscape-scale, climate-smart conservation planning and implementation. They summarize knowledge of current status and key projected climate impacts and stressors on a range of species and ecosystems through 2050. Strategies, drawn from an array of existing management plans, are presented as menus of options managers might consider given local manifestations of climate and climate-related impacts to focal conservation targets. This session describes the collective efforts of partners in the region to address climate change impacts through the coordinated application of species and habitat vulnerability assessments to management decision contexts. Conference attendees will benefit from learning about a structured approach to transfer knowledge gained from vulnerability assessments, traditional ecological knowledge, expert scientific opinion and emerging science to multi-jurisdictional conservation decision making.

HUMAN HEALTH

Use of Meteorological Data to Strengthen Public Health Surveillance of Risk and Disease, Response and Prevention

Tuesday, October 10 - 2:30 PM; Room 317

MODERATOR: Marnie Boardman, *Washington State Department of Health*

PRESENTERS:

Jerry Borchert, *Washington State Department of Health*

Edward Kasner, *University of Washington / Washington State Department of Health*

Hanna Oltean, *Washington State Department of Health*

Elizabeth Dykstra, *Washington State Department of Health*

ABSTRACT:

Climate change will amplify existing health problems and introduce new ones. For some health conditions, weather patterns can mediate or moderate risk of envi-

ronmental exposures and incidence of illness. As climate change introduces shifts in weather patterns, routine consideration of short term, seasonal and longer term forecasts could aid public health practitioners in better projecting and preventing health risks. In this special session, presenters will discuss ways in which meteorological data, weather forecasts and climate models are informing public health practice at the Washington State Department of Health. Panelist Jerry Borchert will discuss the use of predictive models and toxin monitoring data to create a Pacific Northwest Harmful Algal Bloom (HAB) bulletin. The presentation will illustrate ways in which HAB forecasts have been used to better ensure seafood safety, and how applied use of predictive models like the University of Washington's LiveOcean Model will help tackle issues such as hypoxia and ocean acidification. Panelist Edward Kasner will explore the use of meteorological data in the context of pesticide illness surveillance and epidemiological investigation in Washington. New approaches are needed to understand pesticide drift exposure mechanisms, particularly in orchard regions. He will highlight findings from a project to link data from the Pesticide Illness Monitoring System (PIMS) with historic weather data to characterize pesticide drift events between 2000 and 2015, noting challenges and opportunities to use meteorological data to enhance case investigation, public health response and future risk prevention. Panelists Elizabeth Dykstra and Hanna Oltean will provide an overview from the literature regarding weather and climate factors influencing the complex and dynamic landscape of vector ecology and vector borne disease. They will then discuss observations in the seasonality of vector monitoring and disease in Washington, with a focus on *Culex tarsalis* and *Culex pipiens*, the mosquitos that carry West Nile Virus, and how these observations can inform planning for public health operations. Finally, they will point to possible directions for enhancing use of meteorological data and modeling in monitoring and reducing risk of vector borne disease in the region. Following the presentations, the audience and panelists will be invited to consider how meteorological data could be used more widely in the context of public health surveillance and response, exploring practical applications of and barriers to such uses. We hope the discussion will reveal opportunities for novel partnerships between public health agencies and other sectors.

COMMUNICATIONS

Communicating About Climate Change with Clarity & Impact: A Hands-On Opportunity to Enhance Your Climate Communications

Tuesday, October 10 - 2:30 PM; Room 318

FACILITATOR/ PRESENTER: **Heidi A. Roop**, *UW Climate Impacts Group*

OTHER PRESENTERS:

Kavita Heyn, *Portland Water Bureau*

Jamie Stroble, *King County*

ABSTRACT:

The objectives of this 1.5-hour interactive session are to (1) provide Northwest climate scientists and resource managers with an opportunity to explore the challenges of communicating about climate change to different audiences, and (2) expand our community of practice for science communication across the region. This proposed session will explore the cross-cutting issue of effective science communication at a time when the need for thoughtful dialogue about climate change science, impacts and solutions is more important than ever. The session will highlight the importance of knowing and connecting with your audience, and offer concrete ways to engage with diverse audiences and target your messaging. Three presentations, offered from the perspectives of academia, resource management and local government, will explore the landscape of communication efforts across the Northwest and discuss the successes and challenges of climate change communication in our region. The remainder of the session will include interactive and facilitated group exercises where participants will get a chance to distill their research results for different audiences (e.g., the public, elected officials and other communities) and practice communicating complex scientific topics in compelling ways. For example, in small groups we will 'reinterpret' abstracts and project summaries to identify key messages that convey the science with accuracy but in ways that connect with different target audiences. Attendees will walk away from the session with a better understanding of ways to know and connect with your audience and some key strategies that can make their future climate science communications more rewarding, impactful, and connected to our frontline staff and communities.

REGIONAL CLIMATE COLLABORATIVE LAUNCH

Leading from the Local Level: The Puget Sound Climate Preparedness Collaborative

Tuesday October 10 - 4:50 PM; Ballroom

FACILITATOR: **Steve Adams**, *Institute for Sustainable Communities*

PRESENTERS:

Dow Constantine, *King County*

Dave Somers, *Snohomish County*

Terry Williams, *Tulalip Tribes*

ABSTRACT:

Join Dow Constantine (King County Executive), Dave Somers (Snohomish County Executive), and Terry Williams (Tulalip Tribes) for a facilitated conversation about leading from the local level on climate change and how regional resilience can be enhanced by working collaboratively across jurisdictions and disciplines to address our shared challenges and opportunities around adaptation.

Climate Resiliency Planning: Turning Science into Action

Wednesday, October 11 - 8:30 AM; Ballroom

FACILITATOR: **Gretchen Greene**, *Maul Foster & Alongi*

ABSTRACT:

Communities across Washington State are beginning to experience the effects of climate change. Temperatures are increasing. Sea levels are rising. Snow pack is decreasing. Flooding is more frequent and more intense. Washington communities are also starting to proactively plan for climate change by identifying adaptation options and prioritizing actions that integrate multiple local objectives. This panel session will provide applicable information on efforts that local governments in the region are taking to become more resilient to climate change. Panelists will focus on the tools, policies, and collaborative processes that have enabled communities to move from identifying climate vulnerabilities to implementing on-the-ground adaptation solutions. The session will highlight four examples and include facilitated discussion of lessons learned and principles that are applicable to other communities.

1. TimberWorks Resiliency Plan—Collaborative planning effort between the Cities of Aberdeen and Hoquiam to use a multiple-benefits approach to reduce flood risk while enhancing habitat and community benefits in the context of climate change

2. Puyallup River— There are multiple issues affecting the Puyallup River basin. The basin is facing increasing flood risk and finding solutions requires navigating a variety of overlapping issues, including the combination of the Mud Mountain Dam, sediment inflows, existing levees and development, and fisheries concerns raised primarily by the tribes.

3. Coastal Resilience Ventura – along the coast of Ventura County in California, The Nature Conservancy has coordinated development of a mapping tool that is designed to show the effects of alternative climate change adaptation strategies: a nature based approach, and a coastal armoring approach. Benefits and costs are used to facilitate decision making for the different stakeholders within the partnership.

4. Floodplains by Design – throughout Washington State many communities are developing Integrated Floodplain Management plans and projects that address salmon recovery, flood risk, climate adaptation and other community benefits through a holistic co-design process.

Participants will be able to apply the technical knowledge they have gained and principles for facilitating a collaborative resiliency planning process back to their communities to inform their own plans.

WORKING ACROSS BOUNDARIES

Catalyzing Community Resilience: Bridging Science & Local Action

Wednesday, October 11 - 12:30 PM; Room 315

MODERATOR: **Tye Ferrell**, *Resilience Collaborative NW*

PRESENTERS:

Amanda Murphy, *Ruckelshaus Center / Washington State University Extension*

Phyllis Shulman, *Ruckelshaus Center / Washington State University Extension / Resilience Collaborative NW*

ABSTRACT:

The presenters will discuss findings and lessons learned from a recent assessment of coastal resilience efforts on the Washington coast. The William D. Ruckelshaus Center Washington State Coast Resilience Assessment, May 2017, examines the state of coastal resilience efforts among multiple players and offers actions and strategies to strengthen community and ecological resilience, across multiple issues, sectors, and boundaries. The presenters will provide lessons learned from the assessment, with a focus on what they heard from participants about how climate science can better support local mitigation and adaptation efforts in areas that are experiencing climate impacts directly. The stakes for many local communities on the Washington Coast who are experiencing climate change impacts are high and there is a core group of volunteers and professionals who are dedicated to understanding, mitigating, and adapting to these changes. We will discuss ways that these efforts can be better supported by scientists; the relationship between key ecological and social issues; and some of the conditions for community resilience.

TERRESTRIAL & AQUATIC ECOSYSTEMS

Picking Climate Change Winners and Losers in the Pacific Northwest Depends on Methodology and Scale

Wednesday, October 11 - 12:30 PM; Room 316

MODERATORS: **David M. Bell & John B. Kim**, *USDA Forest Service Pacific Northwest Research Station*

PRESENTERS/ TITLES:

Leonardo Salas, *Point Blue Conservation Science*

“Modeling from the Ground Up: Changes in Vegetation Composition Greatly Impact Bird Distribution Model Predictions in the Pacific Northwest”

Michael Case, *University of Washington*

“Mechanisms of Vegetation Response to Climate Change in the Pacific Northwest Simulated by DGVM's: Are They Reliable?”

Julia Michalak, *University of Washington*

“Prioritizing vulnerability assessment planning across the National Parks Service”

Lisa Crozier, *NOAA - Fisheries*

“Climate Vulnerability Assessment of Protected Salmon Populations”

ABSTRACT:

The Northwest of North America is comprised of highly contrasting ecosystems. These ecosystems are subject to a wide range of responses to projected climate change capable of altering regional vegetation patterns and associated ecosystem services. However, substantial uncertainties in the pattern, magnitude, and consequences of landscape change remain due to (1) high diversity of landscapes in the region, (2) methodological differences in how we predict and project climate change impacts, and (3) varying spatial- and temporal-foci of the climate change research. These methodological differences result in a cacophony of climate change impact predictions and projections that are, at times, difficult for scientists, managers, and decision makers to reconcile. The outcomes of differing ecological research projects may be in stark contrast and some outcomes may be viewed skeptically by users. Some results may appear counterintuitive because species or functional groups appear to be “winners” rather than “losers” under differing methodological frameworks, scales of inference, or climate projections. This special session aims to explore contrasting predictions and projections of vegetation response to climate change in the Pacific Northwest arising from multiple lines of evidence and spatio-temporal focuses to provoke, challenge and encourage dialogs among scientists, managers, and decision makers. The session will conclude with a panel discussion examining how such diverse perspectives can be integrated into a common framework for advancing our understanding of climate change impacts in the Pacific Northwest.

INFRASTRUCTURE

Stormwater and Flooding in King County: Co-Producing Research to Support Adaptation

Wednesday, October 11 - 12:30 PM; Room 317

MODERATOR/ TITLE: **Eric Salathé**, *University of Washington, Bothell*

“Identification of local flood generating mechanisms and their sensitivity to climate change”

PRESENTERS/ TITLES:

Guillaume Mauger, *UW Climate Impacts Group*

“Precipitation Extremes and Stormwater: Using a regional climate model to assess risks”

Se-Yeun Lee, *UW Climate Impacts Group*

“Changes in flood risk, with regulation, on the Green and Snohomish Rivers”

Jim Simmonds, *King County*

“Addressing Climate Change when Controlling Combined Sewer Overflows, Managing Stormwater, Protecting Small Streams, and Managing Floodplains in King County, Washington”

ABSTRACT:

King County has experienced 12 federally declared flood disasters since 1990, and tens of thousands of county residents commute through, live, and work in floodplains. Stormwater is another critical management challenge, exacerbated by aging infrastructure, combined sewer and stormwater systems, and continued development. Even absent the effects of climate change these would be challenging to address. Recent studies clearly point to an increase in precipitation extremes for the Pacific Northwest (e.g., Warner et al. 2015). Yet very little information is available on the magnitude and spatial distribution of this change. The literature is clear that this can only be accomplished with dynamical downscaling: in which a regional climate model is used to develop local-scale projections of future climate. This session describes a suite of research and adaptation efforts developed in a close collaboration between King County and the UW Climate Impacts Group. All research was developed using the Weather Research and Forecasting (WRF, Skamarock et al. 2005) regional climate model. Both the model implementation and post-simulation analyses were tailored to the needs of King County managers, addressing three key science questions: (1) How is precipitation in King County affected by changes in large-scale weather conditions? (2) How will precipitation extremes change, and (3) What are the implications for flood risk on King County rivers? The session will begin with presentations on each of the three science topics, followed by an overview of the management context, the implications for King County planning and infrastructure, and the results of a scientist-manager workshop aimed at defining next steps.

COASTAL & MARINE ENVIRONMENTS

Multi-Disciplinary Perspectives of Ocean Acidification

Wednesday, October 11 - 12:30 PM; Room 318

MODERATOR: **Lucas Hart**, *Northwest Straits Commission*

PRESENTERS/ TITLES:

Terrie Klinger, *University of Washington*

“Advances in Understanding Ocean Acidification in Washington State”

Micah Horwith, *Washington Department of Natural Resources*

“Past the Near Meadows: Shellfish Performance Across Eelgrass-Driven pH Gradients”

Melissa Watkinson, *University of Washington*

“Socio-cultural Dimensions of Ocean Acidification: A Community-Based Project with the Squaxin Island Tribe”

Jennifer Phillips, *State of California Ocean Protection Council*

“Policy and Management Perspectives of Ocean Acidification”

ABSTRACT:

This special session will address the chemical, biological, social and management aspects of ocean acidification in Puget Sound and throughout Washington State. Four individual presenters from each sub-specialty will be invited to speak about the current state of knowledge within their area of study. Following the presentations, presenters will serve as a panel to field audience questions and contribute to a 30 minute discussion. The objective of the session is to advance our understanding of how we can work cohesively, and across disciplines, to advance our understanding of ocean acidification and related adaptation and mitigation options. Conference attendees will have the opportunity to learn about the many facets of ocean acidification research and the challenges we face to assure resilient marine ecosystems, cultures and economies

Discussion of the National Climate Assessment Draft and the Northwest Chapter

Wednesday, October 11 - 2:15 PM; Ballroom

PRESENTERS:

David Reidmiller, *U.S. Global Change Research Program*
& **Kris May**, *Silvestrum Climate Associates*

ABSTRACT:

The Global Change Research Act of 1990 mandates the production of a quadrennial National Climate Assessment (NCA) that analyzes the impact of global change on a number of sectors and regions of the U.S. The fourth assessment, NCA4, is currently being developed by nearly 300 Federal and non-Federal experts from across the Nation and is anticipated for release in late 2018. A key advancement since NCA3 is the more in-depth treatment of regional information, and the assessment draws upon case studies to highlight examples of unique vulnerabilities and successful adaptation measures.

This session will highlight the NCA4 report as a whole, including its increased focus on risk-based framing and regional impacts, adaptation, and vulnerabilities. In addition, the session will involve a panel of authors who have worked on the Northwest chapter. The authors will cover the key messages from the chapter, the chapter development process, and how regional engagement informed the content and focus of the chapter.

Varying Actors, Varying Aspirations: Climate Change Policy and Native Nations

Wednesday, October 11 - 3:00 PM; Ballroom

PRESENTER:

Nives Dolšak, *University of Washington*

ABSTRACT:

There are 569 federally-recognized American Indian tribal governments in the United States today. Tribal governments are long-standing, legally-recognized sovereign powers. They govern over 50 million acres across 34 states which contain around 30% of US western coals reserves and 20% of oil reserves. Our paper will examine how Native nations are responding to climate change and the sources of variation in their strategies.

Climate change adaptation presents unique challenges for America's Native nations. American Indian tribal governments' reservation lands are integral to both subsistence and culture and yet especially vulnerable to changing climates. Native nations face compounded vulnerability to climate crises due to profound socioeconomic disadvantages and political marginalization. Similarly, climate change mitigation presents unique challenges for tribal governments. Recent political initiatives, such as tribal opposition to the Dakota Access Pipeline and to the Cherry Point coal terminal, have demonstrated Native leadership in response to fossil fuel consumption. All the same, some tribes sit atop significant reserves of oil and coal, with economies that depend heavily on natural resource extraction. The Trump administration has expressed a desire for increased extraction on these Native lands. How do tribal governments balance their commitment to environmental protection, their political and economic vulnerabilities, and their opportunities to mine and drill?

Our paper will review the existing work on how Native nations have responded to climate change. A plethora of case studies—from both practitioners and academics—have examined portions of tribal governments' climate change policies. We will identify gaps, common themes, and sources of variation in these case studies. Our work will illuminate pathways forward in the study of Native nations and climate change.

Flooding, Warm Nights, and Wildfires: How Community Defined Critical Thresholds for Extreme Events Can Be Used to Build Climate Resilience

Wednesday, October 11 - 3:25 PM; Ballroom

PRESENTER:

Sascha Petersen, *Adaptation International*

ABSTRACT:

We all know that communities across the Pacific Northwest are already vulnerable to extreme events and many of these vulnerabilities will increase with climate change. Yet, a wealth of regional climate information doesn't always translate into action. Are there ways to make that climate information more relevant and useful to a community?

In this three-year project, funded by NOAA's Sectoral Applications Research Program, our team worked with four communities (Boulder, CO; San Angelo, TX; Las Cruces, NW, and Miami, OK) to pilot and test a participatory approach to define critical extreme weather thresholds. Our team collaborated with urban decision makers, in departments that included resilience, planning, public works, public health, emergency management, and others. We then customized climate projections for those communities around those thresholds and helped the communities develop and implement a resilience action project. Our collaborations have resulted in (a) the identification of more than 50 unique indicators and thresholds across the four communities, (b) enhanced communication and collaboration between city departments, and (c) the implementation of actions, ranging from a climate leadership training program for city staff members, to a rainwater capture project to improve responses to expected increases in both stormwater runoff and water capture for drought episodes. A similar approach could be used with communities in the Pacific Northwest to help move climate planning forward.

2017 NORTHWEST CLIMATE CONFERENCE

Tacoma Conference Center | October 9-11, 2017

MONDAY October 9, 2017

6:30 PM

EVENING RECEPTION (Open to the Public) ROOM 315, 316, 317

TUESDAY October 10, 2017

8:30 AM

OPENING PLENARY Ballroom

8:30 AM

Opening comments from **Joe Casola**, *Conference Chair, UW Climate Impacts Group*
 Welcome from **Mayor Marilyn Strickland**, *Mayor of Tacoma*
 Blessing from **Connie McCloud**, *Puyallup Tribal Elder*

9:00 AM

Morning Keynote - Sea-level Rise: Dealing With the Expected and Avoiding the Extreme
Richard Alley, *Pennsylvania State University*

9:45 AM

BREAK

10:00 AM

CONCURRENT SESSIONS

	Agriculture	Terrestrial & Aquatic Ecosystems 1	Communications 1	Pacific Northwest Climate/Hydrology 1
ROOM	315	316	317	318
10:00 AM	Introduction	Introduction	Introduction	Introduction
10:10 AM	Climate Change: Are the Tools Available What Agricultural Professionals Need? Sonia Hall , <i>Washington State University</i>	Long-term Persistence of Aspen in Snowpack-Dependent Ecosystems Alec Kretchum , <i>Portland State University</i>	Applying Social Science to Overcome Communication Challenges Gwen Shaughnessy , <i>The Baldwin Group</i>	Climate Impacts Assessments for Regional Governments in Southwestern British Columbia Using High-Resolution Statistical Downscaling Trevor Murdock , <i>University of Victoria</i>
10:30 AM	A Research Network Approach for Provincial Agriculture Climate Change Adaptation in British Columbia Jason M Lussier , <i>BC Agricultural Climate Adaptation Research Network</i>	The Connection Between Climate and Declining Forest Health in the Western United States David Bell , <i>USDA Forest Service PNW Research Station</i>	Using Story Project Methods to Engage with Partners and Communicate Climate Risks Emily York , <i>Oregon Health Authority</i>	Extreme Precipitation and Snowpack: Model and Observations Naomi Goldenson , <i>University of Washington</i>

TUESDAY, OCTOBER 10 (continued)

TUESDAY, OCTOBER 10 (continued)				
	Agriculture (Rm 315)	Terrestrial & Aquatic Ecosystems 1 (Rm 316)	Communications 1 (Rm 317)	Pacific Northwest Climate/Hydrology 1 (Rm 318)
10:50 AM	Making Climate Projections Useful for Growers Clark Seavert , <i>Oregon State University</i>	Refugia from Drought and Mountain Pine Beetle in a Whitebark and Lodgepole Pine Ecosystem Jennifer Cartwright , <i>U.S. Geological Survey</i>	Teaching Climate Science in Rural Communities Tamara Neuffer , <i>Stillaquamish Tribe</i> & Chrys Bertolotto , <i>Snohomish County WSU Extension</i>	Atmospheric Rivers, Climate Change, and the Howard Hanson Dam Michael Warner , <i>U.S. Army Corps of Engineers</i>
11:10 AM	Development of a Pacific Northwest Biochar Atlas: Translating the Results of Biochar Studies into Usable Information for Growers Kristin Trippe , <i>U.S. Department of Agriculture</i>	Mechanistic Modeling of Bark Beetle Outbreaks to Assess the Influences of Climate Change Jeffrey A. Hicke , <i>University of Idaho</i>	Let's Talk about Climate Change: Creating an App to Spark Meaningful Conversation Michelle Tigchelaar & Judy Twedt , <i>University of Washington</i>	Increasing Hydrologic Drought Severity in the Northwestern US Mountain Rivers: Causal Influences and Implications for Drought Projections Charles Luce , <i>U.S. Forest Service</i>
11:30 AM	LUNCH (provided)			
12:30 PM	Infrastructure 1	Terrestrial & Aquatic Ecosystems 2	Equity/Human Health	Pacific Northwest Climate/Hydrology 2
ROOM	315	316	317	318
12:30 PM	Introduction	Introduction	Introduction	Introduction
12:40 PM	Flood Risk Management in Washington State: How Can We Make it More Resilient? Haley Kennard , <i>University of Washington</i>	Connecting Today's Climates to Future Analogs to Facilitate Species Movement Under Climate Change Caitlin Littlefield , <i>University of Washington</i>	Climate Atlas—Mapping Climate Impacts on Vulnerable Populations in Seattle Christopher Wierzbicki , <i>Futurewise</i>	New Snow Metrics for Decision Support Anne Nolin , <i>Oregon State University</i>
1:00 PM	Integrating Climate Change Considerations Into Public Works Project Planning and Design in Snohomish County Andrea Martin , <i>Cascadia Consulting</i> & Manuela Winter , <i>Snohomish County Public Works</i>	The Northwest as a Hotbed of Innovation in Conserving Climate-Connectivity—The Ability of Landscapes to Accommodate Species Range Shifts Meade Krosby , <i>UW Climate Impacts Group</i>	Stay Safe in the Heat: Research and Response in Seattle's International District and Rainier Valley Neighborhoods Robin Pfohman , <i>Seattle and King County Public Health</i>	Impacts of Glacier Recession on Pacific Northwest Water Resources Erin Whorton , <i>U.S. Geological Survey</i>

TUESDAY, OCTOBER 10 (continued)

TUESDAY, OCTOBER 10 (continued)				
	Infrastructure 1 (Rm 315)	Terrestrial & Aquatic Ecosystems 2 (Rm 316)	Equity/Human Health (Rm 317)	Pacific Northwest Climate/Hydrology 2 (Rm 318)
1:20 PM	<p>Increasing Resilience for Washington State Contaminated Sites - Conducting a Vulnerability Assessment and Development of an Adaptation Strategy</p> <p>Scott O'Dowd, <i>Washington Department of Ecology</i></p>	<p>Can We Conserve Wetlands Under a Changing Climate? Mapping Wetland Hydrology Across and Ecoregion and Developing Climate Adaptation Recommendations</p> <p>Meghan Halabisky, <i>University of Washington</i></p>	<p>Managed Retreat as a Strategy for Climate Change Adaptation in Small Communities: Public Health Implications</p> <p>Andrew L. Dannenberg, <i>University of Washington</i></p>	<p>Understanding Climate Impacts on the Rate and Extent of Glacier Loss in the Olympic Mountains</p> <p>Justin Pflug, <i>University of Washington</i></p>
1:40 PM	<p>Building Coastal Resilience in the Pacific Northwest: Comparing Co-produced Coastal Adaptation Strategies in Tillamook County, OR and Grays Harbor County, WA</p> <p>Janan Evans-Wilent, <i>Oregon State University</i></p>	<p>How Do Trees Know When to Stop Growing?</p> <p>Connie Harrington, <i>USDA Forest Service</i></p>	<p>Enjoining Warming: Using the Law to Mitigate Climate Change</p> <p>Sean Munger, <i>Rose Law Firm</i></p>	<p>Accelerated Snow and Glacier Melt in Washington State from Black Carbon Deposition</p> <p>Susan Kaspari, <i>Central Washington University</i></p>
2:00 PM	BREAK			
	Coastal & Marine Ecosystems 1	Terrestrial & Aquatic Ecosystems 3	Human Health	Communications 2
ROOM	315	316	317	318
2:30 PM	<p><i>Special Session</i></p> <p>Technical Tools for Improving Sea Level Rise Risk Assessment in Washington State</p> <p>Ian Miller, <i>Washington Sea Grant & Collaborators</i></p>	<p><i>Special Session</i></p> <p>Developing Climate-Smart Strategies to Conserve Species and Habitats Through Vulnerability Assessments</p> <p>Lisa DeBruyckere, <i>Creative Resource Strategies</i>; Jill Hardiman, <i>U.S. Geological Survey</i>; Tom Iverson, <i>Yakama Nation Fisheries</i>; Scott Hauser, <i>Upper Snake River Tribes Foundation</i>; Sean Finn, <i>Great Northern Landscape Conservation Cooperative</i></p>	<p><i>Special Session</i></p> <p>Use of Meteorological Data to Strengthen Public Health Surveillance of Risk and Disease, Response and Prevention</p> <p>Marnie Boardman, Jerry Borchert, Hanna Oltean, & Elizabeth Dykstra, <i>Washington State Department of Health</i>; Edward Kasner, <i>UW/ Washington State Department of Health</i></p>	<p><i>Special Session</i></p> <p>Communicating About Climate Change with Clarity & Impact: A Hands-On Opportunity to Enhance Your Climate Communications</p> <p>Heidi A. Roop, <i>UW Climate Impacts Group</i>; Kavita Heyn, <i>Portland Water Bureau</i>; Jamie Stroble, <i>King County</i></p>
4:00 PM	BREAK			

TUESDAY, OCTOBER 10 (continued)

AFTERNOON PLENARY Ballroom

4:15 PM

Afternoon Keynote - Valuing Climate Damages: Policy Needs, Scientific Challenges, and a Path Forward
Kevin Rennert, *Resources for the Future*

4:15 PM

Regional Climate Collaborative Launch

Facilitated by **Steve Adams**, *Institute for Sustainable Communities*

4:50 PM

5:30 PM

RECEPTION & POSTER SESSION (see list of accepted posters)

WEDNESDAY, OCTOBER 11, 2017

8:30 AM

OPENING PLENARY Ballroom

Plenary Special Session

Climate Resiliency Planning: Turning Science into Action
 Facilitated by **Gretchen Greene**, *Maul Foster & Alongi*

8:30 AM

9:45 AM

BREAK

CONCURRENT SESSIONS

10:00 AM

**Working Across
Boundaries 1**

Tribal

Infrastructure 2

**Pacific Northwest
Climate/Hydrology 3**

ROOM

315

316

317

318

10:00 AM

Introduction

Introduction

Introduction

Introduction

10:10 AM

Community-led Planning,
Resilience, and Adaptation
on San Juan Island

**Katie Fleming & Nora Fern
Nickum**, *Friends of the San
Juans*

Salmon and Sagebrush: The
Shoshone-Bannock Tribes
Collaborative Approach to
Adaptation Planning

Wayne Crue, *Shoshone-Bannock
Tribes* & **Sascha Petersen**,
Adaptation International

Applied Sea Level Rise
Science for Road Realignment
and Design in San Juan
County

Jim Johannessen, *Coastal
Geologic Services*

Stream Restoration to Buffer
Climate Change Impacts on
Baseflows in the Upper
Columbia Basin

Susan E. Dickerson-Lange,
Natural Systems Design

10:30 AM

Roadmap to Recovery:
Climate Change and
Ecosystem Recovery in
Puget Sound

Jennifer Pouliotte, *Puget
Sound Partnership*

Coastal Climate Change in SE
Alaska: The ShoreZone Data
Base and Observations and
Experiences of Local Residents

Linda Kruger, *USDA Forest
Service*

Collaborating with The
Netherlands on Climate
Resiliency for Highways

Carol Lee Roalkvam,
*Washington Department of
Transportation*

Stillaguamish Watershed
Summer Flow Response to
Regional Climate Variability:
Implications for Salmon
Productivity

Frank Leonetti, *Snohomish County
Public Works*

WEDNESDAY, OCTOBER 11 (continued)

	Working Across Boundaries 1 (Rm 315)	Tribal (Rm 316)	Infrastructure 2 (Rm 317)	Pacific Northwest Climate/ Hydrology 3 (Rm 318)
10:50 AM	Learning From a Capacity-Based Approach to Adaptation Monitoring and Evaluation Johanna Wolf , <i>BC Ministry of Environment</i>	A Climate Change Assessment of Vegetation, Fire, and Ecosystem Services for Tribal Lands in the Pacific Northwest Michael Case , <i>University of Washington</i>	Olympia's Sea Level Rise Response Plan Andy Haub , <i>City of Olympia</i>	Climate Change and Water Scarcity: The Potential for Social Responses and Institutional Resiliency in the Pacific Northwest William Jaeger , <i>Oregon State University</i>
11:10 AM	Measuring the Progress of Adaptation Made by State Agencies in Washington Joe Casola , <i>UW Climate Impacts Group</i>	Cultivating Tribal Capacity for Climate Change Adaptation Don Sampson , <i>Affiliated Tribes of Northwest Indians</i>	Future Tidal Wetlands of Oregon Under Six Sea Level Rise Scenarios: Impacts, Locations, Priorities, and Planning Fran Recht , <i>Pacific States Marine Fisheries Commission</i>	Streamflow Deficits and Elasticity in Response to the 2015 Drought in the Western United States Christopher Konrad , <i>U.S. Geological Survey</i>
11:30 AM	LUNCH			
12:30 PM	Working Across Boundaries 2	Terrestrial & Aquatic Ecosystems 4	Infrastructure 3	Coastal & Marine Ecosystems 2
ROOM	315	316	317	318
	<i>Special Session</i> Catalyzing Community Resilience: Bridging Science and Local Action Tye Ferrell , <i>Resilience Collaborative NW</i> ; Amanda Murphy & Phyllis Shulman , <i>Ruckelshaus Center & WSU Extension</i>	<i>Special Session</i> Picking Climate Change Winners and Losers in the Pacific Northwest Depends on Methodology and Scale Leonardo Salas , <i>Point Blue Conservation Science</i> ; Michael Case , <i>University of Washington</i> ; Julia Michalak , <i>University of Washington</i> ; & Lisa Crozier , <i>NOAA Fisheries</i>	<i>Special Session</i> Stormwater and Flooding in King County: Co-Producing Research to Support Adaptation Guillaume Mauger & Se-Yeun Lee , <i>UW Climate Impacts Group</i> ; Eric Salathé , <i>UW Bothell</i> ; & Jim Simmonds , <i>King County</i>	<i>Special Session</i> Multi-disciplinary Perspectives of Ocean Acidification Lucas Hart , <i>Northwest Straits Commission</i> ; Terrie Klinger & Melissa Watkinson , <i>University of Washington</i> ; Micah Horwith , <i>Washington Department of Natural Resources</i> ; & Jennifer Phillips , <i>California Ocean Protection Council</i>
2:00 PM	BREAK			

WEDNESDAY, OCTOBER 11 (continued)

CLOSING PLENARY Ballroom

2:15 PM

2:15 PM

Discussion of the National Climate Assessment Draft and the Northwest Chapter
David Reidmiller, *U.S. Global Change Research Program* & **Kris May**, *Silvestrum Climate Associates*

3:00 PM

Varying Actors, Varying Aspirations: Climate Change Policy and Native Nations
Nives Dolšak, *University of Washington*

3:25 PM

Flooding, Warm Nights, and Wildfires:
How Community Defined Critical Thresholds for Extreme Events Can Be Used to Build Climate Resilience
Sascha Petersen, *Adaptation International*

End at
4:00 PM

Closing Comments & Conference Close
Joe Casola, *UW Climate Impacts Group*

POSTER SESSION & NETWORKING RECEPTION

Tuesday October 10, 2017–5:30 - 7:30 PM

Posters will be on display for the duration of the conference. Poster presenters will be available for discussion during the poster session. Posters are listed in alphabetical order by topic and author's first name.

Agriculture

1. "Columbia River Treaty Renegotiation: Potential Impacts on Agriculture, Hydropower and Flood Risk in the Context of an Altered Climate"—**Jennifer Adam**, *Washington State University*
2. "Integrated Adaptive Scenarios for Agriculture in the Yakima River Basin: Synergies and Tradeoffs"—**Kirti Rajagopalan**, *Washington State University*
3. "Codling Moth Pest Pressures for Tree Fruit: Future Outlook and Likely Adaptations for Washington State"—**Kirti Rajagopalan**, *Washington State University*
4. "Sensitivities of Agricultural Nitrogen Use Efficiency to Climate Change and Climate Variability over the Pacific Northwest"—**Mingliang Liu**, *Washington State University*

Coastal and Marine Ecosystems

5. "Adaptation for Addressing Impacts to Forage Fish Spawning Beaches, Recreation, and Coastal Infrastructure due to Shore Armor and Sea Level Rise in the Salish Sea"—**Alexis Blue**, *Coastal Geologic Services*

6. “Nearshore Spatial Data Architectures to Enable Restoration, Preservation, and Coastal Hazard Mapping”—**Branden Rishel**, *Coastal Geologic Services*
7. “Zis a ba Estuary Restoration for Climate Resilience”—**Daniel Elefant**, *Cardno*
8. “The Nature of the Policy Process is Hindering Comprehensive Sea Level Rise Policy”—**Jessica Andrepont**, *Oregon State University*
9. “Projections of Future Transitions in Tidal Wetlands Under Sea Level Rise Within the Port Gamble S’Klallam Traditional Use Areas”—**Mary Ramirez**, *University of Washington*
10. “Blue Carbon in Central Salish Sea Eelgrass Ecosystems”—**Mira Lutz**, *Western Washington University*

Collaboration and Co-production

11. “Dry Farming Collaborative: Participatory Climate Adaptation Research”—**Amy Garrett**, *Oregon State University Extension Service*
12. “The Northwest Climate Science Center: A Partnership for Co-Producing Actionable Science in Support of Northwest Climate Resilience”—**Amy Snover**, *UW Climate Impacts Group*
13. “From Field to Flight: Using Community Capitals to Predict Sustainable Aviation Biofuel Scale-Up”—**Daniel Mueller**, *Washington State University*
14. “Building an Environmental Justice Tool to Inform Climate Policy and Funding Priorities for Communities of Washington”—**Esther Min**, *University of Washington*
15. “Regional Climate Enterprise in the Pacific Northwest: Where Should We Go From Here?”—**Guillaume Mauger** (UW), **Kathie Dello** (OSU), **Gabrielle Roesch-McNally** (USDA Hub), & **Joe Casola** (UW), *UW Climate Impacts Group*

Communications

16. “Deliberative Mapping for a Changing Salish Sea: Acidification Indicators & Marine Protected Areas”—**Katrina Radach**, *Western Washington University*
17. “Life of Pika: A Video Game About PNW Climate Impacts on Animals”—**Life of Pika Team**, *EarthGamesUW*
18. “Campus Climates and Global Climates”—**Nathaniel Matthews-Trigg**, *University of Washington Department of Global Health*

CWU REU Summer Intern

19. “Permafrost in the Eastern Cascades, Washington: Mapping of Pro-Talus Features”—**Casey Ash**, *Chemeketa Community College, now starting at Oregon State University*
20. “Variations in Atmospheric Lead Spanning 1936-1992 from the South Cascade Glacier Ice Core, Washington State”—**Harwant Sethi**, *Rensselaer Polytechnic Institute*
21. “Place-Based Learning: Preparing Students For Climate Change”—**Huiqi Crystal Chen**, *Indiana University*
22. “Dating of Rock Glaciers in Washington’s Eastern Cascades and Its Connection to Climate Change”—**Kate Conlan**, *Colgate University*
23. “Postglacial Fire History of Mount Rainier National Park: Reconstruction using macroscopic charcoal analysis”—**Molly Burchfield**, *Whitman College*
24. “Humidity as a Factor in the Habitat Preferences of the Brown Marmorated Stink Bug”—**Sam Kalb**, *Oberlin College*

25. “Effects of climate change on permafrost distribution in the Eastern Cascade Mountain Range”—**Sarah Newcomb**, *Case Western Reserve University*
26. “Climate Change and Sustainability in K-12 Education Standards: Preparing Future Generations”—**Warren Gunn**, *Portland Community College*

Equity

27. “Climate Change, Public Health, and Social Equity in Washington State”—**Katie Fellows**, *University of Washington*
28. “Addressing Equity & Air Pollution in Seattle’s Chinatown-International District”—**Landon Bosisio & Tania Tam Park**, *Puget Sound Clean Air Agency*

Human Health

29. “Health Risks from Greenhouse Gas Co-Pollutants in Environmental Justice Communities”—**Brendon Haggerty**, *Multnomah County Health Department*
30. “Describing a Changing Pollen Season and its Impacts on Allergies and Asthma” – **Fiona Lo**, *University of Washington*

Hydrology

31. “An Objective Approach to Identify a Representative Subset of an Ensemble of Streamflow Projections”—**Chris Frans**, *U.S. Army Corps of Engineers, Seattle District*
32. “Climate Change Research in Mountainous Headwater Regions of the Columbia River Basin”—**Courtney Cooper**, *University of Idaho*
33. “Downstream Water Availability Consequences of Investment in New Irrigation Technologies”—**Keyvan Malek**, *Washington State University*
34. “Modeling Climate Induced Flow Variability on the Umatilla River”—**Scott O’Daniel**, *Umatilla Tribes*
35. “Soil and Geologic Controls on Recharge and Groundwater Flow Response to Climate Change: A Case Study of the Yakima River Basin”—**Tung Nguyen**, *Washington State University*

Infrastructure

36. “Implementing Future Climate Scenarios into the Decision Making Process of Storm Water Management”—**Beate G Liepert & Jason King**, *Lumen LLC*
37. “On the Potential to Manage Urban Street Tree Canopy for Air and Stormwater Temperature Reductions”—**Kevan B. Moffett**, *Washington State University*
38. “Distributed Energy Generation for Climate Resilience”—**Sherry Stout**, *National Renewable Energy Laboratory*

Pacific Northwest Climate

39. “The National Forest Climate Change Maps Project: Providing Climate Change Projections at a Scale Relevant to Land Managers”—**Abby Lute**, *University of Idaho*

40. “Impact of Projected Changes in Atmospheric Circulation on Cold-Air Pooling in a Small Basin in the Western Cascade Range of Oregon”—**David E. Rupp**, *Oregon State University*
41. “Recipe for a Hot Summer in the Northwest: Roles of Large-Scale Dynamics and Land-Surface Feedbacks” – **John Abatzoglou**, *University of Idaho*
42. “The Northwest Climate Toolbox”—**Katherine Hegewisch**, *University of Idaho*
43. “The Effect of Land Use and Land Cover Changes on Atmospheric Composition and Biogenic Emissions Over the Western United States”— **Mahmoudreza Momeni**, *Washington State University*
44. “Examining the Effects of Pacific Ocean Climatic Oscillations on Snow Water Equivalent in the Washington Cascade Range”— **Matt Lubar**, *Western Washington University*
45. “The Walter Climate Diagram Arc GIS Tool”— **Michael Jennings**, *USDA Forest Service*
46. “Rain in the Pacific Northwest in Relation to the 564 Line”—**Nicholas Bond**, *Office of the Washington State Climatologist*

Terrestrial and Aquatic Ecosystems

47. “A Harbinger of Things to Come : Water Year 2015 in Northwest National Parks”—**Bill Baccus**, *Olympic National Park*
48. “Will Changes in Climate Impact Height-Diameter Ratios of Douglas-fir?”—**Dryw Jones**, *USDA Forest Service Pacific Northwest Research Station*
49. “Carbon Sequestration Valuation of United States Forests and the Potential for Policy Impacts”—**Jeffrey Kline**, *USDA Forest Service*
50. “Assessing the Relative Contribution of Climate Change Versus Forest Management in Driving Large Wildfires”—**Jianning Ren**, *Washington State University*
51. “A three-step decision support framework for linking climate science to adaptation action”—**Lara Hansen**, *EcoAdapt*
52. “How Does Climate Influence Ranges of Berry- and Nut-producing Native Northwestern Shrubs?”—**Leslie Brodie**, *USDA Forest Service Pacific Northwest Research Station*
53. “Modeling interactions among water availability, atmospheric controls, and vegetation productivity in western North America”—**Linnia Hawkins**, *Oregon Climate Change Research Institute*
54. “Climate Land: Saving Dollars & Lives by Mitigating Floods, Fires and Other Hazards”—**Michael Burnham**, *Thurston Regional Planning Council*
55. “The Available Science Assessment Process (ASAP): Evaluating the science behind climate adaptation actions”—**Nicole DeCrappeo**, *Alaska Climate Science Center*
56. “Adaptation of Science and Policy in Ecological Restoration”—**Shana Hirsch**, *University of Idaho*

Tribal Communities

57. “Multidisciplinary Adaptive Water Resources Management for Vulnerable Communities: Analyzing socio-ecological resilience within the Coeur d’Alene Basin”—**Kathleen Torso**, *University of Idaho*
58. “Building Tribal Capacity for Climate Change Vulnerability Assessment”—**Meade Krosby**, *University of Washington*
59. “A Community Discussion on Developing a Tribally Focused Adaptation Guide”—**Meghan Dalton**, *Oregon Climate Change Research Institute*

60. “Outreach and Engagement for the Makah Tribe’s Climate Adaptation Plan”—**Michael Chang**, *Makah Tribe*
61. “Creating a Tribally-Based Toolkit to Encourage Community-Driven Resilience Planning”—**Pah-tu E. Pitt**, *Confederated Tribes of Warm Springs*
62. “Ni Mii Puu Voices on Climate Change: Preliminary Survey Results”—**Stefanie Krantz, Lucy Samuels, Eric Walsh, Rebecca Witinok-Huber, & Amber Zeigler**, *Nez Perce Tribe*

Working Across Boundaries

63. “Feasibility Assessment: Poplar-based production of ethyl lactate in Centralia, Washington ”—**Amira Chowyuk**, *University of Washington*
64. “Using the Climate Adaptation Knowledge Exchange (CAKE; CAKEEx.org) to Build Resilience and Make Climate-Informed Decisions”—**Jessica Hitt**, *EcoAdapt*
65. “How Can We Grow the Resilience of the Puget Sound Region? Fifty cross-sector leaders agree: Grass roots and cross-sector collaboration and action are key”—**Katia Blackburn**, *Sustainable Seattle*
66. “Rewriting the Model for Effective and Equitable Climate Action”—**Stephanie Celt**, *Washington Environmental Council*
67. “The Fate of Climate Change Agreements: Philosophy’s Role in Policy”—**Victoria DePalma**, *University of Idaho*

GETTING TO & AROUND THE CONVENTION CENTER

DRIVING

From I-5 Southbound/Northbound:

Take Exit 133 (City Center Exit) toward I-705/ City Center.

Keep LEFT toward I-705/ City Center.

Turn LEFT onto ramp toward A Street/ City Center.

Keep LEFT to stay on ramp toward S. 15th Street/ Pacific Avenue.

Follow S. 15th Street two blocks, the Convention Center will be on your left.

To access onsite parking, turn LEFT on Court C.

WSDOT Tacoma Traffic Information

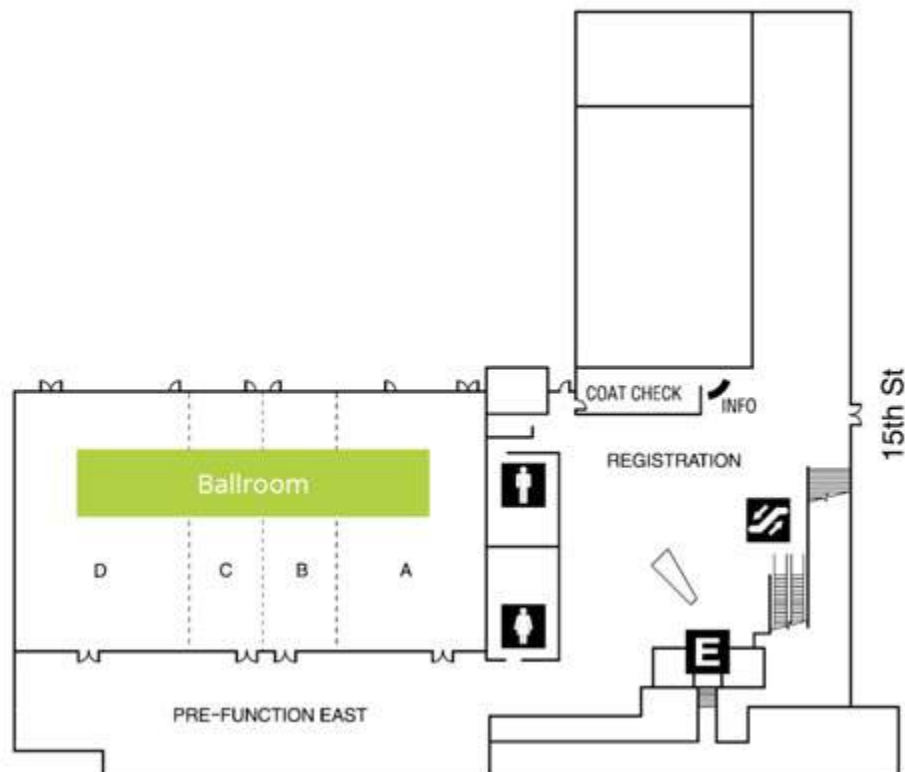
PARKING

There are two primary parking options:

Option 1: Complimentary parking at the Tacoma Dome Station. From there take Tacoma Link light rail to the Convention Center Station (light rail runs every 12 minutes and is free).

Option 2: Parking at the Tacoma Convention Center is available in the Parking Lot A garage on a first come, first serve basis, and can be accessed via the ramp from Commerce Street. Cost is \$6 for four hours or less, and \$12 for more than four hours.

FLOOR PLAN



LIGHT RAIL

Tacoma's Free Link Light Rail runs frequently throughout the downtown corridor with a stop located just outside the Convention Center on Commerce Street.

TRAIN

The Sounder provides transit from Seattle's King Street Station to the Tacoma Dome Station. From there take free light rail to the Convention Center. Train fare is \$5.25 one way. Trains depart Seattle at 6:15 AM (arriving 7:13 AM) and 6:50 AM (arriving 7:48 AM) daily. Trains depart Tacoma at 4:30 PM (arriving 5:28 PM) and 5:00 PM daily (arriving 5:58 PM).

CHARGING STATIONS

Electric Vehicle Charging Stations are located at the Convention Center in Parking Lot A. To utilize a charging station, you must pay for parking within the lot separately. More information on charging stations and fees is available here: <https://tacomaconventioncenter.org/plan/sustainability>



1. Hotel Murano
2. Conference Center Station
3. Tacoma Conference Center
4. Holiday Inn