NW CSC
Northwest Climate Science Center

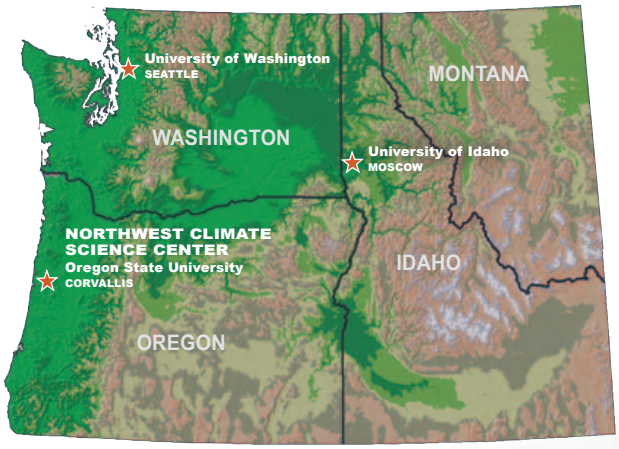
USGS
science for a changing world

A Regional Partnership Advancing Climate Science Development and Delivery

The Northwest Climate Science Center

(NW CSC) is one of eight regional Climate Science Centers launched by the Department of the Interior (DOI) and managed by the U.S. Geological Survey (USGS). The NW CSC was established in 2010 as part of the DOI's strategy to understand and address changes in climate and their effects on natural systems (water, fish, wildlife, habitats) and issues of significance to society (health, economy, safety, cultural resources).

The NW CSC coordinates the expertise of federal and university scientists to develop information and tools that natural and cultural resource managers can use to anticipate, monitor, and adapt to a changing climate. The scientific capacity of this effort rests on the research and discoveries of an academic consortium of 14 institutions led by Oregon State University, the University of Idaho, and the University of Washington, and USGS regional science centers and national programs. This blend of academic and federal expertise and resources provides the cohesion to strategically address climate issues of regional significance.



The Northwest Climate Science Center (NW CSC) coordinates climate research on terrestrial, freshwater, and nearshore marine ecosystems across Washington, Oregon, Idaho, and western Montana. The NW CSC is located at Oregon State University (OSU), Corvallis. Its lead academic partners include OSU, University of Idaho, and University of Washington.

Our vision is to become nationally recognized as a best-practice model for the provision of climate science and decision support tools to address conservation and management issues in the Pacific Northwest Region

The strength of the NW CSC academic consortium hinges on the expertise and resources provided by a robust network of regional professionals and practitioners at the following institutions: Boise State University, Idaho National Laboratory, Idaho State University, Montana State University, Oregon Health and Science University, Oregon State University, Pacific Northwest National Laboratory, Portland State University, University of Idaho, University of Montana, University of Oregon, University of Washington, Washington State University, Western Regional Climate Center.

Anticipated Climate Change Impacts and Effects

The geographic area of the NW CSC contains a rich diversity of natural systems including nearshore marine and freshwater habitats, forests, sagebrush steppe, high-altitude deserts, wetlands, and grasslands. By altering temperature and precipitation patterns, climate change modifies these systems and the ecosystem services they provide to the people of the region.

The NW CSC helps address many of the environmental stresses related to climate change that managers are concerned about. Climate change impacts in the Northwest are expected to increase over the coming decades as greenhouse gas concentrations continue to increase. Temperatures are projected to be warmer with the largest increase in summer. Future trends in precipitation are not clear, but a warming climate alone has implications for the region's hydrology. Warming will diminish snowpacks, change runoff and streamflow timing, and increase drought stress in forests and agricultural lands.

Reduced summer streamflow

degrades aquatic habitat; reduces water available for irrigation and drinking; affects recreational opportunities such as angling

Declining snowpack

diminishes streamflow in spring and summer; impacts fish migration and hydropower generation; decreases revenue for communities dependent on winter sports

Larger, more frequent wildfires

increases risk to human communities through the potential loss of lives and property; limits recovery of forests and other vegetation not adapted to severe fires

Rising sea level

threatens coastal property; alters estuary and nearshore marine habitats; decreases drinking-water availability by increasing saltwater intrusion in coastal aquifers

Extended periods of drought

reduces water supplies for agriculture, fish, wildlife, hydropower, and recreation; fire risk increases due to drought-stressed trees and vegetation

Invasive species range expansion

replaces native wildlife and aquatic species by competing for or degrading their food and habitats; increases economic damage and abatement costs

A Blueprint for the Regional Climate Science Center

The NW CSC Strategic Plan for 2012-15 offers a 4-year blueprint explaining how the NW CSC will support the DOI's coordinated strategy to address current and future impacts of climate change, by emphasizing five core services.

EXECUTIVE	Provides leadership, guidance, and support for climate-related activities through coordination and engagement with regional stakeholders
SCIENCE	Develops and implements a comprehensive Science Agenda to address current and emerging climate change priorities
DATA MANAGEMENT	Collects and secures climate data, and provides timely access to data, analytical functions, and interpretive services
COMMUNICATION	Provides communication and outreach services that support the exchange of information among regional stakeholders and scientists, and raises public awareness of climate change issues
EDUCATION & TRAINING	Promotes broad participation by diverse young scientists in the work of the NW CSC and supports their education

Science Agenda

The Science Agenda establishes priority science themes aimed at developing and delivering information and tools that will aid natural and cultural resource managers in anticipating, monitoring, and adapting to climate change. The Science Agenda will be addressed progressively through sequential implementation of Annual Workplans and other activities designed to enhance, leverage, and coordinate the collective contribution of individual research projects to management-relevant climate science. Annual Workplans are developed in consultation with regional partners who help identify priority science needs. Federal funding opportunities for the necessary research projects trigger cycles of solicitation, review, and selection of proposals every year.

Research Improves Understanding of Climate Issues

The NW CSC provides support to scientists in pursuit of research that improves the understanding of critical climate and climate-related resource issues. This research addresses a broad range of challenges from threats to fish and wildlife to impacts on society. With new information and tools, scientists and managers are working together to minimize these threats and impacts and adapt to climate-related changes. The projects described below are examples of research supported by the NW CSC.

A complete list of projects funded by the NW CSC is available at www.doi.gov/csc/northwest/science.cfm

Climate change vulnerability in the Pacific Northwest: A comparison of three approaches

Climate change has already begun to affect many plant and animal species. Because some species will be more susceptible to changes in climate than others, it is important to determine which species will be most vulnerable and why. To predict how plant and animal species will respond to climate change, this project will compare approaches that rely on the opinions of experts to other approaches that rely more on computer models. A better understanding of how to assess the vulnerability of species to climate change will be critical for managing natural resources and public lands including, fish and game, forests, national parks, and wildlife in general.

Marshes to mudflats: Climate change effects along a latitudinal gradient in the Pacific Northwest

The boundary region where the ocean meets the land is a highly productive area that supports a wealth of wildlife species from salmon to ducks. The salt marshes, mudflats, and shallow bays of the boundary region are connected habitats that are critical for these species and local people and communities. Climate change effects such as sea-level rise are altering these habitats, but it is unknown how they are being affected or will change in the future. This project will examine the links among these habitats and expected future changes at several sites along the Oregon and Washington coasts. Results from this project will provide information to support planning and conservation of natural resources in the boundary region under future climate conditions.

Integrated scenarios of climate, hydrology, and vegetation for the Northwest

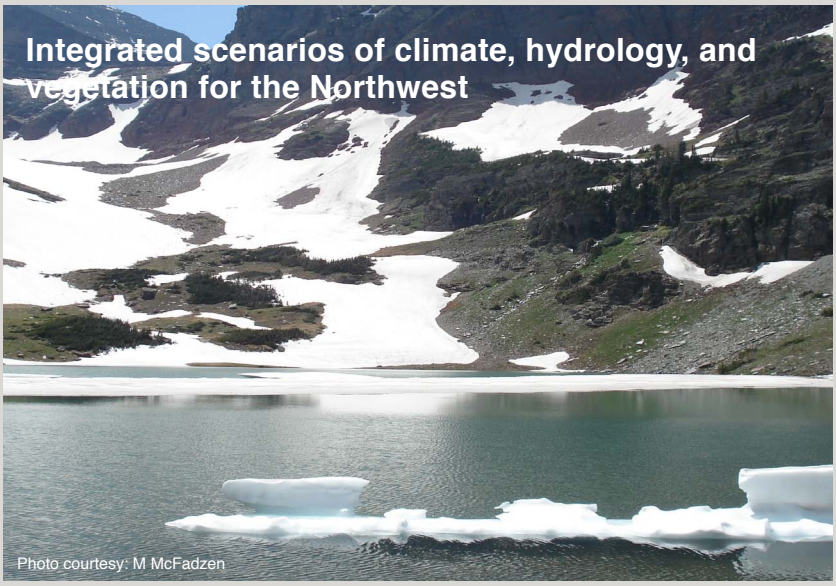


Photo courtesy: M McFadzen

Environmental changes like habitat degradation and arrival of competitive invasive species, caused by climate change and landscape transformation, strain the delivery of ecosystem services. Those who manage a variety of ecosystem services, from urban water utilities to natural resource managers to farmers, are being challenged to cope with some of the changes unfolding before them. As scientists strive to understand and predict effects of climate change on ecosystem services, a foundational piece of knowledge they require is how the climate, water cycle, and vegetation will change in the future. This project integrates state-of-the-science predictive modeling of these different attributes of the future environment in the Northwest, and provides guidance for scientific studies seeking to work out the details of how climate change will affect various plant and animal species and other aspects of ecosystem services.

Photo courtesy: M McFadzen

Regional Partnership Shares Leadership

Leadership of the NW CSC is a shared responsibility — it benefits from the dedicated commitment of many groups working toward shared goals. The complexity of climate change requires synergies and alignment of limited regional resources to advance climate science development and to deliver needed information and tools. Current members of the NW CSC regional partnership include the following:

Executive Stakeholder Advisory Committee (ESAC)

- Conveys the climate-related interests and objectives of 22 federal, state, and tribal organizations
- Sets the Science Agenda for the NW CSC
- Chaired by the USGS Regional Director for the Northwest
- Engages tribal representatives to identify climate change science needs and opportunities to integrate western science with traditional ecological knowledge to address climate change impacts on tribal natural and cultural resources

Leadership Team

Supports the NW CSC Director and mission by bringing together the USGS Regional Director for the Northwest and the Principal Investigators representing the primary academic consortium partners.

Landscape Conservation Cooperatives (LCCs)

Within the NW CSC geographic area, three LCCs help define and prioritize the science that is needed to address natural resource conservation and management issues in relation to climate change:

- Great Northern LCC (greatnorthernlcc.org)
- Great Basin LCC (greatbasinlcc.org)
- North Pacific LCC (www.fws.gov/nplcc)

For more information, visit the NW CSC website at www.doi.gov/csc/northwest

Contacts:

Gustavo A. Bisbal, Ph.D.
Director, Northwest Climate Science Center
326 Strand Hall
Oregon State University
Corvallis, Oregon 97331
541-737-2525
gbisbal@usgs.gov

Philip W. Mote, Ph.D.
Director, Oregon Climate Change Research Institute and Oregon Climate Services
Oregon State University
541-737-5694
pmote@coas.oregonstate.edu

Steven B. Daley-Laursen, Ph.D.
Senior Executive, Office of the Vice President of Research and Economic Development and Director of the Northwest Knowledge Network
University of Idaho
208-885-5804
stevendl@uidaho.edu

Eric P. Salathé Jr., Ph.D.
NW CSC University of Washington Director
University of Washington - Bothell
206-616-5351
salathe@uw.edu

OSU Oregon State University
University of Idaho
UNIVERSITY of WASHINGTON

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February 2013