



# NORTHWEST CLIMATE SCIENCE CENTER ANNUAL REPORT 2015

## MESSAGE FROM THE NW CSC

The NW CSC recognizes that preparing for climate-related environmental change requires a collective effort. In a broad sense, our fifth year was marked by an emphasis on forming new collaborations and strengthening existing ones. This theme colored all of NW CSC’s efforts in FY15, from leveraging funds for new science products with the three Northwest regional Landscape Conservation Cooperatives (page 3), to hosting the largest ever [Climate Boot Camp](#) (page 4), to co-producing new communications products (page 5). In FY15 the NW CSC also spanned geographical and political boundaries by partnering with the [Alaska](#) and [Southwest](#) CSCs, and, for the first time ever, with the [U.S. Department of Agriculture Northwest Regional Climate Hub](#).

As well as working closely with federal partners, the NW CSC also focused on partnerships outside of federal agencies. For example, the NW CSC helped Oregon and Idaho natural resource agencies incorporate current and relevant climate science into their 10-year [State Wildlife Action Plan](#) updates for the U.S. Fish and Wildlife Service. The NW CSC also sponsored and participated in the first-ever [Tribal Leaders Summit on Climate Change](#), an event organized by the [Affiliated Tribes of Northwest Indians](#). This event convened tribal councils, policy leaders, tribal staff and federal agencies to discuss tribal needs, strategies and opportunities for addressing climate change while promoting and protecting tribal sovereignty. Fostering existing relationships and building new ones allows the NW CSC to continue to generate returns on investments that far exceed any that could be achieved alone.



*Members of the NW CSC Leadership Team (from left) Gustavo Bisbal, USGS; Nancy Lee, USGS; Phil Mote, Oregon State University; Steve Daley-Laursen, University of Idaho; and Eric Salathé, University of Washington.*

## 2015 HIGHLIGHTS

- Sponsored and participated in the first-ever [Tribal Leaders Summit on Climate Change](#).
- Helped Oregon and Idaho incorporate climate information into their [State Wildlife Action Plan](#) updates.
- Helped conduct a [survey](#) of 15 Columbia River Basin tribes and three inter-tribal organizations to assess their policy and technical capacity to address climate change.
- Supported 17 [NW CSC Graduate Fellows](#) in FY15
- Organized the largest [Climate Boot Camp](#) to date, which provided training to 33 Graduate Fellows and early-career professionals.
- Distributed the first issue of [Northwest Climate Magazine](#) to over 8,000 recipients.
- Took over production of [Northwest Climate Science Digest](#) in partnership with the North Pacific Landscape Conservation Cooperative.
- Big thank yous to [Anne Nolin](#) for six months service on the NW CSC Leadership Team (LT) from January 1- June 30, 2015 and to Nancy Lee who is stepping down from the LT after four years.

# PRODUCING ACTIONABLE SCIENCE



## Producing actionable science while leveraging opportunities with regional partners was the hallmark of NW CSC science activities in FY15.

At the start of the year NW CSC worked with its [Executive Stakeholder Advisory Committee](#) to identify top management priorities relating to climate change. Common themes emerged, including the need for information on the impacts of hydrologic regime shifts on fish habitat, infrastructure, and agriculture, and the identification of “trigger points” that transition ecosystems to new conditions. The NW CSC is pursuing and will continue to pursue means to address these management priorities.

The NW CSC funded a second year of work on projects awarded in FY14, amounting to over \$1M in research investments. The FY14 projects range from [evaluating the science on the use of prescribed fire](#) to [adapting forest management to retain more snow on the landscape](#). Eleven projects that began in FYs 2011-2013 were completed in FY15. These included one that examined [the effects of sea-level rise on tidal marshes in Washington and Oregon](#), with the goal of supporting future coastal planning and conservation. Another explored [how future climate may interact with management decisions to shape spotted owl and sage grouse habitat](#). A third project [compared different approaches to assessing the vulnerability of 76 plant and animal species to climate change](#) (see page 3).

In FY15 the NW CSC capitalized on regional partnerships to advance a number of research activities. In one such project we worked with the [USDA Northwest Regional Climate Hub](#) and the [Great Basin Landscape Conservation Cooperative](#) on the re-introduction of beavers to the northern Great Basin (see page 3). The NW CSC also teamed up with two other Landscape Conservation Cooperatives, the [North Pacific \(NPLCC\)](#) and [Great Northern \(GNLCC\)](#), to further our research and science delivery goals. With in-kind support and guidance from the NPLCC, we are funding website development to deliver data generated from the NW CSC FY12 project, *Integrated Scenarios of Climate, Hydrology, and Vegetation for the Northwest*. The website will enable users to adjust model settings, download data, visualize scenarios for their area of interest, and view examples of management applications of chosen scenarios. With the GNLCC, we are co-funding an effort to map wetland hydrology across the Columbia Plateau and develop climate adaptation options for the ecoregion.

Finally, the NW CSC has partnered with two other CSCs to produce timely, actionable science. With the [Alaska CSC](#), we are supporting a project incorporating glacier dynamics into streamflow models for Alaska and Washington. A second project co-sponsored by the [Joint Fire Science Program](#) and [Southwest CSC](#) will examine the relationship between climate change and fire and subsequent impacts to sensitive-status birds in the Great Basin. Both project teams will work with natural resource managers in their regions, including the Northwest to address their highest management priorities.

## NW CSC'S FY15 BY THE NUMBERS

29

Publications by  
NW CSC-funded  
researchers

9

Agencies partnered  
with NW CSC to  
leverage funding

\$1.3M

Invested in climate  
research

44

Early career climate  
scientists supported

8,610

People opened the  
first issue of *Northwest  
Climate Magazine*



EVALUATING THE  
POTENTIAL OF  
BEAVER REINTRODUC-  
TIONS TO MITIGATE  
ECOLOGICAL DROUGHT

In FY15 the NW CSC partnered with the [USDA Northwest Regional Climate Hub](#), the [U.S. Forest Service PNW Research Station](#), and the [Great Basin Landscape Conservation Cooperative](#) to **assess the value of reintroducing beavers to the Great Basin**. This partnership funds scientists from the Desert Research Institute, Oregon State University, U.S. Forest Service, and USGS to evaluate the potential benefits of using natural and artificial beaver dams to reconnect isolated streams to their natural floodplains. The overarching goal of this project is to build resilience to future drought by creating or maintaining wetlands and providing habitat and water sources for wildlife and livestock.

The ambitious [Integrated Scenarios of Climate, Hydrology, and Vegetation for the Northwest](#) project wrapped up in FY15. This study involved Oregon State University, University of Idaho, University of Washington, and other collaborators. One of its products is a series of freely available datasets that can be used to address specific management questions. These datasets are compatible with other hydrological and ecological modeling efforts and represent a next-generation climate change framework for land managers. This framework supports a range of management activities to increase the resilience of Northwest ecosystems, agricultural systems, and built environments.



INTEGRATED  
SCENARIOS  
OF  
CLIMATE,  
HYDROLOGY &  
VEGETATION  
FOR THE NORTHWEST



COMPARING METHODS FOR ASSESSING VULNERABILITY

Climate change is already affecting species in many ways. Successfully managing species in a changing climate will require an understanding of which species will be most and least impacted by climate change. Although several approaches have been proposed for assessing the vulnerability of species to climate change, it is unclear whether these approaches are likely to produce similar results. **NW CSC-funded researchers at the University of Washington compared the relative vulnerabilities to climate change of 76 species of birds, mammals, amphibians, and trees based on three different approaches.** They compared 1) projected shifts in species

distributions to 2) an assessment based on expert opinion and projected changes in climate to 3) an approach based on the current and future climatic conditions within species' current ranges. They found that the three approaches provided substantially different rankings of the species. Some species were determined to be highly vulnerable by one approach but only moderately vulnerable by the other two approaches. These results are important because they indicate that more than one approach may be needed to adequately assess vulnerability- and that basing management decisions on one approach alone may lead scientists and managers to underestimate vulnerability.

# TRAINING THE NEXT GENERATION

The annual **NW CSC Climate Boot Camp** is a week-long educational program that offers an interdisciplinary view of the workings of climate impacts science, science communications and knowledge integration. In FY15 the fifth annual NW CSC Climate Boot Camp was held at the University of Washington's Pack Forest Center for Sustainable Forestry. Thirty-three fellows from the eight Department of the Interior Climate Science Centers, universities, tribes, and federal agencies experienced presentations, field excursions and experiential learning on topics including: fire ecology, knowledge co-production, sediment transport, and communicating climate science research and work to diverse audiences. Field excursions followed water flow from glaciers on Mt. Rainier to the Nisqually River delta, including a visit with Nisqually Tribal staff who presented on the tribe's work restoring salmon and shellfish.

In August 2015 the Department of the Interior Bureau of Indian Affairs announced that they were awarding a grant to the NW CSC, **Affiliated Tribes of Northwest Indians** and **United Southern and Eastern Tribes** to launch the inaugural **National Tribal Climate Camp** to be held in 2016. The NW CSC will lead the design and implementation of this new venture which will be located at the University of Idaho's **McCall Campus** in central Idaho.



2015 CLIMATE BOOT CAMP PARTICIPANTS

## 2015 NORTHWEST CLIMATE CONFERENCE

The NW CSC university PI's and USGS staff played key leadership, planning, and support roles for the **5th Annual Northwest Climate Conference** (formerly the Pacific Northwest Climate Science Conference) at the Coeur d'Alene resort in Coeur d'Alene, Idaho. The NW CSC provided financial support for scholarships to increase conference participation by tribal members/staff and students. The NW CSC also played a strong role as advocate for novel means for scientist-manager dialogues within the conference program.

## PROMOTING EDUCATION AND PARTICIPATION OF DIVERSE SCIENTISTS IN THE WORK OF THE NW CSC

The objective of the NW CSC's Training and Education Services is to promote broad participation by and support education of diverse scientists in the work of the NW CSC. In pursuit of this objective the NW CSC funded 17 **graduate student fellowships** in FY15 at the primary consortium partner institutions, including Oregon State University (4), University of Idaho (9) and the University of Washington (4). The fellowship experience prepared students for careers in climate science, education and outreach. Fellows attended **Climate Boot Camp**, participated as presenters and facilitators at the **Northwest Climate Conference**, and self-organized networking and collaboration via the **Early Career Climate Network** (established by fellows at the 2012 NW CSC Climate Boot Camp).

Each year the NW CSC provides additional training for early career climate scientists by providing support for graduate students and post-doctoral researchers through the many science projects that it funds.

The NW CSC also provided leadership for the national CSC Education and Training Working Group, including compilation of education and training activities and development of a priority education and training agenda.

# GROWING COMMUNICATION THROUGH NEW PARTNERSHIPS AND PRODUCTS

In FY15 the Northwest Climate Science Center grew its communications program through the use of three new products: the monthly [Northwest Climate Science Digest](#), periodic e-mail updates, and the [Northwest Climate Magazine](#). In late summer of 2014 the NW CSC surveyed its Executive Advisory Stakeholder Committee (ESAC) to assess their climate science information needs. The most desired communication product was a periodic digest-style e-mail update. In response the NW CSC began producing the Northwest Climate Science Digest- a monthly summary of scientific papers, government reports, popular media stories and upcoming events related to climate science and relevant to the Northwest. The NW CSC produces the digest in partnership with the [North Pacific Landscape Conservation Cooperative](#) (NPLCC). To-

gether we circulate the digest to over 6,000 recipients.

Other priority products identified by ESAC were regular newsletters and an annual newsletter. To meet these demands, the NW CSC created newsletter-style e-mail updates and the [Northwest Climate Magazine](#). NW CSC e-mail updates feature vignettes about NW CSC-funded projects and recent highlights. The [Northwest Climate Magazine](#) is a joint effort of the NW CSC, NOAA's [Pacific Northwest Climate Impacts Research Consortium](#) and the NPLCC to tell stories about climate science informing resource management (see below).

In addition to these new efforts the NW CSC continued to maintain its academic and federal websites, active social media accounts and to provide science communication training to graduate students through [Climate Boot Camp 2015](#).

## TELLING THE STORIES OF COOPERATIVE CLIMATE RESEARCH IN THE NORTHWEST

In FY15 the NW CSC launched [Northwest Climate Magazine](#), an electronic publication developed with partners to tell stories that humanize climate change research, and highlight productive collaborations in the region. [Northwest Climate Magazine](#) was created by a team representing the major university and federal partnerships in the Northwest. Gustavo Bisbal (NW CSC), John Mankowski (NPLCC), Philip Mote (Oregon State University, CIRC & NW CSC) & Eric Salathé Jr. (University of Washington Bothell & NW CSC) served on its editorial board. Nathan Gilles (CIRC), Lisa Hayward (NW CSC) and Meghan Kearney (NPLCC) served as writers and editorial staff. The stories included in the first issue of [Northwest Climate Magazine](#) provide examples of research from Northwest communities successfully guiding conservation and efforts to build resilience.

The first issue of [Northwest Climate Magazine](#) received wide distribution, with over 8,000 people receiving the magazine, 6,000 people reading it online and over 5,500 opening the pdf version. Twelve different partner groups shared the magazine with their constituents, and various stories were featured in news releases, and popular media stories. To date more than 2,300 people have subscribed to receive the second issue of the magazine, planned for release in FY16.



## PARTNERING WITH NORTHWEST TRIBES

In FY15 NW CSC helped the [Tribal Leadership Forum](#) assess tribal capacity and needs relating to climate change in the Columbia River Basin. This project evaluated the technical, scientific and policy capacity of 15 tribes and three intertribal organizations to assess their climate change preparedness and need for adaptation efforts.

The assessment represents important progress in preparing local tribes for the environmental changes underway as a result of climate change. The study found, among other things, that

tribal management and policy leaders have a moderate level of awareness of climate impacts and planning methods, and that tribal citizens have a low to moderate awareness, which influences the priority of addressing climate change. Fewer than half of the tribes are currently engaged in federal, state, tribal and local government agency climate change planning efforts. We will further analyze these findings to assess opportunities and priorities to provide Northwest Tribes with assistance and decision tools necessary to improve their climate capacity.



**PROVIDING ACCESSIBLE AND USEABLE DATA PRODUCTS TO SCIENTISTS, RESOURCE MANAGERS, DECISION-MAKERS, EDUCATORS, STUDENTS, AND THE GENERAL PUBLIC**

The NW CSC works closely with funded Principal Investigators at the beginning of each project to develop Data Management Plans, and strives to collect all data and metadata within 90 days of the project's end. To date, we have collected over 24 terabytes of data from 19 completed projects.

Data products are accessible via [ScienceBase](#), the USGS's publically-available data repository, and also through the [NW CSC](#) and [National Climate Change and Wildlife Science Center's](#) websites. Data are primarily available as download files through these websites; however, much of the spatially-explicit data is also available over web services. These services are critical when datasets are too large to download efficiently.

In addition to hosting our own data products, in FY15 the NW CSC developed a [web-based clearing house](#) for regional climate and related data resources from other federal, state, tribal, and non-profit entities. The collection includes climate projections, fire information, snow and water resources, fish and wildlife biodiversity indices, and human health measures. Also included are links to species and ecosystem vulnerability assessments and climate adaptation databases that can help support local, landscape, or regional planning and adaptation efforts.

The NW CSC follows the Federal Geographic Data Committee's Content Standard for Digital Geospatial Metadata and/or ISO 19115 geographic metadata standards and has become an early-adopter of new USGS data release policies. Submission of data products with DOIs is now required with manuscript submissions by many peer-reviewed scientific journals; the NW CSC's data/metadata collection, verification, and packaging processes helps PIs satisfy these strict requirements.

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