

**Department of the Interior
U.S. Geological Survey**

Northwest Climate Science Center

Annual Report Fiscal Year 2012



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November 16, 2012

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Introduction

The Northwest Climate Science Center (NW CSC) was established in 2010 as one of eight regional Climate Science Centers created by the Department of the Interior (DOI). The NW CSC encompasses Washington, Oregon, Idaho, and western Montana and has overlapping boundaries with three Landscape Conservation Cooperatives (LCCs): the Great Northern, the Great Basin, and the North Pacific (Fig. 1) With guidance from its Executive Stakeholder Advisory Committee (ESAC), the NW CSC and its partner LCCs are addressing the highest priority climate science needs of Northwest natural and cultural resource managers.

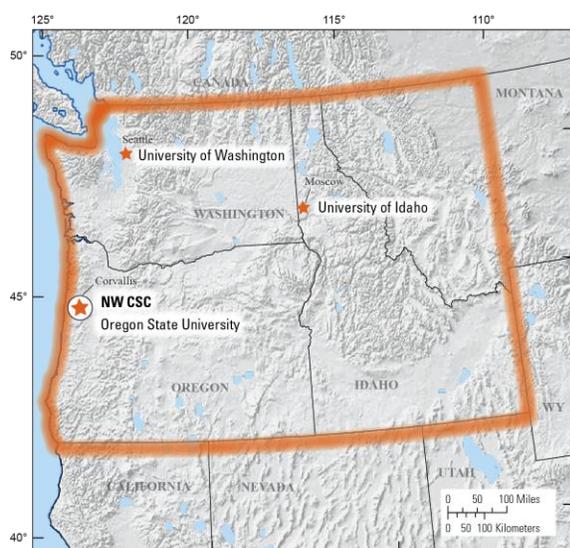


Figure 1 – Geographic area of the NW CSC.

Climate Science Centers tap into the scientific expertise of both the U.S. Geological Survey (USGS) and academic institutions. The NW CSC is supported by an academic consortium¹ with the capacity to generate climate science and tools in a coordinated fashion, serving stakeholders across the Northwest region. This consortium is primarily represented by

¹Institutions that participate in the NW CSC academic consortium include: 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, and Western Regional Climate Center.

Oregon State University (OSU), the University of Idaho (UI), and the University of Washington (UW). The academic consortium and USGS provide capabilities in climate science, ecology, impacts and vulnerability assessment, modeling, adaptation planning, and advanced information technology, all of which are necessary to address and respond to climate change in the Northwest. University members also recruit and train graduate students and early-career scientists.

This Annual Report summarizes progress on goals set out in the NW CSC Strategic Plan for 2012-2015 and the NW CSC Workplan for Fiscal Year (FY) 2012. The report follows the structure of the Strategic Plan, which describes the five core services (Executive, Science, Data, Communications, and Training and Education) provided by the NW CSC in support of its vision.

Our vision

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

Major NW CSC Accomplishments in Fiscal Year 2012

1. Executive Services

The objective of Executive Services is to provide leadership, guidance, and support for climate-related activities through coordination and engagement with relevant stakeholders. Establishing a significant and effective leadership presence in the Northwest is essential to developing a comprehensive climate science portfolio and coordinated response to climate-related resource management challenges.

1.1. NW CSC Strategic Plan for 2012-2015

The NW CSC Strategic Plan for 2012-2015 (<http://www.doi.gov/csc/northwest/upload/Northwest-CSC-Strategic-Plan.cfm>) provides a blueprint for how the NW CSC will support DOI's coordinated strategy to address current and future impacts of climate change to cultural and natural resources.

The fundamental elements of the Strategic Plan include a vision and two overarching goals. The first goal aims to “Establish a significant and effective leadership presence to strengthen the region’s ability to plan and implement a coordinated climate science portfolio.” The second goal endeavors to “Develop resources and programs to enhance climate science literacy and give regional audiences the necessary tools and information to promote climate change awareness.”

The two goals are supported by five related core services provided by the NW CSC to fulfill the stated vision. These core services emphasize (a) bringing together the regional resource management and research communities to define priorities and ensure efficient integration of climate science resources and tools when addressing issues of regional significance (**Executive Services**); (b) developing and implementing a stakeholder-driven science agenda (**Science Services**); (c) establishing national leadership in data management and climate scenario development (**Data Services**); (d) providing a platform for effective climate change-related communication among scientists, resource managers, agencies, and the general public (**Communication Services**); and (e) supporting and training graduate students at the three primary consortium universities, including sponsoring and organizing an annual “Climate Boot Camp” (**Training and Education Services**). The Strategic Plan will be reviewed at least once every four years, or as dictated by the USGS National Climate Change and Wildlife Science Center (NCCWSC) mission.

1.2. Staffing

Early in October 2011, after a succession of three Acting Directors, the DOI announced the appointment of Dr. Gustavo Bisbal as permanent NW CSC Director. Gustavo drafted the NW CSC Strategic Plan for 2012-2015, the Annual Report for FY 2011, and the Workplan for FY 2012, and assumed control of NW CSC operations, fiscal administration, and coordination of responsibilities among regional stakeholders and academic associates.



Gustavo Bisbal

In FY 2012, the NW CSC added two staff members to focus on immediate priorities. One priority was to administer and coordinate the regional climate science effort. With this in mind, the NW CSC invited Dr. Nicole DeCrappeo to work for 60 days as Research Coordinator for the NW CSC; this interim



Nicole DeCrappeo

appointment has been extended into FY 2013. Prior to joining the NW CSC, Nicole worked at the USGS Forest and Rangeland Ecosystem Science Center in Corvallis, Oregon, as a soil ecologist and she brings extensive knowledge of the scientific issues of the

Northwest and the Great Basin in particular. Her duties at the NW CSC are to inventory current climate science research projects to assess regional scientific strengths and information gaps, foster collaborative research partnerships, and ensure that scientific products generated from projects funded by the NW CSC and partners are being disseminated and used by resource managers and other stakeholders.

Another area of urgent emphasis includes the relationship with Northwest tribes and the need to boost our communications capacity. To this end, the NW CSC offered Ms. Marijke van Heeswijk a 30-day position as the Tribal Liaison and Communications

Coordinator for the NW CSC in FY 2012. This appointment has been extended on a part-time basis into the first quarter of FY 2013. Marijke also works as a supervisory hydrologist for the USGS Washington Water Science Center in Tacoma, Washington, where she leads a team of scientists and



Marijke van Heeswijk

engineers who conduct hydrological research. For the NW CSC, Marijke facilitates outreach and information exchange between the NW CSC, federal and university scientists, and federal, state, and tribal natural- and cultural-resource managers. Effective communication between these groups with diverse backgrounds and perspectives is essential to the success of the NW CSC. Marijke is particularly focused on ensuring that the interests of the 52 federally recognized tribes within the NW CSC geographic area are represented.

1.3. Shared Leadership Responsibility

The NW CSC works closely with many regional partners to seek guidance, coordinate efforts, and plan for an effective distribution of functions and responsibilities. Two primary groups participate in the shared leadership of the NW CSC: the Executive Stakeholder Advisory Committee (ESAC) and the Leadership Team (LT).

The ESAC ensures broad participation by regional stakeholders and provides guidance for the NW CSC by identifying and prioritizing needs for research, monitoring, data management, and additional skills and capacities in the Northwest. It is composed of 22 executives from federal and state agencies, tribal organizations, and LCCs (Appendix 1). The ESAC convened in Portland, Oregon, on May 2, 2012, and has interacted through group emails throughout FY 2012.

The LT was established to allow for open and frequent communication between the USGS and the primary academic consortium partners. Members of the LT are the NW CSC Director, the USGS Regional Director for the Northwest (or his/her designee), and the principal investigators (PIs) from the primary academic consortium partners (Appendix 2). The LT addresses coordination of communications, data management, and emerging issues through monthly conference calls and quarterly face-to-face meetings.

In July 2012, Dr. Lisa Graumlich stepped aside from her role as University of Washington PI for the NW CSC so that she could better tend to the demands of her position as Dean of the UW College of the



Nate Mantua

Environment. Lisa was replaced by Dr. Nate Mantua, co-Director of the UW's Climate Impacts Group and an Associate Professor in the UW School of Aquatic and Fishery Sciences. Nate's own research focuses on the impacts of climate variability and climate change on the Pacific Northwest. Nate's

vast experience with planners and policy makers to apply this information to regional decision-making processes are invaluable assets to the DOI Climate Science Center network.

1.4. Engaging Northwest Tribes

The geographic area covered by the NW CSC is home to 52 federally recognized tribes. Northwest tribal communities are especially vulnerable to climate change because they are place-based and depend on natural resources to sustain their economies and traditional way of life. In addition, blending of Traditional Ecological Knowledge (TEK) and western science brings a unique opportunity for understanding linked social, cultural, and natural resource impacts from climate change. The NW CSC reached out to the Northwest tribal community to listen to tribal needs and make tribes aware of opportunities within the NW CSC. In FY 2012, the NW CSC:

- Participated in regular conference calls with the Pacific Northwest Tribal Climate Change Network and gave a presentation to introduce the NW CSC, and identify opportunities for collaboration;
- Delivered a presentation at the 2012 Tribal Summit organized by Region 10 of the U.S. Environmental Protection Agency;
- Created opportunities for tribal participation as students and instructors at the Climate Boot Camp; and
- Linked tribal leaders and staff with USGS science centers to cooperate in the preparation of research proposals in response to the FY 2012 NW CSC Request for Proposals.

1.5. National leadership

In FY 2012, the national network of eight CSCs and the NCCWSC stayed connected through one face-to-face meeting and multiple conference calls. Dr. Phil Mote, Oregon State University PI for the NW CSC, helped organize both meetings. In addition, the national CSC/NCCWSC network includes five working groups, with four of these being led or co-led by NW CSC PIs. Phil currently leads a working group on climate data / scenarios and the Council of Lead PIs. Dr. Steve Daley-Laursen, University of Idaho PI for the NW CSC co-leads a working group on data management and leads another one on communication. These working groups typically



Phil Mote

conduct the bulk of their business through phone calls and emails.

2. Science Services

The objective of Science Services is *to develop and implement a comprehensive Science Agenda to address current and emerging climate priorities in the Pacific Northwest*. Science Services include the design of a long-term (4-year) Science Agenda and ensuing Annual Workplans that provide guidance for the progressive implementation of the broad Science Agenda. Both products rely heavily on stakeholder input regarding Northwest climate science needs. Ultimately, this statement of regional climate science needs is combined with similarly identified needs of Climate Science Centers throughout the United States to articulate a national climate science program.

2.1. Science Agenda

In FY 2012, the NW CSC began implementing the Northwest Climate Science Agenda that was established by the ESAC in 2011 (the full Science Agenda can be found at <http://www.doi.gov/csc/northwest/Climate-Science-Agenda.cfm>). This broad agenda is composed of seven themes, each with several sub-themes, that outline the science needed to support sound resource management decisions in the Northwest in the face of climate change. The seven themes are:

1. Climate science and modeling
2. Response of physical systems to climate change
3. Response of biological systems to climate change
4. Vulnerability and adaptation
5. Monitoring and observation systems
6. Data infrastructure, analysis, and modeling
7. Communication of science findings

The NW CSC endeavors to address this Science Agenda by requesting and funding proposals that fit one or more of the above themes, by working with our regional partners to identify and co-fund projects with relevance to the Science Agenda, and by inventorying and synthesizing climate-related projects from federal, state, and local agencies around the Northwest.

2.2. Workplan for FY 2012

The Workplan for FY 2012 included the first ever Request for Proposals (RFP) released by the NW CSC. A timeline of the FY 2012 RFP announcement, submittal, and award process is provided in Appendix 3. Eligible applicants for the RFP were institutions participating in the primary academic consortium and USGS science centers, field stations, and laboratories. Applicants were asked to address the following five science priority needs identified by the ESAC:

1. Response of hydrologic systems to future climate
2. Vulnerability of species, populations, and ecosystems to climate
3. Aquatic integrity related to climate change
4. Disturbance occurrence due to climate change
5. Climate change monitoring and observation systems

Ninety-two pre-proposals were received. Eighteen of those were selected for submittal as full proposals and nine were selected for funding (Appendix 4). An Independent Review Panel of federal and university climate science professionals evaluated proposals based on their relevance and applicability to management needs, transfer value, scientific design, feasibility, and ability to leverage funds and build climate science capacity in the region.

2.3. Funded Science

To date, the NW CSC has invested about \$2.3M in climate science research projects. Projects funded in FY 2012 range from examining climate change effects on near-shore environments along a latitudinal gradient in the Pacific Northwest to assessing how sagebrush ecosystems will respond to changes in temperature and timing of precipitation (Project titles can be found in Appendix 4 and project summaries can be found at <https://nccwsc.usgs.gov/display-csc/4f8c64d2e4b0546c0c397b46>). All NW CSC-funded research is conducted within the geographic boundaries of one or more of the NW CSC's partner LCCs and is designed to be responsive to the science needs of resource managers within those LCCs (Fig. 2).

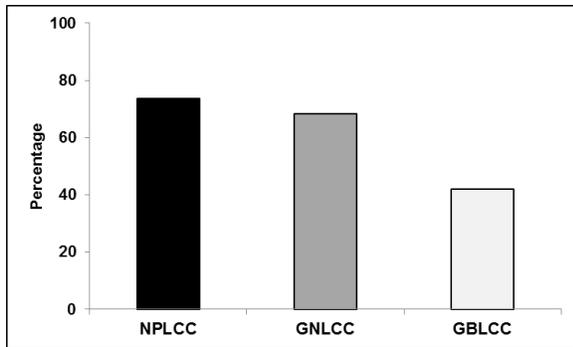


Figure 2 - Percentage of NW CSC-funded projects that are relevant to one or more of the NW CSC's partner LCCs: North Pacific (NPLCC), Great Northern (GNLCC), and Great Basin (GBLCC).

The NW CSC has embarked on an ambitious project to provide state-of-the-science climate research and decision management tools for the Northwest: with help from the ESAC, the NW CSC is building a comprehensive database of projects in the region funded by federal and state agencies and tribal organizations that address the NW CSC Science Agenda. This shared effort is anticipated to result in many benefits:

- The database will be placed on a public website and serve as a tool to help identify management-relevant information gaps, build opportunities for collaboration, and avoid duplication of efforts. It will also be used to help assess when the portfolio of regional climate-related products satisfies specified resource management needs;
- Each agency's climate science will be counted and represented by the NW CSC in regional and national meetings and in discussions with members of Congress, USGS and DOI leadership, and officials of other agencies; and
- The collective Northwest climate science portfolio will be used to refine regional and national climate science priorities.

By cataloguing and synthesizing the collective Northwest climate science portfolio, individual research projects begin to add to something more than the sum of their parts. Our overarching goal is to give climate scientists, resource managers, and the general public a more holistic and useful view of how climate change will affect Northwest natural and cultural resources in the short- and long-term future.

3. Data Services

The objective of Data Services is to collect and secure climate data, while providing timely access, analytical functions, and interpretive services. Data Services provide a core business function to Northwest stakeholders by linking data owners and providers to users. This high-level function includes developing data-administration standards and procedures, conducting data processing and validation, and providing technical tools, risk management, security and user-friendly data access. The NW CSC considers the orderly and thoughtful management of data resources to be fundamental to the success of all projects funded by the Center. Our view of the value of data as a resource permeates all stages of the project cycle. We included data management planning as a selection criterion for proposals submitted under the FY 2012 RFP, and we provide data management services indefinitely for each funded project.

The University of Idaho, in partnership with the IT program of the NCCWSC, is the lead institution for data management and cyberinfrastructure programs of the NW CSC. The UI received supplementary grant funding from the NCCWSC to help develop a framework and guidance for best practices in data management for the national network of CSC and to facilitate data management by the Great Northern, Great Basin, and North Pacific LCCs.

3.1 Northwest Knowledge Network

The Northwest Knowledge Network (NKN) is an institute at the UI that provides data services for the NW CSC. The UI established the NKN in 2010 to advance the use of data in society and steward research data for producers and end users by: a) adopting and promoting current and emerging data policies, protocols, and standards; b) providing stable and enduring access to data; c) anticipating and delivering data services; and d) conducting research to respond to challenges in large data management. University of Idaho PI for the NW CSC, Dr. Steven Daley-Laursen, is the Director of the NKN.



Steve Daley-Laursen

3.2 Staffing

The NKN hired a Data Services Operations Director, Mr. Greg Gollberg, and a Systems Administrator, Dr. Luke Sheneman, both partially funded by the NW CSC, to manage the overall data services process in support of the NW CSC. Both positions commenced on September 1, 2012. The NKN also hired two Website Designers, a Web Applications Programmer, and a Metadata Librarian-Data Manager, all partially funded by the supplementary grant from the NCCWSC and contributing directly to data management services for the NW CSC.



Greg Gollberg

3.3 Portal Development

During FY 2012, the NKN successfully launched the NKN data portal. This product was in a beta test form and a number of participants actively tested the site. Nested within this platform, the NKN designed and constructed a NW CSC data portal around a highly customized instance of the freely-available, open-source ESRI Geoportal Server product. This Java-based geospatial metadata cataloging system provides a robust, extensible and community-supported platform for developing the NW CSC data portal. The NKN expanded the basic Geoportal server by providing a mechanism for uploading data products and automatically linking these assets to a specific ISO 19115-2 metadata form that is compliant with an approved subset of metadata fields used by the USGS. The NW CSC portal will be fully launched into production by December 2012.

4. Communication Services

The objective of Communication Services is to *provide professional communication and outreach services that support the exchange of information among regional stakeholders (including scientists), and effectively raise awareness of climate issues in the Pacific Northwest.* The key role of Communication Services is to provide logistical and technical support for effective outreach and community involvement in the activities of the NW CSC. Notably, promoting communication between researchers and stakeholders and the

communication of science findings were considered so important that both were blended into a selection criterion for proposals submitted under the FY 2012 RFP.

4.1 Communication Strategy

In FY 2012 the NW CSC initiated the development of a communication strategy that describes the overall NW CSC communication goals and specific objectives, the primary audiences for specific objectives, the general approaches for effectively communicating with those audiences, and a schedule for implementing the communication strategy. The three overarching goals currently under consideration are to:

1. Facilitate development and dissemination of Northwest climate-related science, information, and tools to support management of natural and cultural resources under changing climate conditions;
2. Increase knowledge and understanding of Northwest climate-related science; and
3. Facilitate use of data from NW CSC-funded research and other regional databases.

This effort is ongoing, with a goal of completing the communication strategy in FY 2013.

4.2. Website Development

The DOI NW CSC website (www.doi.gov/csc/northwest) was launched in October 2011. The website describes the vision and mission of the NW CSC, allows readers to access the NW CSC Strategic Plan, Science Agenda, summaries of science projects funded in FYs 2011 and 2012, and information about the NW CSC Executive Stakeholder Advisory Committee, Leadership Team, staff, and graduate student Fellows.

The academic NW CSC website (www.nwclimatescience.org) mirrors much of the information contained on the DOI NW CSC website, but additionally it includes feature articles on CSC-funded research projects for Center scientists and graduate Fellows that are updated quarterly.

4.3. Supporting the Dissemination of Northwest Climate Science

The NW CSC continued its support of the annual Pacific Northwest Climate Science Conference, which

began in 2010. The NW CSC was a major sponsor of the 3rd Annual Conference, held at the Boise Centre in Boise, Idaho, on 1-2 October 2012. The conference provides a forum to exchange scientific results and policy and management options related to climate impacts research in the Northwest. The meeting is attended by a wide range of professionals, including policymakers, resource managers, and scientists. NW CSC PI Mote served on the program committee for the 2012 conference, and PI Daley-Laursen also helped organize the conference. A session on 'conservation' was kicked off by NW CSC Director Bisbal, who described the NW CSC, followed by presentations by Sean Finn, Science Coordinator for the Great Basin LCC, and NW CSC-funded USGS scientist, Clint Muhlfeld.

With additional financial support from the North Pacific LCC, the NW CSC created a directory of academic climate change scientists whose research is focused on the North Pacific Coast of North America, including California, Oregon, Washington, Idaho, British Columbia, and Alaska. The University of Washington developed the California, Oregon, Washington, and Idaho portion of the directory, and the Alaska Coastal Rainforest Center developed the British Columbia and Alaska portion of the directory. The intended audience for this directory ranges from individual parties involved in climate change adaptation to LCC stakeholders.

5. Training and Education Services

The objective of Training and Education Services is to *promote broad participation by and support education of diverse young scientists in the work of the NW CSC*. The NW CSC provides Training and Education Services to deliver science-based knowledge and informal educational programs to the larger community. These services also aim to develop and sustain a revolving corps of young researchers by elevating the priority of student and post-doctoral opportunities in budget planning. Training and education of young scientists carries such importance that it was included as a selection criterion for proposals submitted under the FY 2012 RFP.

The NW CSC provided funding for nine new and continuing graduate student Fellows in FY 2012. Four of these students attend Oregon State University, four attend the University of Washington, and one

attends the University of Idaho. Student project titles can be found in Appendix 5.

The NW CSC provided travel funds for two students to attend a two-week summer course: "Climate System Modeling: Downscaling Techniques and Practical Applications," hosted by the University of Alaska Fairbanks and sponsored by the Alaska Climate Science Center, July 16-28, 2012. The NW CSC also provided financial support for 17 students to attend the 3rd Annual Pacific Northwest Climate Science Conference in Boise, Idaho, October 1-2, 2012.

5.1. Climate Boot Camp

A major objective of the NW CSC is to support and train graduate students across the Northwest to work at the interface of scientific research on climate, climate impacts, or climate adaptation and resource management decision-making. A primary means to meet this objective is the NW CSC Climate Boot Camp, which is organized collaboratively by Oregon State University, the University of Idaho, the University of Washington, and the USGS. Oregon State University hosted the 2012 boot camp at the H.J. Andrews Experimental Forest in Blue River, Oregon. The Climate Boot Camp brought together 15 participants from 10 universities, two federal science agencies, and one non-governmental organization (NGO). Participants included two students from Oregon State University, one student from the University of Idaho, one student from the University



NW CSC Climate Boot Camp students and instructors during the 2012 session.

of Washington, the education coordinator of the Agriculture and Food Research Initiative under the Regional Approaches to Climate Change project (REACCH) (sponsored by the U.S. Department of

Agriculture) at the University of Idaho², five Graduate Fellows from other Climate Science Centers, and two USGS scientists. Participants received training in interdisciplinary science communication and development, climate change impact pathways, and a framework for data management. They also gave videotaped practice interviews and several small group presentations, interacted with leading local scientists and resource managers, and visited field sites. More information about the Climate Boot Camp can be found on the NW CSC website (<http://www.doi.gov/csc/northwest/news/Climate-Boot-Camp-Grooming-the-Next-Generation-of-Climate-Experts.cfm>).

NW CSC Funding in Fiscal Year 2012

Funding for the NW CSC comes from the DOI through the USGS (a summary budget sheet can be found in Appendix 6). The total funding allocation for the NW CSC in FY 2012 was \$2,741,280. The largest share of these funds (56%, Fig. 3) was dedicated to supporting academic operations and research, including a basic Cooperative Agreement for \$727,282 with the primary academic consortium partners (OSU-UI-UW) and other grants provided to institutions within the academic consortium on a competitive basis. The Cooperative Agreement with the primary academic partners included funding for nine new and continuing graduate student Fellows (project titles are presented in Appendix 5).

The second-largest share of NW CSC funds (23%, or \$629,954) supported research projects designed and led by USGS Science Centers. Of this total, \$280,000 (44%) represented the second-year commitment for projects started in FY 2011; the balance was applied to projects started in FY 2012.

The NW CSC and North Pacific LCC jointly funded two tribal climate research projects. The NW CSC contribution of \$42,400 (1.6%) helped one project designed and led by the Yurok Tribe and another by the Swinomish Indian Tribal Community. These projects are designed to gather, refine, and communicate Traditional Ecological Knowledge as it relates to natural and cultural resources and assess

how culturally-important resources will be affected by changing climate and related environmental stressors.

NW CSC operational costs, including salaries and benefits, facilities, and other non-personnel expenditures reached \$465,971 (17%). A balance of \$54,930 (2%) was carried over into FY 2013.

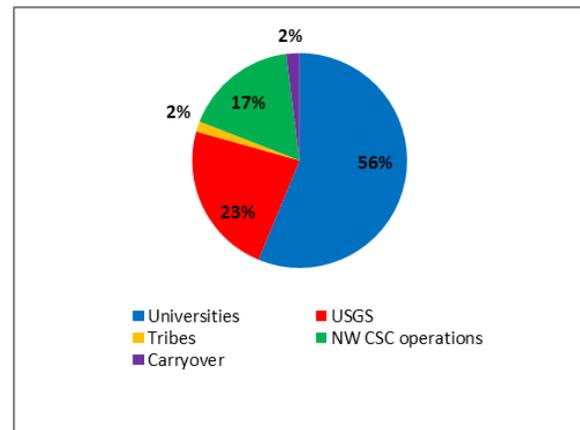


Figure 3 - Allocation of NW CSC budget in FY 2012

² This resulted in REACCH offering a similar Graduate Fellows summer development program in northern Idaho in September 2012.

Appendix 1: Executive Stakeholder Advisory Committee (ESAC)

(22 agencies and organizations: 3 State agencies, 3 Tribal organizations, 3 Landscape Conservation Cooperatives, 13 Federal agencies)

Federal Agencies

U.S. Army Corps of Engineers, Northwestern Division
Bonneville Power Administration
Bureau of Indian Affairs
Bureau of Land Management, Oregon/Washington
Bureau of Reclamation, Pacific Northwest Region
U.S. Environmental Protection Agency, Region 10
Federal Highway Administration, Western Federal Lands Highway Division
National Oceanic and Atmospheric Administration, Northwest Fisheries Science Center
National Park Service, Pacific West Region
Natural Resources Conservation Service, National Water and Climate Center
U.S. Fish and Wildlife Service, Pacific Region
U.S. Forest Service
U.S. Geological Survey, Northwest Region

State Agencies

Montana Department of Natural Resources and Conservation
Oregon Department of Fish and Wildlife
Washington State Department of Ecology

Tribal Organizations

Affiliated Tribes of Northwest Indians
Columbia River Inter-Tribal Fish Commission
Northwest Indian Fisheries Commission

Landscape Conservation Cooperatives

Great Basin Landscape Conservation Cooperative
Great Northern Landscape Conservation Cooperative
North Pacific Landscape Conservation Cooperative

Appendix 2: NW CSC Leadership Team (LT)

Gustavo Bisbal, Director, Northwest Climate Science Center
Philip Mote, Principal Investigator, Oregon State University
Steven Daley-Laursen, Principal Investigator, University of Idaho
Nathan Mantua³, Principal Investigator, University of Washington
Nancy Lee, Chair of the ESAC and Deputy Director, U.S. Geological Survey Northwest Region

³ Dr. Mantua replaced Dr. Lisa Graumlich, Dean of the University of Washington College of the Environment, as co-PI to the NW CSC.

Appendix 3: Timeline of NW CSC Proposal Solicitation Process in FY 2012

February 17, 2012 – Release of proposal solicitation and guidelines

March 12, 2012 – Due date for pre-proposals

March 27, 2012 – Announcement of selection of pre-proposals invited for submittal as full proposals

April 25, 2012 – Due date for full proposals

May 16, 2012 – Due date for peer reviews of full proposals

May 25, 2012 – Announcement of project selection

Appendix 4: NW CSC Projects Funded in Fiscal Year 2012

Lead principal investigators, their affiliations, and titles for projects funded by the Northwest Climate Science Center (NW CSC) in FY 2012. For project summaries, visit the NW CSC Science webpage (<http://www.doi.gov/csc/northwest/science.cfm>).

SCIENCE PROJECTS:

- **Jamie Donatuto** (Swinomish Indian Tribal Community), **Eric Grossman** (USGS), **Sarah Grossman** (Swinomish Indian Tribal Community) – Correlation and climate sensitivity of human health and environmental indicators in the Salish Sea (Co-funded with the North Pacific LCC)
- **Matt Germino** (USGS) – Sagebrush ecosystems in a changing climate
- **Alan Hamlet** (University of Washington) – Extended monitoring and modeling of climate change effects on Pacific Northwest wetlands
- **Emilie Henderson** (Oregon State University) – Climate, land management and future wildlife habitat in the Pacific Northwest
- **Jeffrey A. Hicke** (University of Idaho) – Improving understanding of threats to whitebark pine in the Western U.S.: quantifying climate change effects on mountain pine beetle outbreaks
- **Joshua Lawler** (University of Washington) – Climate-change vulnerability in the Pacific Northwest: a comparison of three approaches
- **Phil Mote** (Oregon State University), **John Abatzoglou** (University of Idaho), **Dennis Lettenmaier** (University of Washington), and **David Turner** (Oregon State University) – Integrated scenarios of climate, hydrology, and vegetation for the Northwest (Jointly funded with CIRC)
- **Clint Muhlfeld** (USGS) – Predicting climate change impacts on river ecosystems and salmonids across the Pacific Northwest: combining vulnerability modeling, landscape genomics, and economic evaluations for conservation
- **Anne Nolin** (Oregon State University) – Climate change and peak flows: Knowledge-to-action to help managers address impacts on streamflow dynamics and aquatic habitat
- **Kathleen Sloan** (Yurok Tribe) – Utilizing Yurok traditional ecological knowledge to inform climate change priorities (Co-funded with the North Pacific LCC)
- **John Takekawa** (USGS) – Marshes to mudflats: climate change effects along a latitudinal gradient in the Pacific Northwest

INFORMATION-MANAGEMENT/WORKSHOP-SUPPORT PROJECTS:

- **Von Walden** (University of Idaho) – Support for the 3rd Annual Pacific Northwest Climate Science Conference

Appendix 5: NW CSC Graduate Student Fellows Projects in FY 2012

Graduate student Fellows, affiliations, and titles for projects funded by the NW CSC in FY 2012. For project summaries, visit the NW CSC contacts webpage (<http://www.doi.gov/csc/northwest/contact-us.cfm>).

- **Collette Gantenbein** (University of Idaho) - Land cover change in relation to climate change impacts on burn severity in the Pacific Northwest
- **Isabel Guerrero** (Oregon State University) - The economics of climate change for possible impacts on the Pacific Northwest and evaluation of mitigation and adaptation strategies
- **Sarah Hadley** (Oregon State University) – Climate, land cover, and the distribution of forest birds
- **Brittany Jones** (University of Washington) – Spatially-explicit assessment of natural adaptation and restoration of tidal wetlands under the influence of future climate change throughout Puget Sound
- **Jesse Langdon** (University of Washington) – Forecasting the impact of climate change and land use on terrestrial animals in the Pacific Northwest
- **David Lawrence** (University of Washington) – Forecasting the interactive effects of climate change, land-use alteration, and invasive species on Pacific salmon
- **Sihan Li** (Oregon State University) – Regional climate modeling with large ensembles using volunteer computing: Regional Climate Prediction Dot Net (REGCPDN)
- **John Peters** (University of Washington) – Minimizing the gap between climate science and resource management: developing a web-assessable database of expert science (graduated spring 2012)
- **Ronda Strauch** (University of Washington) – Adapting to climate change on federal lands in Washington: a proposed science-management partnership
- **Lindsey Thurman** (Oregon State University) – Climate change and UV-B radiation: synergistic impacts on high-elevation amphibian species
- **Seth Wiggins** (Oregon State University) – Ecosystem services: carbon sequestration and rangeland management (graduated spring 2012)
- **Jacob Wolf** (University of Idaho) – Potential impact of predicted future drought for the western US: developing indices that describe drought frequency, intensity and duration (graduated spring 2012)

Appendix 6: NW CSC Funding and Expenses in FY 2012

FY 2012 NW CSC Funding	
Initial allocation	\$2,527,282
One-time addition from NCCWSC	\$200,000
FY 2011 carryover	\$13,998
Subtotal	\$2,741,280

Center Operational Costs	
Salaries and awards	\$281,934
Travel, supplies, relocation expenses	\$184,037
Subtotal	(\$465,971)

University Grants/Cooperative Agreements	
OSU/UI/UW – Basic NW CSC Co-op	\$727,282
OSU – Integrated scenarios	\$234,000
OSU – Land management and wildlife	\$130,709
OSU – Peak flows	\$143,996
UW – Wetlands	\$136,000
UW – Comparative vulnerability approaches	\$79,038
UI – Pine beetles	\$92,000
UI – Climate Science Conference co-sponsorship	\$5,000
Subtotal	(\$1,548,025)

Tribal Grants/Cooperative Agreements	
Yurok Tribe	\$21,200
Swinomish Tribe	\$21,200
Subtotal	(\$42,400)

Funds Allocated to Other USGS Science Centers	
FY11 yr2 FRESC – Sagegrouse vulnerability	\$30,000
FY11 yr2 FRESC – Bull trout vulnerability	\$125,000
FY11 yr2 WA WSC – Macroinvertebrate vulnerability	\$125,000
FRESC – Sagebrush ecosystems	\$58,000
FRESC – Wetlands (UW project)	\$6,954
WERC – Marshes to mudflats	\$144,000
NOROCK – Salmon ecosystems	\$141,000
Subtotal	(\$629,954)
TOTAL EXPENSES	(\$2,686,350)
Carryover into FY13	\$54,930