Cooperative Ventures
An update of activities from the Pacific Northwest Cooperative Ecosystem Studies Unit
Spring 2011

Pacific Northwest CESU Update

News from the Host University

Important events marked the beginning of the 2010-11 academic year for the Pacific Northwest Cooperative Ecosystem Studies Unit and the University of Washington host institution. The PNW CESU was established in 2000 and like other CESU's must complete a review and renewal process every five years. We are pleased to announce that in the fall of 2010 the National CESU Council completed its review and has recommended a third five-year term for the PNW CESU. The approval by the Council recognizes the significant accomplishments of the PNW CESU and positive trajectory that we anticipate over the next five years. The Renewal Self Assessment noted a substantial increase in funded projects from the previous five years ($9M vs. $22M); a continued allocation of funds across all disciplinary interests (social, biological, physical, cultural and interdisciplinary), and broad participation by our university partners and federal agencies. Funding was distributed almost evenly between research and technical assistance projects.

Events related to the host institution involve the creation of the new College of the Environment at the University of Washington (UW). The College of Forest Resources, with a 102-year history with the UW is now one of the founding units within the new College of the Environment. The new designation for the College of Forest Resources is the School of Forest Resources and we join eleven other core units including the School of Aquatic and Fishery Sciences, Departments of Atmospheric Sciences, and Earth and Space Sciences, and the Schools of Oceanography, and Marine and Environmental Affairs. With this new affiliation the CESU is subsumed under a larger College, but remains within the School of Forest Resources where our staff and primary operations reside. It is important to note that the new dean of the College of the Environment, Lisa Graumlich, came to the UW from the University of Arizona, where she was involved with the Desert Southwest CESU. Therefore her understanding of the CESU concept and its important role in the new College is central to her administrative goals. Finally, the School of Forest Resources is in a transition period with regard to leadership, which should be resolved within the next academic year. A search is underway, and it is anticipated that a new director will be in residence by fall 2011.

PNW CESU and Regional News

Other events involving the PNW CESU include several new partnership efforts associated with climate change initiatives. In late 2010, Interior Secretary Ken Salazar announced the establishment of a national network of Climate Science Centers (CSCs). Three centers have now been funded and implemented, the Northwest Climate Science Center (NW CSC), the Southeast CSC, and the Alaska CSC, hosted by the University of Alaska. Our host institution, UW, along with Oregon State University and the University of Idaho are leading the NW CSC. The CSC is to provide science to natural and cultural resource managers on those resources most vulnerable

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Mission

The Pacific Northwest Cooperative Ecosystem Studies Unit (PNW CESU) is a partnership for research, technical assistance and education to enhance understanding and management of natural and cultural resources.

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Bureau of Land Management
Bureau of Ocean Energy Management, Regulation, and Enforcement
Bureau of Reclamation
National Oceanic and Atmospheric Administration
National Park Service
Natural Resource Conservation Service
US Army Corps of Engineers
US Fish and Wildlife Service
US Forest Service
US Geological Survey

Universities and state agencies:
University of Washington (host)
Alaska Department of Fish & Game
Central Washington University
Eastern Washington University
Heritage University
Oregon Institute of Technology
Oregon State University
Portland State University
Saint Mary's University of Minnesota
Southern Oregon University
University of Alaska – Anchorage
University of Alaska – Southeast
University of British Columbia
University of Idaho
University of Oregon
University of Vermont
Washington State University
Western Washington University

The PNW CESU and the CESU National Network

The **Cooperative Ecosystem Studies Unit National Network** is organized around biogeographic regions across the United States. Each region is served by a distinct CESU, and all regions are linked together by the National Network. The goal of the CESU Network is to improve the scientific base for managing federal lands by providing resource managers with high quality scientific research, technical assistance and education through working partnerships.

The **PNW CESU** region encompasses Washington, Oregon, northern California, western Idaho, and southeastern and southwestern Alaska. The unit is hosted by the University of Washington. As a member of the CESU National Network, the PNW CESU is a working partnership of leading academic institutions, federal and state agencies, and non-governmental organizations.

Visit our Web site at: www.cfr.washington.edu/research.cesu

- **Browse or search our online project library**
- **Learn about our agency and university partners**
- **Find helpful materials for initiating a project through the PNW CESU**

Special thanks to Kris Freeman for the newsletter layout.

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Pacific Northwest CESU Update

to climate change and on predicted impacts to resources. The PNW CESU will provide support as needed for this developing center. In addition to these regional CSCs, the Department of Interior established a network of Landscape Conservation Cooperatives (LCCs) that engage federal agencies, local and state partners, and the public in developing landscape-level strategies for managing climate change impacts on natural and cultural resources. The LCCs are partnerships for applied conservation science that support and enhance on-the-ground conservation efforts by facilitating the production and dissemination of applied science for resource management decision-makers. Within the PNW CESU there are four LCCs, including all of the North Pacific LCC (NP LCC), and portions of the Great Basin, the Great Northern, and the Western Alaska LCCs. Chris Lauver (PNW CESU co-leader) is currently serving as a primary contact for the National Park Service (Pacific West Region) for the developing NP LCC. Finally, the PNW CESU is supporting the North Cascadia Adaptation Partnership (NCAP), which is a Forest Service – National Park Service collaboration on climate change adaptation. NCAP addresses climate change adaptation involving two national forests (Mt. Baker-Snoqualmie, and Okanogan-Wenatchee) and two national parks (North Cascades NP Complex and Mount Rainier) over a land area of 6 million acres. See http://www.northcascadia.org/ for more details.

Recent Funding Activity

In fiscal year 2010 (FY10), new projects and funded modifications to existing projects for all Pacific Northwest CESU federal partners totaled over $5 million, up from nearly $4 million in FY09. Of 64 new projects, 43 were technical assistance, 16 were research, and five were education-oriented. There were 40 funded modifications as well during FY10. New projects were well-distributed across disciplines (biological, cultural, physical, social and interdisciplinary), with half in the biological sciences, and one-third were social and cultural projects.

FY10 was a record-setting year for NPS. The number of new projects represents a significant increase in activity compared to all previous years: projects increased by 65% compared to FY09, and total funding increased by 62%.

Allocation of FY10 project funds to academic partners was equitable, with 15 of 18 partners participating in task agreements, up from 12 institutions in FY09. Three partners (Oregon State University,

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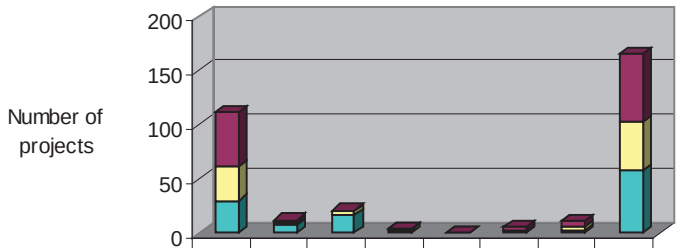
New projects FY08 - FY10



	NPS	NRC	USB	USB	USF	USF	USG	TOT
FY10	51	2	1	1	0	3	6	64
FY09	31	3	3	3	1	0	3	44
FY08	30	7	17	0	0	2	2	58

Federal agency

Project Highlights

Bureau of Land Management
Project Title: Inner City Youth Institute Natural and Cultural Resource Program
Funding: $15,000
Collaborators: David Stemper, Oregon State University; Karen Wilson, BLM Oregon State Office
Project Goal: Conduct natural resource educational programming for youth in Portland, Oregon area through the Inner City Youth Institute

National Park Service
Project Title: Enhancing Visitor Experience of Mount Ranier Archaeology through Excavations at Sunrise
Funding: $115,000
Collaborators: Patrick McCutcheon, Central Washington University; Greg Burtchard, Mount Rainier Cultural Resources Program
Project Goal: Conduct a field-school program for archaeological data recovery, public interpretation & site stabilization at the Sunrise Borrow Pit Site

Natural Resources Conservation Service
Project Title: Improving Water Supply Forecasts through Implementation of Streamflow Simulation Models
Funding: $128,896
Collaborators: Juinn-Der Geoffrey Duh, Portland State University; James Marron, NRCS National Water and Climate Center
Project Goal: Integrate cutting-edge Geographic Information Systems (GIS) technologies in water supply forecasts by creating an effective GIS data-management environment and a streamlined scientific procedure that can be used by water forecasters to process a vast amount of information efficiently in day-to-day operations and steering committee

US Bureau of Reclamation
Project Title: Evaluating Water Management Responses to Global Climate Change Using Coupled Hydrologic and Economic Models
Funding: $97,000

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Saint Mary's University of Minnesota, and University of Washington) captured 55% ($2,807,163) of the FY10 funding, with the host institution, UW, receiving 13% of the total allocated. In FY09, the three institutions receiving the highest amount of funding were University of Oregon, University of Washington, and Portland State University. Since its inception in October 2000, nearly $38 million in funding for 448 projects has been processed through the PNW CESU.

New PNW CESU Partners

Three new members have been admitted to the PNW CESU since 2008, two federal partners and one university.

U.S. Army Corps of Engineers (USACE) became a member of the PNW CESU in spring 2008 under Amendment IV of the 2005-2010 master cooperative agreement. Linda Nelson attended the PNW CESU 2009 annual meeting to discuss USACE technical assistance needs related to the research and development areas of navigation, flood and coastal storm damage reduction, and ecosystem restoration. To learn more about USACE topics of interest, please visit the USACE page of the PNW CESU Web site at http://www.cfr.washington.edu/research.cesu/participants/ federal_agencies/USACE.asp

National Oceanic and Atmospheric Administration (NOAA) is the newest PNW CESU federal partner. NOAA was admitted to the unit in late 2009 under Amendment V of the 2005-2010 master cooperative agreement. John Ferguson attended both the PNW CESU 2009 and 2010 annual meetings to present the research interests of NOAA Fisheries science centers. For more information on NOAA Fisheries research needs, see the NOAA page of the PNW CESU Web site at http://www.cfr.washington.edu/research.cesu/participants/ federal_agencies/NOAA.asp

Central Washington University (CWU) is the PNW CESU's newest university partner. CWU was also admitted to the unit under Amendment V of the 2005-2010 master cooperative agreement. CWU is currently working with the National Park Service on an archaeological field school at Mount Rainier. Field work at the site includes educational and training components for university students, park visitors and staff, and other practicing professionals. Project findings will be used in exhibits at Sunrise Visitor Center. To learn more about resources offered by CWU, please visit the CWU page of the PNW CESU Web site at http://www.cfr.washington.edu/research.cesu/participants/universities/cwu.asp .

Announcements

Upcoming meetings of interest, mark your calendars!

2011 PNW CESU Annual Meeting of the Managers & Executive Committees Since our last newsletter in 2007, the PNW CESU has held two annual partner meetings. The 2009 Annual Meeting of the Managers and Executive Committee (i.e., all partners) was convened in October at the host university in Seattle. The 2010 Annual Meeting was hosted by the U.S. Fish & Wildlife Service in Portland, Oregon in April. We are exploring options for the 2011 annual partner meeting, and welcome comments from our partner representatives on agenda topics and location of our next meeting.

The **2nd Annual Pacific Northwest Climate Science Conference** is scheduled for June 2011 (dates TBD). Research institutions joined by federal and state government agencies from throughout the region have organized a comprehensive conference on the science of climate variability and change in the Pacific Northwest. Meeting host is University of Washington, Seattle.

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USBR Project Highlight continued
Collaborators: Jennifer Johnson, University of Idaho; John C. Tracy, Idaho Water Resources Research
Project Goal: Combine insights gained from hydrologic modeling with those gained from modeling the economics of water supply and demand to evaluate both the hydrologic and economic outcomes of various strategies for meeting changing conditions of supply and demand, including those associated with global climate change

US Fish and Wildlife Service
Project Title: North Pacific Landscape Conservation Cooperative Time Graphs and Spatial Maps
Funding: $38,760
Collaborators: Philip Mote, Oregon State University; Mary Mahaffy, USFWS Science Applications
Project Goal: Create time graphs and spatial maps with climate variables to inform discussions by North Pacific Landscape Conservation Cooperative participants and steering committee

US Forest Service
Project Title: Protocols for Assessing Community Quality of Life for Land Management Planning
Funding: $52,585
Collaborators: Chuck Harris, University of Idaho; Deb Whitall, USFS Pacific Southwest Region
Project Goal: Develop basic protocols to assess social, economic and environmental amenities, settings, or attributes that contribute to perceived quality of life for communities affected by National Forest Planning

US Geological Survey
Project Title: Climate Impacts on Burn Severity in Three Forest Ecoregions of the US
Funding: $114,000
Collaborators: Charles Halpern, University of Washington; Carl Key, NRMSC Science Center
Project Goal: Compare climate-fire relationships in Yosemite NP with similar relationships in Glacier NP and Yukon Charley NR for a synthesis of climate-fire relationships in western North America

Colonization, Succession and Exotic Species Invasion on Sediment Deposits Associated with Dam Removal, Olympic National Park

Rebecca L. Brown, Eastern Washington University; James M. Helfield, Western Washington University; Patrick B. Shafroth, US Geological Survey

The removal of two dams on the Elwha River in Olympic National Park, scheduled to begin in 2011, will be among the largest planned dam removals in the world. Their removal presents a range of challenges for the science of river restoration. One of the challenges will be to understand processes controlling revegetation and invasive species colonization on sediments that are exposed by dam removal.

To determine the trajectory of vegetation succession within the drained impoundments, the extent to which reservoir sediments will facilitate the colonization of invasive species, and how sediments will affect downstream riparian vegetation, National Park Service (NPS) collaborated with Eastern Washington University (EWU) and Western Washington University (WWU) in: 1) a study of vegetation colonization and seed bank patterns related to temporal and physical gradients on the deltas of Lake Mills, and 2) in an experiment simulating the deposition of lake sediments in downstream floodplains.

Aerial photos showing changes in vegetation over time. From August 2002 (left) to September 2006 (right) forest and shrub vegetation filled in on the east main, west main, and Boulder creek deltas. Herbaceous vegetation is also present on much of the sediment that became exposed over the 4-year period (indicated by circles).

A total of 177 species were observed in extant vegetation and soil seed bank on the Lake Mills deltas, 10 of which were only in the seed bank. Exotic species were not a dominant component of delta vegetation, which is encouraging for revegetation of the drained impoundment. Results indicated that soil seed bank species composition had little similarity to extant species composition at all depths as hypothesized. However, 26% of seed bank species and 33% of all seeds were exotic, which could affect revegetation. Native species such as red alder (*Alnus rubra*), Sitka willow (*Salix sitchensis*), and Arctic sweet coltsfoot (*Petasites frigidus*) may be useful for planting because they appear to be successful on the deltas. Result from the experiment indicated that, among the native species tested, growth rates were generally decreased on substrates containing reservoir silt. The potential exists for invasive species to thrive on fine sediments in the former reservoirs and/or downstream floodplains following dam removal. One species of concern is Canada thistle (*Cirsium arvense*), which appears not to be hampered by fine reservoir sediments and may therefore have a competitive advantage over other species.

The findings suggest there is some potential for invasive species to gain a competitive advantage on fine sediments deposited after dam removal, but that thimbleberry (*Rubus parviflorus*), along with the species mentioned above, might be suitable candidates for revegetation.

NPS contacts are Steve Acker and Joshua Chenoweth, Olympic National Park. Project partners are Cara C. Hulce, EWU; and Jamie Michel, WWU.

If you have comments or suggestions for the newsletter, please contact Debbie Confer at pnwcesu@uw.edu.

Envisioning Future Changes in the Climate and Hydrology in Northwest Estuaries

Deborah Reusser, PhD, U.S. Geological Survey, Western Fisheries Research Center

A workshop sponsored by US Geological Survey (USGS) and Environmental Protection Agency (EPA) was held in December 2009 to identify on-going sea level rise (SLR) modeling efforts, data gaps, and information needs for management decisions about current and future mitigation and restoration efforts in Oregon estuaries. In 2010, a detailed evaluation of the Sea Level Affects Marshes Model (SLAMM) was conducted to understand and document the methodology. Activities included preparing input parameters for project areas, documenting derivations, requirements, best-uses, and limitations. Uncertainty and sensitivity analyses were conducted for habitat change projections using six scales of digital elevation models. Outputs from SLAMM model runs 2000 to 2100 were provided to the US Forest Service (USFS) for evaluation of loss/gain in salmon habitat through 2100 in Poole Slough.

Collaborative meetings are held frequently to discuss on-going climate change research activities including analyzing sea surface temperature (SST) patterns in nearshore ecosystems, model development for submerged aquatic vegetation and SLR. Data for nearshore SST analyses are now available to the public through the National Biological Information Infrastructure (NBII). An open file report describing these data has been submitted to the USGS Enterprise Publishing Network (EPN), and a manuscript on the ecoregional nearshore patterns of SST is in internal review. In April and Nov. 2010, USGS was invited to present detailed information on current research activities to state, regional, and local stake holders in Oregon. Specialized GIS techniques for preparing data for SLR modeling have also been made available to our partners and presented to the local GIS user group.

EPA has performed simulations examining the effect of rising sea level (30 and 60 cm rise) on water temperature and salinity in the Yaquina Estuary. Simulations demonstrate that the interaction of changes in river discharge, rising sea level, and atmospheric temperature associated with climate change produce non-linear patterns in the response of estuarine salinity and temperature, which vary with season and location inside the estuary.

Researchers in the Agricultural Research Service (USDA) have put together high resolution ArcGIS layers for intertidal bathymetry and distance to mouth, as well as eelgrass, burrowing shrimp and oyster aquaculture habitats in Willapa Bay, Washington for this project. We have also assembled a historical layer representing native oyster (*Ostrea lurida*) habitat in Willapa Bay, and are in the process of assembling data for oyster aquaculture and potential native oyster habitats in Coos Bay, Yaquina Bay, and Netarts estuaries in Oregon.

USFS is exploring potential changes in salmon habitat configuration, location, and quantity as part of ongoing work to generate predictions of changes in estuarine vegetation as a result of sea-level rise using SLAMM model outputs from USGS researchers. Preliminary work has focused on Poole Slough, a small slough contained within the larger Yaquina Bay Estuary. Poole Slough has offered us the opportunity to refine analysis and determine questions of interest with regard to salmonid habitat. Five SLAMM predictions for Poole Slough were made available to USFS for this assessment (for years 2000, 2025, 2050, 2075, and 2100). The available area of estuarine habitat in each prediction was overlaid with the current habitat distributions for Chinook, coho, and steelhead trout.

Between 2000 and 2025, estuarine habitats migrated upstream by approximately 0.61 km. Further inundation of freshwater stream habitat did not occur in later SLAMM predictions. By inundating approximately 0.61 km of upstream freshwater habitat between 2000 and 2025, USFS predicts a decrease in the available spawning habitat of Chinook salmon. The loss of spawning habitat for Chinook is of concern. While approximately 4.4 km of spawning habitat will remain in the basin, the predicted loss represents a decrease of approximately 15% of the spawning habitat in the system. This cannot be compensated by the expansion of the estuary margin due to the high levels of salinity which would kill incubating eggs.

USFS is planning to expand this analysis to other estuaries on the Oregon coast as the SLAMM predictions become available from USGS. The work done in Poole Slough will be included in a larger comparison to patterns of fish habitat in the Yaquina Estuary and may offer insights into differences in habitat that would be expected at differing spatial extents. A list of abstracts for presentations and posters is available upon request.

Northwestern Pond Turtle Assessment Eugene District Bureau of Land Management

Chris Langdon, Wildlife Biologist, Bureau of Land Management

The western pond turtle (*Clemmys marmorata*) has experienced population declines throughout its range. Threats include habitat modification, predation by introduced species, and roadkill mortality. Research and management of the species is a region-wide concern, with at least one reintroduction program underway in Washington. The western pond turtle is designated as a BLM Sensitive Species, USFWS Species of Concern in Oregon, and Oregon Department of Fish and Wildlife Sensitive-Critical because of its continuing conservation needs.

Through the PNW CESU, the Eugene District of the Bureau of Land Management conducted yearly pond turtle projects with the University of Oregon's Environmental Leadership Program (ELP) from 2006 to 2010. The ELP allows undergraduate students to collaborate with government agencies, non-profits, and businesses to complete real-world projects and gain experience in professional natural resource work. The amount, distribution and quality of habitat in the Eugene District BLM were generally unknown prior to this project. Students evaluated both aquatic and nesting habitat in forested streams and Willamette Valley wetland habitat by measuring aquatic and vegetative characteristics important to pond turtles. In years 2006–2008 students focused on habitat evaluation, visiting 75 potential areas and assigning habitat values. In 2009 and 2010 students surveyed for turtles at 32 points in 18 suitable, aquatic-habitat areas identified in previous project years. Turtles were detected in nine of these areas.

With the information gained from this project, the Eugene BLM will be better able to maintain viable pond turtle populations at known sites, as well as identify and prioritize habitat to be actively managed or restored. Doing so will fulfill the agency's management direction to conserve sensitive species and not contribute to the need to list them under the Endangered Species Act. Additionally, using the Environmental Leadership Program in this CESU project helped to develop the next generation of natural resource professionals by exposing them to 'on the ground' field work.