



# School of Environmental and Forest Sciences

UNIVERSITY of WASHINGTON

College of the Environment

## Research Newsletter

Volume IV, Issue 5  
September 20, 2013

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### NEWS

**NEW RATES:** With the new fiscal year, there are many changes in rates that you need to keep in mind as you prepare proposal budgets. For the first time in a number of years, there are salary increases for most employees. The figures should be known by the middle of the month and most of them will be available through the payroll system at the same time. If there are individual salaries that you need, let Sally know & they will be emailed to you. Student salaries we know now: \$5,034/ \$5,409/ \$5,811 per quarter for premaster/intermediate/candidate (monthly: \$1,678/ \$1,803/ \$1,937). For projects that preclude tuition remission, the Schedule III salary is used (monthly: \$3,249/ \$3,374/ \$3,508). The tuition increase is less than we anticipated, at \$4,713/quarter.

Benefit rates have all changed: faculty: 25.0%, students: 16.6%, classified staff: 35.3%, professional staff: 30.9%, and hourly employees: 15.2%.

**BUDGET TEMPLATES:** If you would like a budget template (Excel), contact Sally with the sponsor, length of project, and whether the project is on- or off-campus, to get the appropriate template, updated with the new rates. Time permitting, these will be posted to the SEFS forms page soon, but in the meantime, they are available directly from her.

**FINANCIAL DISCLOSURE:** Office Sponsored Programs has been requiring completion of the Significant Financial Interest Disclosure before any post-award changes can be processed, including no-cost extensions, formal rebudgeting, or any changes in personnel. Most of the bugs seem to be worked out

of the system, but there are still instances where the notices fail to arrive. When that happens, there is an easy work-around, so it has not been a problem.

ROYALTY RESEARCH FUND (RRF) DEADLINE: The autumn round deadline is September 30. For instructions, see <http://www.washington.edu/research/main.php?page=rrf>.

## June Awards

Application Number: A84822

Faculty Member: Joshua Lawler

Role: Principal Investigator

Title: **Comparison, Integration, and Application of Diverse Methods to Create a Climate-Adaptation Conservation Planning Database for Western North America**

Agency: Wilburforce Foundation

Period: 3/29/2013 - 3/31/2015

Amount: \$217,730

New

Conservation planning efforts that are naïve to climate change have the potential to be inefficient at best and, at worst, ineffective. Although many approaches have been suggested for integrating climate adaptation within the planning process, climate-adaptation planning is still in the early stages of development. Here, we propose to build on recent efforts that have attempted to organize current knowledge on climate-adaptation planning by 1) conducting a comprehensive comparison and synthesis of the many available approaches that have previously been developed, 2) apply those approaches to the majority of western North America, and 3) develop a spatial database from the results of these analyses. The review and synthesis papers from the project will provide agencies and organizations (including Wilburforce grantees) with detailed knowledge about how the different approaches work and to what degree they are complementary or duplicative. The database will also provide users with integrative analyses and tools that can inform conservation planning and prioritization across much of western North America.

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Application Number: A84290

Faculty Member: L. Monika Moskal

Role: Principal Investigator

Title: **Terrestrial LiDAR Scanning (TLS) at Panther Creek Research Plots for Inventory and Tree Species Identification**

Agency: Affiliated Tribes of Northwest Indians Economic Development

Period: 3/1/2013 - 3/1/2015

Amount: \$50,000

Supplement and Extension

Precision forestry leverages advanced sensing technologies and analytical tools to support site-specific economic, environmental, and sustainable decision making for the forestry sector in a timely and effective way. The discipline is highly reliant on accurate, timely and detailed forest inventory characterization and structural information, spanning extensive land holdings. Discrete, high density, LiDAR point clouds derived from aerial and terrestrial laser scanning have become invaluable datasets for precision forestry applications. This project will acquire terrestrial LiDAR scans (TLS) for forest inventory and soil study plots at the Panther Creek research site in the state of Oregon, for the purpose

of capturing ground based 3D point clouds and scanner hemispherical camera based photography. The data will be utilized for extraction of inventories and compared to traditional methods of forest inventory and aerial LiDAR based inventories (and calibration). Moreover, the new innovative research proposed in this project will focus on deriving tree species information from TLS. This will serve as the basis for future work to use the TLS data to calibrate other remote sensing approaches as well as explore additional potential of TLS data in conjunction with the wide array of scientific project at the Panther Creek research site.

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Application Number: A83278  
Faculty Member: Luke Rogers  
Role: Principal Investigator  
Title: **Kitsap Community Forest Management Plan**  
Agency: Great Peninsula Conservancy  
Period: 4/1/2013 - 3/31/2014  
Amount: \$22,500  
New

The Great Peninsula Conservancy and other conservation organizations propose to nominate Pope Resources 6,900 acres of forestland on the Kitsap Peninsula for inclusion in the State's Community Forest Trust. The Conservancy seeks to work with the University of Washington's School of Forest Resources to develop alternative management plans that demonstrate the range of social, ecological and economic products the forest can provide and to quantify those outputs over time. Desired outcomes are:

- A range of FSC management options will be explored to demonstrate different strategies for managing the proposed community forest and to consider a range of revenue generation scenarios:

FSC Certification: maximum revenue stream allowable under FSC guidelines.

FSC Certification: revenue neutral harvest. A FSC forest certification plan that seeks to generate revenue necessary to support forest administration and management by DNR and land stewardship costs incurred by Kitsap County and local partners.

Management framework and revenue generation projections are requirements for DNR nomination of Kitsap Community Forest as a pilot community forest under the DNR Community Forest Trust program recently passed by the Washington State legislature. This information will inform DNR and Kitsap County of potential revenue generation to offset management costs of the community forest and may also provide a revenue source to underpin a local open space ballot measure within Kitsap County. This project will greatly enhance Kitsap County's ability, as a potential future landowner, to conserve and manage this regionally-unique community forest.

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Application Number: A83116  
Faculty Member: Aaron Wirsing  
Role: Principal Investigator  
Title: **Will a Warming Climate Affect Mesocarnivore Interactions in Washington's Southern Boreal Forests?**  
Agency: Seattle City Light  
Period: 6/16/2013 - 6/15/2014  
Amount: \$24,052

New

There is growing concern that climate change will affect ecosystems by altering species interactions. Yet, to date, there has been little empirical effort to understand how species interactions might change in the face of anticipated climatic shifts. Given that landscape-level manipulations of climate are intractable, one of the best ways we have to forecast the nature of future biotic relationships at ecologically relevant temporal and spatial scales is to explore species interactions across current climatic gradients. Accordingly, in an effort to better understand how Canada lynx (*Lynx canadensis*) populations in Washington might respond to climate change, we will examine the relationship between variation in winter snow conditions and competition for snowshoe hares (*Lepus americanus*) between this threatened carnivore and two other medium-sized predators – coyotes (*Canis latrans*) and bobcats (*Lynx rufus*).

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Application Number: A85468

Faculty Member: Darlene Zabowski

Faculty Member: Robert Edmonds

Role: Principal Investigator

Role: Co-Investigator

Title: **Assessing the Effects of Nitrogen Deposition on High-Elevation Plant and Soil Communities**

Agency: USDI National Park Service

Period: 7/15/2012 - 4/30/2015

Amount: \$37,000

Non-Competing Supplement

Increasing levels of nitrogen (N) deposition have been identified as critical concerns for ecosystems worldwide. High-elevation plant communities are generally adapted to low soil resource supply and increases in N may result in significant changes in biomass and species composition. Understanding the effects of N deposition on alpine plant and soil communities is needed for the development of “critical loads” to inform and improve air quality policy and protect high-elevation ecosystems. The term “critical loads” is used to describe the point at which the natural system is damaged by air pollution. This project will use fertilization of alpine plant communities to document effects on plant and soil community dynamics and to derive initial estimates of critical loads of N for alpine systems in North Cascades, Mount Rainier, and Olympic National Parks and will provide insight for park management policies. The overall objective is to evaluate the effects of atmospheric N deposition on the structure and function of alpine ecosystems in these parks. Specific tasks are: (1) to initiate an in situ N addition experiment to determine alpine vegetation and soil process response to N enrichment; (2) identify critical loads of N for dominant high-elevation plant species; (3) provide data on Pacific Northwest high-elevation plants and mycorrhizas for the adaptation of the ForSAFE-VEG model to US alpine plant ecosystems; and (4) collect all data in a manner that will allow them to be compared with similar experiments in other national parks. National Park Service staff will be involved in several ways, including working with the cooperator to identify and select sample sites, establish vegetation plots, and collect data. Public benefits of this project including improved protection of public lands, protection of Class I Airsheds within Pacific Northwest national parks and Wilderness Areas, and improved understanding of potential changes to park ecosystems. The experimental application of nitrogen to alpine ecosystems will enhance our understanding of the rate and magnitude of changes that may occur in high-elevation ecosystems without improved air quality standards. This research will allow scientists and managers to estimate the amount of pollution exposure (i.e., nitrogen) below which significant effects are not expected to occur. This level of nitrogen (the critical load) is a valuable tool both in the scientific and regulatory arenas for protection of ecosystem process.

## June Proposals

Application Number: A85826

Faculty Member: Ernesto Alvarado

Role: Principal Investigator

Title: **Wildland Fuel and Fire Management in a Changing Climate**

Agency: US Forest Service

Period: 5/11/2009 - 3/31/2014

Amount: \$317,589

Non-Competing Supplement

The amendment to the Joint Venture Agreement with the USFS proposed here will generate, develop, apply and transfer science-based information, strategies and tools for fire management in public, and tribal lands.

Specific objectives for this amendment are:

- To developing a methodology for creating annually changing fuel maps and improvement of fire mapping (location and timing) for the US (CONUS and Alaska) including forests, other wildland, and agricultural sources (cropland & rangeland burning) in order to improve agricultural and wildland fire emissions.
- Develop improvements in the Consume model, including integration of new emissions factors and development of uncertainty estimation methods for biomass consumption in wildland fires.
- To evaluate several remote sense methods to capture explicit variability in complex canopy fuels for forests and non-forests ecosystems.
- To develop a methodology to improve fuelbed mapping and combustion of deep organic layers of Alaska boreal forest.
- To develop a set of FCCS fuelbed types that represents forest ecosystems typical of SE US Army installations.
- To study the conditions that affect fuel consumption and emissions in military installations in the SE US during prescribed fires.
- To continue studying in the Okanogan and Wenatchee National Forest and Pueblo Tribal Lands in New Mexico on how piles change with age and how those changes affect the amount of biomass consumed, the rate of pile combustion, carbon dynamics, soil characteristics, and vegetation response under spring and fall burning conditions.
- To continue assisting in data collection an analysis of field research conducted in wildland urban interface fires using the NIST WUI 1 and the NIST WUI 2 GIS-based data collection methodology to provide field validation of the WFDS Model.
- To continue conducting pre-and post fire data collections in fire vulnerable forest and communities in California, Texas, Colorado, and Arizona to improve the fuel bed information for the WFDS fire behavior model.

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Application Number: A83108

Faculty Member: Sally Brown

Role: Principal Investigator

Title: **Restoration with Residuals**

Agency: USDA

Period: 7/1/2013 - 7/30/2015

Amount: \$50,013

New

The United States Department of Agriculture (USDA) initiated a Specific Cooperative Act (SCA) with University of Washington (UWA) in 1998. The purpose of that agreement was to initiate and monitor large-scale restoration efforts on hard rock mining sites that had been listed under the US Environmental Protection Agency (EPA) Superfund program. Restoration efforts included the use of locally available residuals including municipal biosolids, composts, wood ash and log yard wastes. Research and Demonstration sites were established at uplands and wetlands areas at the Bunker Hill mine in ID, on alluvial tailings in Leadville, CO, on chat and tailings at Jasper County, MO and on tailings in Tar Creek, OK. In addition to field scale installations, the work also included greenhouse trials to develop remedial mixtures.

The success of these research and demonstration sites has led to an interest in additional research, publications, outreach and education on use of residuals to restore ecological function and reduce contaminant bioavailability at a wider range of sites within the US EPA Superfund program. Research efforts to this end have already commenced at USDA with field and greenhouse trials on use of composts for restoration at an asbestos mine site in VT and a mercury tailings site in CA. The USDA would like to set up a new SCA with Sally Brown at UW SEFS to continue with this work.

This new SCA includes work to interpret and write up sampling data from a recent trip to the restored areas in Jasper County, MO. It also includes outreach and education efforts for US EPA including but not limited to participating in Webinars and training sessions in the different EPA regions. Work includes consultation and potential research (greenhouse and field trials) for different restoration sites. Work may also include calculating the carbon balance for different restoration options at different sites. This funding is intended as a means to re-involve Dr. Brown in the restoration efforts. Dr. Brown will work with Dr. Chaney at USDA Agricultural Research Service and staff at EPA including Michele Mahoney, Mark Sprenger and on site project managers and remedial project managers to develop remedial options for sites and evaluate success of these options. This is a general statement of the work that will take place. Specific projects, outside of the Jasper County data, and outreach and education efforts will be based on requests from within EPA, in conjunction with work at USDA.

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Application Number: A85768  
Faculty Member: Thomas DeLuca  
Role: Principal Investigator  
Title: **2013 McIntire-Stennis Final**  
Agency: USDA  
Period: 10/1/2012 - 9/30/2013  
Amount: \$508,766  
New

Public Law 87-788, commonly known as the McIntire-Stennis Cooperative Forestry Act, 16 U.S.C 582a, et seq., was signed into law in 1962 to provide a federally-supported base for forestry research and graduate education programs at state-certified schools of forestry in the United States. Since then, the University of Washington has received an award each year. These are formula funds; the annual amount is determined by a variety of data points, linking the award to, among other things, the level of activity in the states' timber industry. The Act is broadly written to support research activities in forest-related areas. New projects are awarded competitively to members of the faculty of the School of Environmental and Forest Sciences. They are selected with a goal of encouraging highly impactful research that will provide training opportunities for graduate students and have a long-term, positive effect on forestry and natural resources issues and the natural resources community and stakeholders of the School and they are individually approved by NIFA administrators.

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Application Number: A86322  
Faculty Member: Ivan Eastin  
Role: Principal Investigator  
Title: **Waste to Wisdom: Utilizing Forest Residues for the Production of Bioenergy and Bioproducts**  
Agency: Humboldt State University  
Period: 1/1/2014 - 12/31/2016  
Amount: \$138,838  
New

The objective of this research is to develop a comprehensive economic understanding of the proposed technology and developing strategies for long term economic sustainability of the program. For short term economic viability of the proposed technology, the revenues attained from the biochar production process have to outweigh the capital and operating costs associated with the process. However, the long term economic success and sustainability of the proposed pyrolysis technology can only be attained through the enviro-economic viability (micro and macro level) of the proposed technology, with specific reference to geo-socio-economic conditions. Moreover, acknowledging the lack of information regarding biochar and its environmental and economic benefits among the general population, region-specific strategies need to be adopted to develop effective educational programs based on the perceptions and concerns of local stakeholders.

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Application Number: A86256  
Faculty Member: Gregory Ettl  
Role: Principal Investigator  
Title: **Stand Management Coop**  
Agency: Pilchuck Tree Farm  
Period: 1/1/2013 - 12/31/2013  
Amount: \$6,672  
Supplement and Extension

2013 Membership Dues to Stand Management Coop from Pacific Denkmann Tree Farm.

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Application Number: A86434  
Faculty Member: Jerry Franklin  
Role: Principal Investigator  
Title: **Wind River Field Station**  
Agency: US Forest Service  
Period: 10/1/2011 - 7/31/2016  
Amount: \$86,665  
Non-Competing Supplement

Faculty Member: Ken Bible  
Role: Co-Investigator

Project will continue support of the Wind River Field Station long-term monitoring of key ecosystem processes and climate variables, development of new monitoring capabilities as appropriate in cooperation with the Forest Service and other institutions, and to partner with the UW in the management and oversight of ongoing research and education activities in the Wind River Experimental Forest (WREF), and the promotion of new research, education and outreach activities in the WREF.

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Application Number: A85994  
Faculty Member: Charles Halpern  
Role: Principal Investigator  
Title: **Long-term Assessment of Vegetation Responses to Variable-retention Harvests**  
Agency: US Forest Service  
Period: 9/16/2013 - 9/15/2017  
Amount: \$92,500  
New

Variable-retention harvest is an important component of ecological forestry worldwide. It involves the retention of key forest structures (large live trees, snags, and logs) through timber harvest to emulate the outcomes of natural disturbance. The goals of retaining live trees within harvest units include moderation of understory microclimate, structural enrichment of the regenerating forest, and “life-boating” of forest-dependent species through disturbance. To what extent the amount and spatial pattern of live-tree retention affect these ecological functions, or can be manipulated to achieve a range of management objectives, remain important and unanswered questions in many forest ecosystems. The Demonstration of Ecosystem Management Options (DEMO) experiment was established in 1993 to examine ecological and silvicultural responses to variable-retention harvests in mature, coniferous forests of the Pacific Northwest. Its design, unique among variable-retention experiments, allows for clear separation of the effects of level of retention (40 and 15% of original basal area) and its spatial pattern (trees dispersed vs. aggregated). Long-term vegetation studies form the core of the DEMO experiment. This joint-venture agreement will be used to initiate a re-measurement of vegetation structure and composition 17-19 years after treatment during what may be the most dynamic phase in the development of these forests, the regeneration of the understory cohort. Variation in the composition of, and pace at which, regeneration occurs has important implications for the persistence of early-seral habitat and for future development of the overstory. Continued monitoring is critical to understanding the longer-term implications of varying levels and patterns of retention for the post-harvest development of these forests.

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Application Number: A86276  
Faculty Member: Clare Ryan  
Role: Principal Investigator  
Title: **Coastal Hazard Resiliency**  
Agency: California Sea Grant  
Period: 1/1/2014 - 1/1/2016  
Amount: \$98,815  
New

This research project addresses the question: What factors facilitate or hinder efforts to mitigate impacts to critical facilities in coastal communities in Oregon and Washington? Coastal communities in Oregon and Washington have prepared plans that recognize the importance of hazard mitigation for reducing vulnerability, improving preparedness and increasing the resiliency of coastal regions in the face of natural and climate-induced threats. However, implementation of these plans is challenging due to the multiplicity of organizations and the competing pressures for time, resources and attention. We propose to research hazard mitigation efforts on the Oregon and Washington coast by investigating how communities have implemented key strategies. Specifically, we will focus on the mitigation of critical facilities (school and police, fire and medical facilities) identified in prior hazard mitigation plans. Using a broad-based assessment of coastal critical facility mitigation

combined with 16-20 case studies, the team will investigate the role of plans, networks, leadership and external pressures for inducing change. The findings will assist participating communities in identifying successful strategies and barriers; it will help a range of smaller, west coast communities to identify the factors most likely to contribute to successful implementation; it will also contribute to the wider, emerging research on collaborative and networked governance.

## July Awards

Application Number: A84990

Faculty Member: Jonathan Bakker

Role: Principal Investigator

Title: **Maintenance and Enhancement of Prairie Habitat Restoration Sites**

Agency: USDI Fish and Wildlife Service

Period: 7/1/2013 - 6/30/2014

Amount: \$24,998

New

The prairie ecosystems of Puget Sound contain a disproportionate number of federal and state listed species, including the golden paintbrush (*Castilleja levisecta*), Taylor's checkerspot butterfly (*Euphydryas editha taylori*), and other species. Habitat degradation and destruction have been identified in recovery documents and by biologists as key factors contributing to the rarity of these species. There is not enough extant habitat of reasonable quality to support these species, so restoration of highly degraded sites such as abandoned agricultural fields is urgently needed. Furthermore, restoration activities need to occur at ecologically meaningful scales to provide adequate habitat to support viable new populations of these species. This project addresses these recovery needs by adaptively improving our methods for restoring highly degraded sites. By doing so, it results in habitats that can support viable populations of these species. Restoring this habitat also benefits other species, common and rare, within prairie ecosystems. Finally, this project specifically addresses the recovery of golden paintbrush by maintaining and enhancing three new populations of this species. The benefits of this project include: 1) Directly contribute to the recovery of golden paintbrush by maintaining and enhancing viable populations of this species at three sites; 2) Maintain and enhance ~ 8 acres of habitat for Taylor's checkerspot, Mardon skipper, valley silverspot, and/or other rare butterflies in South Puget Sound; and 3) Maintain and enhance ~ 3 acres of habitat suitable for Taylor's checkerspot, valley silverspot, island marble, and/or other rare butterflies in North Puget Sound.

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Application Number: A86840

Faculty Member: Gordon Bradley

Role: Principal Investigator

Title: **Pacific NW Coop Ecosystem Studies Unit Program Support**

Agency: USDI National Park Service

Period: 7/15/2012 - 3/1/2016

Amount: \$10,000

Non-Competing Supplement

The University of Washington (UW) and the National Park Service (NPS) have been collaborating since 2001 to host and administer the Pacific Northwest Cooperative Ecosystem Studies Unit (PNW CESU) program. The PNW CESU is part of the national CESU network, which is a consortium of federal agencies, universities, and other partners with a mission to work together on research, technical assistance, and

education projects to enhance understanding and management of natural and cultural resources. Currently, staff at the PNW CESU is also servicing some of the administrative and business needs for the Great Basin Cooperative Ecosystem Studies Unit (GB CESU), also a member of the national CESU network. This project is a continuing collaboration between UW and NPS to support administrative functions of the PNW CESU and GB CESU including public outreach and development of financial assistance agreements for a wide variety of technical, research, and educational projects relevant to the mission of the CESU network. The project objectives are to provide program support to the PNW CESU, including funding for the Program Coordinator (PC). The duties of the PC include acting as the primary point of contact for the 28 PNW CESU members, providing assistance to the NPS Research Coordinator (RC) in reviewing and processing Task Agreements and modifications, overseeing the maintenance of the unit's project tracking database and website, managing the production of newsletters, and providing logistical support in holding periodic partner meetings. The PC and NPS RC also work together in reviewing and processing Task Agreements and modifications for the GB CESU, and maintaining a GB CESU project tracking database. NPS will be substantially involved in collaborating with UW to review and process Task Agreements, produce summary reports, provide advice on maintaining databases and on web site maintenance, and by coordinating on partner meetings and newsletters for the PNW CESU. Public benefits include cooperative research concerning the resources of the National Park System and other federal agencies, maintenance of a public web site that contains current and searchable information on all research, technical assistance, and education projects funded by NPS and other federal agencies through the PNW CESU, publicly-available newsletters (posted on the web site), and annual reports to Congress for both the PNW and GB CESUs.

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Application Number: A86631  
Faculty Member: Sally Brown  
Role: Principal Investigator  
Title: **Biosolids Information and Education Program**  
Agency: Northwest Biosolids Management Association  
Period: 7/1/2013 - 6/30/2014  
Amount: \$113,000  
Non-Competing Supplement

UW staff will continue to provide public information, regulation development, and technical support to the King County Biosolids program. As detailed in the Scope of Work, this will include the following: 1) providing public information through committee support, a community assistance/resource information center, information gathering, and assisting in the BW Biosolids Conference; 2) regulation development, including committee support and regulatory interpretation; 3) research and demonstrations to include W-170 group interaction and projects involving A. the fate of organic compounds in biosolids amended soils, B. Canola growth using biosolids, and C. lead arsenic and compost; 4) continuing special research projects with the King County Biosolids Program on Canola for Biodiesel, gravel pit, biosolids basics, Class A soil mixes, and organic contaminants; 5) attending NBMA general and board meetings.

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Application Number: A86636  
Faculty Member: Sally Brown  
Role: Principal Investigator  
Title: **Mountains to Sound Greenway**  
Agency: King County Department of Natural Resources and Parks  
Period: 7/1/2013 - 6/30/2014  
Amount: \$39,999

## Non-Competing Supplement

This agreement is a continuation of a long-standing agreement between the King County Wastewater Treatment Division and the School of Forest resources. Dr. Brown will assist the KCWTD in determining appropriate biosolids application rates for commercial forest plantations. She will assist with questions on benefits and safety of biosolids use in commercial forestry. Biosolids application rate are based on a number of factors including soil nitrate concentrations. The focus of this year's research will be to measure variability in soil nitrate concentrations across application units. This will be carried out by soil sampling in pits as well as across transects in three forest units. Results will be presented to KCWTD and stakeholders as required.

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Application Number: A84236  
Faculty Member: Gregory Ettl  
Role: Principal Investigator  
Title: **Stand Management Cooperative**  
Agency: Oregon Department of Forestry  
Period: 1/1/2013 - 12/31/2013  
Amount: \$37,364  
Supplement and Extension

2013 Membership Dues to Stand Management Coop from Oregon Department of Forestry, State of Oregon.

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Application Number: A84241  
Faculty Member: Gregory Ettl  
Role: Principal Investigator  
Title: **Stand Management Cooperative**  
Agency: Sierra Pacific Industries  
Period: 1/1/2013 - 12/31/2013  
Amount: \$20,009  
New

2013 Membership Dues to Stand Management Coop from Sierra Pacific Industries, Mt Vernon, WA.

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Application Number: A85406  
Faculty Member: Gregory Ettl  
Role: Principal Investigator  
Title: **Stand Management Coop**  
Agency: Campbell Group, Inc.  
Period: 1/1/2013 - 12/31/2013  
Amount: \$27,494  
Supplement and Extension

2013 Membership dues to Stand Management Coop from Campbell Group.

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Application Number: A86256

Faculty Member: Gregory Ettl  
Role: Principal Investigator  
Title: **Stand Management Coop**  
Agency: Pilchuck Tree Farm  
Period: 1/1/2013 - 12/31/2013  
Amount: \$6,672  
Supplement and Extension

2013 Membership Dues to Stand Management Coop from Pacific Denkmann Tree Farm.

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Application Number: A86611  
Faculty Member: Gregory Ettl  
Role: Principal Investigator  
Title: **CSF-PF/WA State Parks On-Call Projects**  
Agency: WA Parks and Recreation Commission  
Period: 9/15/2011 - 6/30/2015  
Amount: \$5,000  
Supplement and Extension

The purpose of this Agreement is to provide select technical assistance to the CSF-PF Applied Forest Ecologist/Stewardship Forester (FOREST ECOLOGIST), identified in IAA 911-xxx, so that individual can ensure that COMMISSION identified forest health activities can be undertaken in a timely and professional manner. Specify terms and conditions for this assistance are described in this on-call convenience contract.

Technical expert assistance to the CSF-PF FOREST ECOLOGIST will ensure that the FOREST ECOLOGIST is able to implement select, COMMISSION identified forest health activities, including:

- Undertaking forest health surveys to assess the condition of COMMISSION natural resources;
  - Creating appropriate records of field surveys, analyzing data and providing management recommendations for the COMMISSION, with consideration of stakeholders for specific areas in and around the state park system;
  - Marking timber, creating timber contracts and overseeing forestry operations implemented across COMMISSION natural resources;
  - Monitoring the response of forest attributes to restoration actions;
  - COMMISSION will provide available agency natural resources information, timely reviews of CSF-PF products, and CSF-PF will be responsible for assuring completion of projects.
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Application Number: A86619  
Faculty Member: Gregory Ettl  
Role: Principal Investigator  
Title: **CSF-PF/WA State Parks Joint Appointment**  
Agency: WA Parks and Recreation Commission  
Period: 9/15/2011 - 6/30/2015  
Amount: \$5,000  
Supplement and Extension

The purpose of this Agreement is for the Center for Sustainable Forestry - Pack Forest to provide technical expert assistance to a COMMISSION lead, in forest health assessment and management that

protects and restores COMMISSION natural resources while engaging the public in their appreciation and stewardship. This contract describes the hiring of an Applied Forest Ecologist/Stewardship Forester (FOREST ECOLOGIST) who will serve both the CSF-PF and the COMMISSION. The FOREST ECOLOGIST will be a CSF-PF employee but with part of salary and benefits paid by the COMMISSION for work performed for the COMMISSION.

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Application Number: A86934  
Faculty Member: Kern Ewing  
Role: Principal Investigator  
Title: **Elwha River Revegetation 2013 - Plant Performance Study**  
Agency: USDI National Park Service  
Period: 6/28/2013 - 12/30/2014  
Amount: \$4,950  
New

This is a collaborative project between the University of Washington (UW) and the National Park Service (NPS) to support monitoring in 2013 of the revegetation efforts in the former Lake Mills reservoir at Olympic National Park. Dam removal began in September 2011 in the Elwha River watershed. Elwha Dam, the first of two dams on the Elwha River, was completely removed by March of 2012 and the Glines Canyon Dam will be fully removed by the fall of 2013. The revegetation program incorporates public outreach and volunteerism, providing opportunities for communicating and educating the public about the restoration process. The UW and NPS will conduct a study to determine the impacts of different site prescriptions and sediment texture on plant performance of five species planted in recently exposed lakebed sediment of the former Lake Mills reservoir. The study will also examine the effect of sediment moisture content on plant condition and mortality over the initial growing season. The results will be used to determine which site prescriptions are most successful and which plant species will have the highest rates of survivorship in the xeric conditions of exposed lakebed sediment. Results will provide project managers with data to improve and therefore accelerate revegetation success and will provide future restoration projects with plant performance results related to soil texture and soil moisture content.

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Application Number: A86725  
Faculty Member: Joshua Lawler  
Role: Principal Investigator  
Title: **Hydrologic and Ecological Monitoring of Montane Wetlands in North Cascades, Mount Rainier, and Olympic National Parks**  
Agency: USDI National Park Service  
Period: 6/17/2013 - 9/1/2014  
Amount: \$10,076  
New

Wetland ecosystems are ecologically important components of park landscapes. Montane wetlands may be particularly vulnerable to changing climates. Responsible and effective park protection of these areas relies on accurate inventories of sites, a detailed understanding of ecosystem functions and hydrologic cycles, and projections of changes based on future climates. Currently, parks have incomplete baseline inventories of montane wetlands and only qualitative information on hydroperiods of wetlands. The goals of this collaborative project are to collect hydrologic data to support the development of models, to collect GPS data to improve delineations of wetland maps, and to use these data to improve model

projecting future wetland hydroperiods and function. The models will be used by park managers, scientists, and other interested parties to apply vulnerability assessments to park landscapes and develop adaptation strategies for future park management of these important components.

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Application Number: A84950

Faculty Member: Robert Lee

Role: Principal Investigator

Title: **Using Common Core State Standards to Enhance Student Learning of Environmental Literacy in Science for Rural School Districts**

Agency: Washington Student Achievement Council (WSAC)

Period: 7/1/2013 - 6/30/2014

Amount: \$150,000

New

The goal of this project is to improve content-area instruction and increase student achievement by building knowledge of the Common Core State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects (CCSS-ELA) and related pedagogical content knowledge, aligning these forms of knowledge with instructional contexts and practice.

UW's training activities will build and enrich science teachers' knowledge of CCSS-ELA by integrating these standards into the instruction and exploration of environmental science. Our work with teachers will emphasize academic literacy as a means for improving teaching and learning in both the study of environmental science and science in general. The Literacy Learning in Environmental Science project is a partnership between the University of Washington School of Environmental and Forest Sciences, and the University of Washington Bothell Education Program. Teachers of science in the middle and/or high school in Educational Service District 113 are eligible for this project.

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Application Number: A83389

Faculty Member: Luke Rogers

Role: Principal Investigator

Title: **Alaska Riparian Inventory**

Agency: Martin Environmental Services, Inc.

Period: 4/1/2013 - 12/31/2013

Amount: \$7,072

New

To quantify and characterize riparian stand conditions along all streams (approx. 1000 miles) on Sealaska lands (approx. 290,000 ac). These data would be used along with results from the habitat trend study to assess the overall cumulative effects of timber harvest on riparian potential to maintain ecological functions and salmonid habitat on Sealaska lands. The data should be attributed in a GIS data base and suitable for queries (e.g., determine proportion of streams with buffer strips and quantify riparian functional status for supplying large wood and shade) and development of map products.

## July Proposals

Application Number: A87115

Faculty Member: Ernesto Alvarado

Role: Principal Investigator  
Title: **Research on Fire, Fuels, Landscape Ecology, and the Wildland-Urban-Interface**  
Agency: US Forest Service  
Period: 7/1/2013 - 6/30/2016  
Amount: \$686,597  
New

This Cost Reimbursable Agreement (CRA) will support the research conducted by the USFS Fire and Environmental Research Applications Team (FERA) and the School of Environmental and Forest Sciences (SEFS), University of Washington. The CRA proposed here will generate, develop, apply and transfer science-based information, strategies and tools for fire management in public, tribal lands, and homeowners in the wildland urban interface.

Specific tasks for this cost reimbursable agreement are:

- To develop a fire and fuel management application to integrate fuels, consumption in wildland fires, and combustion phases.
  - To develop a new data reduction and analysis software to convert field data to fuel loading estimates.
  - To enhance the fuelbed development and mapping capabilities of FCCS to map fuels for forest landscapes in the western US.
  - To improve a Wildland-Urban Interface Fire Dynamics Simulator to integrate empirical field studies.
  - To collaborate on data collection and analysis of wildland fuels information to develop new, or improve existing fire and fuel models.
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Application Number: A86648  
Faculty Member: Ernesto Alvarado  
Role: Principal Investigator  
Title: **Solutions to Current and Future Wildfires: Physical and Ecological Models for Fire, Fuels, and Smoke in Ecosystems and the Wildland Urban Interface**  
Agency: US Forest Service  
Period: 6/1/2013 - 5/30/2015  
Amount: \$1,126,598  
New

This Joint Venture Agreement (JVA) with the USFS PNW Research Station will generate science-based information, strategies and tools for current and future fire management needs in public, tribal lands, and the wildland urban interface. This joint research is aimed to promote attainment of desired future ecosystem conditions and ensure the long-term integrity of ecosystems under a changing climate scenario, reduce air quality impacts and carbon emissions, and contribute to carbon management; enhance restoration of healthy, resilient, fire-adapted ecosystems through evaluation of integrated fire/fuel management practices; and to develop WUI hazard reduction guidelines to prevent home losses from WUI fires across the United States.

Specific objectives of this JVA are:

- To develop a methodology for creating and mapping dynamic fuel models across multiple ecosystems the United States that will improve estimation of fuel consumption and smoke and greenhouse gases from wildland fires.
- To study the relation between severity patchiness and fuel consumption components with climate and topography on alpine ecotones.
- To model FCCS fuelbed pathways to model fire hazard across landscapes in federal, tribal and military installation lands for fire hazard mitigation and improving fuel consumption and emissions from wildfires and prescribed burns.

- To integrate high-resolution information of fuelbeds, winds, and topography into physics-based fire and ecological models for developing a new exposure scale for the wildland-urban-interface. This component of the JVA will assist managers to improve mitigation of structural damage, smoke effects, and socioeconomic effects in fire-prone areas.
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Application Number: A86651

Faculty Member: Ernesto Alvarado

Role: Principal Investigator

Title: **Improving Estimates of Future Fires, Fire Emissions, and Smoke**

Agency: US Forest Service

Period: 9/1/2013 - 8/31/2016

Amount: \$250,000

New

The purpose of this research proposal is to advance climate, fire, and smoke science in support of building a better understanding of how fire and smoke emissions are affected by and affects the atmosphere, including weather and climate, and how this knowledge can be used to develop scenarios and tools to better inform land managers. The joint research proposed here will generate, develop, apply and transfer science-based information, strategies and tools for fire and smoke emissions management in public, tribal lands, and communities under current and future land management scenarios.

Specific objectives for this research are:

- To develop a model based on statistics of extreme events of very large fire occurrence on the landscape based on high-resolution fuel, topographic, and weather data that can be used to forecast future risk of large fire occurrence and effects on air quality. The model will be based on fire occurrence for the last 30 decades in the United States.
  - To study smoke impacts on air quality from future very large wildland fire conflagrations, including both emissions of regulated air pollutants and greenhouse gases, and impacts on large population centers and small communities.
  - To collaborate on research to improve existing wildland fire modeling capabilities for fuel consumption, emissions, and smoke impacts, for example as developed in the BlueSky Smoke Modeling Framework.
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Application Number: A87078

Faculty Member: Ernesto Alvarado

Role: Principal Investigator

Title: **Solutions to Current and Future Wildfires: Physical and Ecological Models for Fire, Fuels, and Smoke in Ecosystems and the Wildland Urban Interface**

Agency: US Forest Service

Period: 7/1/2013 - 6/30/2017

Amount: \$440,000

New

This Joint Venture Agreement (JVA) with the USFS PNW Research Station will generate science-based information, strategies and tools for current and future fire management needs in public, tribal lands, and the wildland urban interface. This joint research is aimed to promote attainment of desired future ecosystem conditions and ensure the long-term integrity of ecosystems under a changing climate scenario, reduce air quality impacts and carbon emissions, and contribute to carbon management;

enhance restoration of healthy, resilient, fire-adapted ecosystems through evaluation of integrated fire/fuel management practices; and to develop WUI hazard reduction guidelines to prevent home losses from WUI fires across the United States.

Specific objectives of this JVA are:

- To develop a methodology for creating and mapping dynamic fuel models across multiple ecosystems the United States that will improve estimation of fuel consumption and smoke and greenhouse gases from wildland fires.
  - To study the relation between severity patchiness and fuel consumption components with climate and topography on alpine ecotones.
  - To model FCCS fuelbed pathways to model fire hazard across landscapes in federal, tribal and military installation lands for fire hazard mitigation and improving fuel consumption and emissions from wildfires and prescribed burns.
  - To integrate high-resolution information of fuelbeds, winds, and topography into physics-based fire and ecological models for developing a new exposure scale for the wildland-urban-interface. This component of the JVA will assist managers to improve mitigation of structural damage, smoke effects, and socioeconomic effects in fire-prone areas.
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Application Number: A87129

Faculty Member: Stanley Asah

Role: Principal Investigator

Title: **Role of Motivations on Involvement and Participation in Stewardship Organizations: Case of Greater Seattle**

Agency: US Forest Service

Period: 10/1/2010 - 7/31/2015

Amount: \$7,969

Non-Competing Supplement

The Pacific Northwest Station, USDA Forest Service is exploring various facets of stewardship organizations within the Seattle-Tacoma area. Their goal is to understand and enhance the structure and function of these organizations for the purposes of achieving social-ecological sustainability within the Seattle-Tacoma area. Using a database of over 700 stewardship and sustainable design organizations, this study will deepen our understanding of the role that motivations and desired benefits plays in determining involvement and participation in these organizations.

The initial objectives of this study were to:

- (1) Explore the empirical basis for understanding the influence of various dimensions of motivations on involvement and participation in stewardship and sustainable design organizations.
- (2) Contribute to an enhanced understanding of the structure and function of, including variation among, various stewardship and sustainable design organizations.
- (3) Serve as an empirical basis for the transferability of insights fostering the stewardship of social-ecological sustainability goals across the nation.

A subsequent modification/supplement covered 4 weeks of summer salaries and benefits, totaling \$9540.00, for Dr. Asah to:

- (4) Further explore open ended questions regarding the diverse values and motivations of volunteers.

To the above stated objectives, this supplement will cover the purchase of the Platinum version of the survey monkey software, and 282 hours of undergraduate research work for data collection and preliminary analyses to:

5) Examine the relationship between the motivational content of volunteer recruitment messages and organizational practices, and manager-rated satisfaction with varied elements of volunteer performance.

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Application Number: A86840

Faculty Member: Gordon Bradley

Role: Principal Investigator

Title: **Pacific NW Coop Ecosystem Studies Unit Program Support**

Agency: USDI National Park Service

Period: 7/15/2012 - 3/1/2016

Amount: \$10,000

Non-Competing Supplement

The University of Washington (UW) and the National Park Service (NPS) have been collaborating since 2001 to host and administer the Pacific Northwest Cooperative Ecosystem Studies Unit (PNW CESU) program. The PNW CESU is part of the national CESU network, which is a consortium of federal agencies, universities, and other partners with a mission to work together on research, technical assistance, and education projects to enhance understanding and management of natural and cultural resources. Currently, staff at the PNW CESU is also servicing some of the administrative and business needs for the Great Basin Cooperative Ecosystem Studies Unit (GB CESU), also a member of the national CESU network. This project is a continuing collaboration between UW and NPS to support administrative functions of the PNW CESU and GB CESU including public outreach and development of financial assistance agreements for a wide variety of technical, research, and educational projects relevant to the mission of the CESU network. The project objectives are to provide program support to the PNW CESU, including funding for the Program Coordinator (PC). The duties of the PC include acting as the primary point of contact for the 28 PNW CESU members, providing assistance to the NPS Research Coordinator (RC) in reviewing and processing Task Agreements and modifications, overseeing the maintenance of the unit's project tracking database and website, managing the production of newsletters, and providing logistical support in holding periodic partner meetings. The PC and NPS RC also work together in reviewing and processing Task Agreements and modifications for the GB CESU, and maintaining a GB CESU project tracking database. NPS will be substantially involved in collaborating with UW to review and process Task Agreements, produce summary reports, provide advice on maintaining databases and on web site maintenance, and by coordinating on partner meetings and newsletters for the PNW CESU. Public benefits include cooperative research concerning the resources of the National Park System and other federal agencies, maintenance of a public web site that contains current and searchable information on all research, technical assistance, and education projects funded by NPS and other federal agencies through the PNW CESU, publicly-available newsletters (posted on the web site), and annual reports to Congress for both the PNW and GB CESUs.

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Application Number: A86636

Faculty Member: Sally Brown

Role: Principal Investigator

Title: **Mountains to Sound Greenway**

Agency: King County Department of Natural Resources and Parks

Period: 7/1/2013 - 6/30/2014

Amount: \$39,999  
Non-Competing Supplement

This agreement is a continuation of a long-standing agreement between the King County Wastewater Treatment Division and the School of Forest resources. Dr. Brown will assist the KCWTD in determining appropriate biosolids application rates for commercial forest plantations. She will assist with questions on benefits and safety of biosolids use in commercial forestry. Biosolids application rate are based on a number of factors including soil nitrate concentrations. The focus of this year's research will be to measure variability in soil nitrate concentrations across application units. This will be carried out by soil sampling in pits as well as across transects in three forest units. Results will be presented to KCWTD and stakeholders as required.

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Application Number: A86631  
Faculty Member: Sally Brown  
Role: Principal Investigator  
Title: **Biosolids Information and Education Program**  
Agency: Northwest Biosolids Management Association  
Period: 7/1/2013 - 6/30/2014  
Amount: \$113,000  
Non-Competing Supplement

UW staff will continue to provide public information, regulation development, and technical support to the King County Biosolids program. As detailed in the Scope of Work, this will include the following: 1) providing public information through committee support, a community assistance/resource information center, information gathering, and assisting in the BW Biosolids Conference; 2) regulation development, including committee support and regulatory interpretation; 3) research and demonstrations to include W-170 group interaction and projects involving A. the fate of organic compounds in biosolids amended soils, B. Canola growth using biosolids, and C. lead arsenic and compost; 4) continuing special research projects with the King County Biosolids Program on Canola for Biodiesel, gravel pit, biosolids basics, Class A soil mixes, and organic contaminants; 5) attending NBMA general and board meetings.

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Application Number: A86698  
Faculty Member: Thomas DeLuca  
Role: Principal Investigator  
Title: **Washington's Working Forests 2040: Intersecting Natural Capital with Private Capital**  
Agency: US Forest Service  
Period: 8/1/2013 - 3/31/2014  
Amount: \$20,000  
New

The Northwest Environmental Forum at the School of Environmental and Forest Sciences provides a collaborative opportunity for decision makers and stakeholders to apply science and policy to our region's critical environmental and natural resource management issues. The NWEF will hold a two-day meeting on October 29 and 30, 2013, at the Center for Urban Horticulture to discuss the transformational strategies needed to ensure sustainable working forests well into the future. The forum will discuss alternative scenarios of containing forest losses and providing the continuity of well-managed Pacific Northwest forests. This meeting will be followed by a second meeting

to be held in early 2014 so the group can quickly move forward toward definable milestones and actions.

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Application Number: A84236  
Faculty Member: Gregory Ettl  
Role: Principal Investigator  
Title: **Stand Management Cooperative**  
Agency: Oregon Department of Forestry  
Period: 1/1/2013 - 12/31/2013  
Amount: \$37,364  
Supplement and Extension

2013 Membership Dues to Stand Management Coop from Oregon Department of Forestry, State of Oregon.

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Application Number: A86611  
Faculty Member: Gregory Ettl  
Role: Principal Investigator  
Title: **CSF-PF/WA State Parks On-Call Projects**  
Agency: WA Parks and Recreation Commission  
Period: 9/15/2011 - 6/30/2015  
Amount: \$5,000  
Supplement and Extension

The purpose of this Agreement is to provide select technical assistance to the CSF-PF Applied Forest Ecologist/Stewardship Forester (FOREST ECOLOGIST), identified in IAA 911-xxx, so that individual can ensure that COMMISSION identified forest health activities can be undertaken in a timely and professional manner. Specify terms and conditions for this assistance are described in this on-call convenience contract.

Technical expert assistance to the CSF-PF FOREST ECOLOGIST will ensure that the FOREST ECOLOGIST is able to implement select, COMMISSION identified forest health activities, including:

- Undertaking forest health surveys to assess the condition of COMMISSION natural resources;
  - Creating appropriate records of field surveys, analyzing data and providing management recommendations for the COMMISSION, with consideration of stakeholders for specific areas in and around the state park system;
  - Marking timber, creating timber contracts and overseeing forestry operations implemented across COMMISSION natural resources;
  - Monitoring the response of forest attributes to restoration actions;
  - COMMISSION will provide available agency natural resources information, timely reviews of CSF-PF products, and CSF-PF will be responsible for assuring completion of projects.
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Application Number: A86619  
Faculty Member: Gregory Ettl  
Role: Principal Investigator  
Title: **CSF-PF/WA State Parks Joint Appointment**  
Agency: WA Parks and Recreation Commission

Period: 9/15/2011 - 6/30/2015  
Amount: \$5,000  
Supplement and Extension

The purpose of this Agreement is for the Center for Sustainable Forestry - Pack Forest to provide technical expert assistance to a COMMISSION lead, in forest health assessment and management that protects and restores COMMISSION natural resources while engaging the public in their appreciation and stewardship. This contract describes the hiring of an Applied Forest Ecologist/Stewardship Forester (FOREST ECOLOGIST) who will serve both the CSF-PF and the COMMISSION. The FOREST ECOLOGIST will be a CSF-PF employee but with part of salary and benefits paid by the COMMISSION for work performed for the COMMISSION.

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Application Number: A86934  
Faculty Member: Kern Ewing  
Role: Principal Investigator  
Title: **Elwha River Revegetation 2013 - Plant Performance Study**  
Agency: USDI National Park Service  
Period: 6/28/2013 - 12/30/2014  
Amount: \$4,950  
New

This is a collaborative project between the University of Washington (UW) and the National Park Service (NPS) to support monitoring in 2013 of the revegetation efforts in the former Lake Mills reservoir at Olympic National Park. Dam removal began in September 2011 in the Elwha River watershed. Elwha Dam, the first of two dams on the Elwha River, was completely removed by March of 2012 and the Glines Canyon Dam will be fully removed by the fall of 2013. The revegetation program incorporates public outreach and volunteerism, providing opportunities for communicating and educating the public about the restoration process. The UW and NPS will conduct a study to determine the impacts of different site prescriptions and sediment texture on plant performance of five species planted in recently exposed lakebed sediment of the former Lake Mills reservoir. The study will also examine the effect of sediment moisture content on plant condition and mortality over the initial growing season. The results will be used to determine which site prescriptions are most successful and which plant species will have the highest rates of survivorship in the xeric conditions of exposed lakebed sediment. Results will provide project managers with data to improve and therefore accelerate revegetation success and will provide future restoration projects with plant performance results related to soil texture and soil moisture content.

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Application Number: A86746  
Faculty Member: E. David Ford  
Role: Principal Investigator  
Title: **Development of Silvicultural Systems for the Pacific Northwest**  
Agency: US Forest Service  
Period: 9/1/2013 - 12/31/2014  
Amount: \$58,482  
New

The objective of this grant is to develop a 5-year plan for ONRC silviculture and landscape research targeting alternative management approaches to meeting diverse ownership and societal objectives for Olympic Peninsula forests.

The long term objective is to establish a series of field trials of different silvicultural systems that can inform about options for different management objectives.

There are three components:

1) The first task is to identify principle current and possible future management problems on the Olympic Peninsula and to define the biological and environmental scenarios that affect the way that those problems might be overcome, e.g., problems of natural regeneration, problems with individual species.

2) The second phase would be a forum for professionals to discuss the proposed trials. This should include contributions at a conference from professionals outside of the area who have experience with one or more of the types of silvicultures being proposed.

3) Following the forum the deliverable to the Forest Service would be a plan for silvicultural trials that is understood by interested parties. Whether this can actually be achieved in the first year depends to some considerable extent on how long the forum and discussion phase needs to be.

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Application Number: A86620

Faculty Member: Jerry Franklin

Role: Principal Investigator

Title: **Characterizing Forest Structure Using Airborne LIDAR**

Agency: US Forest Service

Period: 7/1/2013 - 6/30/2018

Amount: \$130,000

New

Faculty Member: Van Kane

Role: Co-Investigator

This project will extend current research methods to new forest regions, currently planned to be a study area in the Blue Mountains in Oregon and Washington State and on the Kenai Peninsula, Alaska. Existing methods for examining forest structure and health developed for forests in California, Oregon, and Washington State developed by the collaborators will be applied the new study areas. The results will then be analyzed both to study forest structure and health within the study area and within the larger context of forests across these states.

The University of Washington will also contract with an airborne LiDAR vendor to collect new LiDAR data for one of the study areas. The actual area of data collection and parameters of the acquisition will be mutually agreed upon. The University of Washington will allow the USDA Forest Service to use the collected LiDAR data both for this project and other projects.

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Application Number: A87168

Faculty Member: Jerry Franklin

Role: Principal Investigator

Title: **Colville National Forest Vision 2020 Monitoring**

Agency: US Forest Service

Period: 7/15/2013 - 7/15/2018

Amount: \$23,348

New

The Colville National Forest proposes to develop and implement an adaptive monitoring approach to test the efficacy of forest restoration treatments that are part of its Vision2020 project. The strategy includes melding the disciplines of forest ecology and silviculture with fire behavior and fuels modeling. The Colville NF seeks to work with forest ecologists from the University of Washington currently engaged in monitoring efforts within Region 6 to build on regional expertise. These experts would work with Rocky Mountain Research Station fire ecologists and the Colville NF monitoring staff to build a restoration monitoring program that informs prescription development and monitoring outcomes at both landscape and stand scales. The project will involve (1) Integrating forest ecology, silviculture, and fire behavior experts to design monitoring plots within Walker and Sherman projects; (2) Assessing LiDAR data needs to enable integration of ground-based monitoring and landscape-scale monitoring; (3) Reference conditions feasibility study in dry and mesic mixed-conifer types; and (4) Workshop to share lessons learned and develop monitoring program for Orient and Sanpoil projects.

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Application Number: A87289

Faculty Member: Jerry Franklin

Role: Principal Investigator

Title: **Using Light Detection and Ranging (LiDAR) to Guide Burned Landscape Recovery and Restoration in Sierra Nevada Forests**

Agency: US Forest Service

Period: 10/1/2013 - 9/30/2018

Amount: \$44,285

New

Faculty Member: Van Kane

Role: Co-Investigator

Over the last decade Forest Service Region 5 Sierra Nevada forests have experienced a number of large fires that have burned under extreme weather conditions and produced extensive areas of high-severity fire effects. In many instances post-burn conditions are outside our understanding of historic fire patterns, making it difficult to predict forest recovery and landscape resilience. Furthermore, managers may have a powerful set of tools for understanding stand dynamics but currently lack the means, metrics, and analytical tools to assess landscape-level disturbance, connectivity, and restoration objectives.

Recent work has demonstrated the ability to airborne LiDAR data to address these objectives. Airborne LiDAR provides unique, high-resolution measurements of vertical and horizontal structure of individual tree clumps and gaps over large areas. LiDAR collection alone, however, cannot address management needs without a concurrent investment in the development of LiDAR-based analysis and metrics of landscape forest heterogeneity and restoration progress.

This project will be a collaborative effort between UW SEFS and the USDA to develop LiDAR and GIS tools to quantify current and desired structure and pattern across Sierra Nevada forest landscapes. In addition, training for forest managers in how to use the new methods and tools and apply them will be developed and delivered.

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Application Number: A86875

Faculty Member: James Fridley

Role: Principal Investigator

Title: **College Affordability Model for Use by the Washington Student Achievement Council**

Agency: Washington Student Achievement Council (WSAC)  
Period: 8/1/2013 - 9/30/2013  
Amount: \$20,028  
New

This project will continue the development of Jim Fridley's college affordability model. The model will be provided to the Washington Student Achievement Council (WSAC) for use in council, legislative and other meetings. The version of the affordability model provided to WSAC will include:

- Manipulated variables for years of saving, percent of expected family contribution, interest earned on savings, years of college attendance, income level, cost of attendance, sector, interest on debt, loan duration.
  - Incorporation of financial aid data by income levels to offset savings expectation or unmet need.
  - A display that can be viewed in Powerpoint presentations.
  - A "user guide" for the model.
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Application Number: A86596  
Faculty Member: James Fridley  
Role: Principal Investigator  
Title: **SmartWEPP: A New Generation Water Management Tool Using Mobile Technologies**  
Agency: USDA  
Period: 10/1/2013 - 9/30/2016  
Amount: \$438,759  
Resubmission

This project will develop SmartWEPP, a water management tool using mobile technologies for improving site-specific local decision-making. SmartWEPP will be based on the USDA's Water Erosion Prediction Project (WEPP) model for which an interface as an online geospatial information system (GIS) application is available. SmartWEPP will allow in-field professionals, stakeholders, and interested general public to estimate information for their needs (e.g., watershed discharge and sediment yield) with minimum inputs, using the built-in global positioning system (GPS) within mobile devices, a complex hydrology model, and a comprehensive online database on a public server. When a mobile device is out of the coverage area, it can be used as a data recorder to collect various in-field data for later use with SmartWEPP.

Through the project we will (1) engage stakeholders to further develop our understanding of (a) how they perceive using water management tools for their decision-making, especially in the field, and (b) the key inputs and outputs that the stakeholders would like to use; (2) customize a new online GIS WEPP interface and database that are specifically designated for the mobile applications; (3) develop mobile applications for SmartWEPP for two major mobile platforms (Google's Android and Apple's iOS); (4) develop supporting mobile applications for use of SmartWEPP to assist field data collection; (5) acquire the stakeholders' feedback on the developed SmartWEPP and the supporting mobile applications, and further improve them; and (6) disseminate and transfer information and technologies derived in this study to stakeholders and decision-makers through various technology transfer venues, including a website, classroom education, eXtension, workshops, conferences, and peer-reviewed publications.

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Application Number: A87131  
Faculty Member: Charles Halpern

Role: Principal Investigator  
Title: **Long-term Assessment of Vegetation Responses to Variable-retention Harvests**  
Agency: US Forest Service  
Period: 9/16/2013 - 9/15/2016  
Amount: \$92,498  
Resubmission

Variable-retention harvest is an important component of ecological forestry worldwide. It involves the retention of key forest structures (large live trees, snags, and logs) through timber harvest to emulate the outcomes of natural disturbance. The goals of retaining live trees within harvest units include moderation of understory microclimate, structural enrichment of the regenerating forest, and “life-boating” of forest-dependent species through disturbance. To what extent the amount and spatial pattern of live-tree retention affect these ecological functions, or can be manipulated to achieve a range of management objectives, remain important and unanswered questions in many forest ecosystems. The Demonstration of Ecosystem Management Options (DEMO) experiment was established in 1993 to examine ecological and silvicultural responses to variable-retention harvests in mature, coniferous forests of the Pacific Northwest. Its design, unique among variable-retention experiments, allows for clear separation of the effects of level of retention (40 and 15% of original basal area) and its spatial pattern (trees dispersed vs. aggregated). Long-term vegetation studies form the core of the DEMO experiment. This joint-venture agreement will be used to initiate a re-measurement of vegetation structure and composition 17-19 years after treatment during what may be the most dynamic phase in the development of these forests, the regeneration of the understory cohort. Variation in the composition of, and pace at which, regeneration occurs has important implications for the persistence of early-seral habitat and for future development of the overstory. Continued monitoring is critical to understanding the longer-term implications of varying levels and patterns of retention for the post-harvest development of these forests.

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Application Number: A86962  
Faculty Member: Joshua Lawler  
Role: Principal Investigator  
Title: **Assessing the Effectiveness of Core Areas for Greater Sage-grouse Conservation: a Spatially-explicit Demographic Approach Using Management and Resource Development Scenarios**  
Agency: USDI US Geological Survey  
Period: 9/1/2013 - 8/31/2016  
Amount: \$48,175  
New

Sagebrush habitats have undergone significant loss, degradation, and fragmentation of habitat, resulting in widespread declines in Greater Sage-grouse (*Centrocercus urophasianus*) populations. Land managers are now faced with the challenge of identifying which populations are relatively secure and those requiring increased protection and recovery. In Wyoming, there is a need for an empirically-based decision support tool to aid land managers in synthesizing regional habitat and demographic data, assessing the effectiveness of current species protection measures, and exploring the implications of alternative resource development scenarios.

Funding for this project will allow us to develop an individual-based spatially-explicit population modeling framework to enable the quantitative investigation of the long-term dynamics and persistence of Sage-grouse populations in Wyoming. The modeling framework will combine regional habitat and population datasets to simulate Greater Sage-grouse abundance, productivity, and persistence in

Wyoming. The completed modeling framework will then be used to explore a range of current and future scenarios including assessments of current habitat protection measures (i.e., core areas around leks) and the impacts of alternative future resource (oil and gas) developments. An understanding of the key factors driving Sage-grouse dynamics can be used to direct management actions including future data collection and identifying key areas for conservation.

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Application Number: A86725

Faculty Member: Joshua Lawler

Role: Principal Investigator

Title: **Hydrologic and Ecological Monitoring of Montane Wetlands in North Cascades, Mount Rainier, and Olympic National Parks**

Agency: USDI National Park Service

Period: 6/17/2013 - 9/1/2014

Amount: \$10,076

New

Wetland ecosystems are ecologically important components of park landscapes. Montane wetlands may be particularly vulnerable to changing climates. Responsible and effective park protection of these areas relies on accurate inventories of sites, a detailed understanding of ecosystem functions and hydrologic cycles, and projections of changes based on future climates. Currently, parks have incomplete baseline inventories of montane wetlands and only qualitative information on hydroperiods of wetlands. The goals of this collaborative project are to collect hydrologic data to support the development of models, to collect GPS data to improve delineations of wetland maps, and to use these data to improve model projecting future wetland hydroperiods and function. The models will be used by park managers, scientists, and other interested parties to apply vulnerability assessments to park landscapes and develop adaptation strategies for future park management of these important components.

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Application Number: A86492

Faculty Member: L. Monika Moskal

Faculty Member: Jeffrey Richardson

Role: Principal Investigator

Role: Co-Investigator

Title: **Large Wood and Riparian Forest Data Development Using Remote Sensing**

Agency: King County Department of Natural Resources and Parks

Period: 7/15/2013 - 12/31/2014

Amount: \$45,344

New

Remote Sensing datasets will be used to identify coarse woody debris (CWD) and individual riparian trees in six spatial extents within King County. Aerial LiDAR will be the primary remote sensing dataset used in this study, and object based image analysis (OBIA) the principle methodology. A field campaign will occur in the summer of 2013 to collect spatial information and attributes of CWD and individual riparian trees within the study areas. The results of this study will be delivered to King County in a report. A workbook and one day training will be created in order to train King County staff on the methodologies used in this project.

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Application Number: A86741

Faculty Member: John Perez-Garcia

Role: Principal Investigator

Title: **Exploring the Economics of Forest Restoration**

Agency: US Forest Service

Period: 7/15/2010 - 7/14/2015

Amount: \$19,999

Non-Competing Supplement

The Pacific Northwest Research Station's Urban Wildland Interaction Team (UWI) is developing a new program focusing on forest restoration economics. We will generate, disseminate, and integrate economic analysis techniques into forest restoration activities in the Pacific Northwest region. Specifically, the objectives are to investigate the state of economics as an analysis tool for restoration projects, estimate market and non-market impacts of restoration activities in the Pacific Northwest, identify ways to incorporate economics into restoration planning and evaluation, describe barriers to integration, and develop and communicate a baseline understanding of methods and data required to estimate benefits and costs to land owners and managers. Knowledge gaps and research needs of forest managers and landowners conducting restoration activities in the region will also be examined. Washington and Oregon will be the study area.

We will expand the analysis completed to estimate input/output multipliers and their impacts on rural communities in the east Cascade counties of Chelan, Kittitas, Yakima and Klickitat. We will compare multipliers with western Washington counties using the input/output model developed in the previous task to examine economic impacts of ecological restoration. The model addresses direct, indirect, and induced employment as well as employment multipliers resulting from a set of restoration activities. Activities range from highly skilled engineering or technical jobs to unskilled manual labor.

We will expand literature and other published research regarding linking economic analysis with ecological restoration outcomes to include the TAPASH Sustainable Forest Collaborative. We will calculate the impacts restoration has on ecological benefits in the four county region using results from the above analysis.

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Application Number: A87211

Faculty Member: Sarah Reichard

Role: Principal Investigator

Title: **BLM Rare Plant Monitoring & Seed Collecting**

Agency: USDI Bureau of Land Management

Period: 1/1/2014 - 12/31/2014

Amount: \$83,963

Non-Competing Supplement

Rare Care objective is to monitor, report on, collect seeds, and restore the most threatened of Washington State's 300 species of plants in decline. Monitoring and seed collections will be carried out by trained volunteers and Rare Care staff. Information collected by under this project will provide critical and more frequent data to support scientists and land managers in identifying trends in plant-population changes, testing assumptions about climate change and other anthropomorphic impacts on native plants, and understanding ecosystem interactions; provide seeds for augmentation and reintroduction projects for our region's most imperiled species; help to evaluate national conservation strategies and approaches, and produce key reports and information for managers of public lands to aid in managing sensitive plant species. The project is conducted in partnership with the Natural Heritage Program (WANHP) and data collected by rare plant monitors is provided to WANHP and to state and federal agencies who own the land where the populations occur. In 2014, approximately 130 populations will be revisited and reported on by volunteers, seeds will be collected from 10 populations of rare plants, and approximately 30 new volunteers will be trained in rare plant monitoring techniques.

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Application Number: A86991  
Faculty Member: Fernando Resende  
Role: Principal Investigator  
Title: **Conversion of Ethanol to Gasoline at Supercritical Conditions**  
Agency: National Science Foundation (NSF)  
Period: 1/1/2014 - 12/31/2018  
Amount: \$461,618  
New

The overall goal of this CAREER proposal is to create a research and educational program that will advance our understanding of the ethanol-to-gasoline (ETG) reactions, kinetics, and catalyst deactivation at supercritical conditions. The conversion of bioethanol into gasoline addresses several of the problems associated with cellulosic ethanol, and therefore has a large potential to contribute to the develop of the biorefineries which will produce fuels and products from renewable sources. This application proposes the use of supercritical conditions as a tool to control product selectivity and prevent catalyst deactivation by coke deposition. An integrated educational component will take advantage of the infrastructure available to the PI and generate new sustainability-related curriculum materials to undergrads and high-school students from underrepresented groups, including minority students and students with disabilities.

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Application Number: A86739  
Faculty Member: Sandor Toth  
Role: Principal Investigator  
Title: **Integrating Carbon and Other Ecosystem Services into a Framework for Forest Management**  
Agency: US Forest Service  
Period: 9/1/2013 - 7/18/2015  
Amount: \$59,998  
Non-Competing Supplement

The extension of the Deschutes Ecosystem Services project includes detailed research on carbon storage assessment under different management scenarios. We will project future carbon storage and flux, and assess the effects of management activities on carbon storage. Also, the project will continue the research on integration of ecosystem services into forest management decision making. Within the scope of the project we will work on methods to estimate carbon in forest ecosystems, including changes after management activities designed to increase the provision of forest ecosystem services. In addition, we plan to assess cultural ecosystem services, evaluate how forest management activities might compromise them, and understand the relationships between these services and other conservation objectives. This research will allow the estimation of the provision of services under different scenarios that might include, but are not limited to, restorative management for reducing fire hazard and management for maximizing carbon sequestration. An improved understanding of the tradeoffs among the provision of ecosystem services could not but enhance forest stewardship.

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Application Number: A86189  
Faculty Member: Daniel Vogt  
Role: Co-Investigator

**Title: Work Plan for the University of Washington in Managing and Facilitating a Scientific Review Process for CMER by the Independent Scientific Peer Review Program**

Agency: WA Department of Natural Resources

Period: 7/1/2013 - 6/30/2015

Amount: \$150,416

New

The Forest Practices Adaptive Management Program's Cooperative Monitoring, Evaluation and Research Committee (CMER) needs to have an independent review process for evaluating research designs and research and monitoring reports that may be used in support of future forest practices rule changes or the creation of new rules. This agreement is for the continuation of an Independent Scientific Peer Review program that will manage and facilitate scientific review for CMER.

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Application Number: A86877

Faculty Member: Kathleen (Kathy) Wolf

Role: Principal Investigator

**Title: Science Delivery for Human Health Benefits of Urban Forests and Urban Greening**

Agency: US Forest Service

Period: 10/1/2013 - 12/31/2016

Amount: \$84,000

New

Social science and public health research provides compelling reasons why urban trees and natural resources are essential in cities. The Green Cities: Good Health (GCGH) project has been a multi-year literature review and science delivery project that has cataloged the health services and benefits derived from city trees and urban greening. The project goals are: 1) compile the best available science about urban forestry/urban greening and human health and well-being, 2) summarize the research into compact, readable formats that are accessible by stakeholders, 3) provide a web portal to the science, and associated science delivery tools, and 4) support the assertion that trees, parks, and open spaces are a necessity for city livability and quality of life. It has taken several years to collect the science publications into reference management software, access and collect .pdf files of the materials, and prepare the summaries. This proposal will fund the second generation of this project and continued development of the science delivery tools. It will leverage the current GCGH resources to produce these deliverables: 1) update the science article database and web page summaries, 2) upgrade the graphic structure and interface for the web and outreach materials, and 3) scope possible web-based search tools for the article database. The project products do and will have national significance. The online sources will report the expansive research on HHWB, with most findings being generalizable to cities and citizens across the entire U.S. Daily experiences of trees, gardens and open space are not just about aesthetics, or nice to have, but are a profoundly important human need. Planning and management for urban nature is of national significance, an issue that is relevant to millions of Americans. The entire compendium of GCGH literature has become a compelling presentation, providing a major and meaningful justification for why society should invest in urban forestry and urban greening.

## August Awards

Application Number: A87078

Faculty Member: Ernesto Alvarado

Role: Principal Investigator

Title: **Solutions to Current and Future Wildfires: Physical and Ecological Models for Fire, Fuels, and Smoke in Ecosystems and the Wildland Urban Interface**

Agency: US Forest Service

Period: 7/1/2013 - 6/30/2017

Amount: \$440,000

New

This Joint Venture Agreement (JVA) with the USFS PNW Research Station will generate science-based information, strategies and tools for current and future fire management needs in public, tribal lands, and the wildland urban interface. This joint research is aimed to promote attainment of desired future ecosystem conditions and ensure the long-term integrity of ecosystems under a changing climate scenario, reduce air quality impacts and carbon emissions, and contribute to carbon management; enhance restoration of healthy, resilient, fire-adapted ecosystems through evaluation of integrated fire/fuel management practices; and to develop WUI hazard reduction guidelines to prevent home losses from WUI fires across the United States.

Specific objectives of this JVA are:

- To develop a methodology for creating and mapping dynamic fuel models across multiple ecosystems the United States that will improve estimation of fuel consumption and smoke and greenhouse gases from wildland fires.
  - To study the relation between severity patchiness and fuel consumption components with climate and topography on alpine ecotones.
  - To model FCCS fuelbed pathways to model fire hazard across landscapes in federal, tribal and military installation lands for fire hazard mitigation and improving fuel consumption and emissions from wildfires and prescribed burns.
  - To integrate high-resolution information of fuelbeds, winds, and topography into physics-based fire and ecological models for developing a new exposure scale for the wildland-urban-interface. This component of the JVA will assist managers to improve mitigation of structural damage, smoke effects, and socioeconomic effects in fire-prone areas.
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Application Number: A87115

Faculty Member: Ernesto Alvarado

Role: Principal Investigator

Title: **Research on Fire, Fuels, Landscape Ecology, and the Wildland-Urban-Interface**

Agency: US Forest Service

Period: 7/1/2013 - 6/30/2016

Amount: \$686,597

New

This Cost Reimbursable Agreement (CRA) will support the research conducted by the USFS Fire and Environmental Research Applications Team (FERA) and the School of Environmental and Forest Sciences (SEFS), University of Washington. The CRA will generate, develop, apply and transfer science-based information, strategies and tools for fire management in public, tribal lands, and homeowners in the wildland urban interface.

Specific tasks for this cost reimbursable agreement are:

- To develop a fire and fuel management application to integrate fuels, consumption in wildland fires, and combustion phases.
- To develop a new data reduction and analysis software to convert field data to fuel loading estimates.

- To enhance the fuelbed development and mapping capabilities of FCCS to map fuels for forest landscapes in the western US.
  - To improve a Wildland-Urban Interface Fire Dynamics Simulator to integrate empirical field studies.
  - To collaborate on data collection and analysis of wildland fuels information to develop new, or improve existing fire and fuel models.
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Application Number: A86711  
Faculty Member: Stanley Asah  
Role: Principal Investigator  
Title: **Statistical Support for People and Their Environments**  
Agency: US Forest Service  
Period: 7/9/2013 - 7/1/2018  
Amount: \$8,003  
New

We will support statistical analysis of social science data such as that from the RESTORE and other projects. Dr. Asah will consult with Northern Research Station scientists as needed on current and future projects. Current needs include assistance with hierarchical linear modeling, structural equation modeling, and appropriate techniques to combine qualitative social science data with quantitative ecological data in a single analysis.

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Application Number: A79982  
Faculty Member: Jonathan Bakker  
Role: Principal Investigator  
Title: **Leveraging Land Condition Trend Analysis (LCTA) data to understand vegetation change on military installations**  
Agency: US Department of Defense  
Period: 9/16/2013 - 9/15/2014  
Amount: \$99,514  
New

DoD training activities are threatened by habitat degradation, the risk of listing at-risk species, climate change, and other factors. The objective of this project is to leverage historical data by applying new analytical techniques to them to better understand how military activities have affected plant communities. This project will have nationwide implications as over 50 installations, spanning multiple Army divisions, have collected data from Land Condition Trend Analysis (LCTA) plots. The Yakima Training Center (YTC) will serve as a pilot installation, having collected LCTA data multiple times from 1989-2002 on 261 permanent plots. The primary products will be a refined model of vegetation change, maps highlighting areas of recovery or degradation, maps prioritizing areas at risk for future degradation or suitable for habitat restoration and enhancement, and identification of opportunities to further leverage historical data by integrating it with other data.

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Application Number: A83108  
Faculty Member: Sally Brown  
Role: Principal Investigator  
Title: **Restoration with Residuals**  
Agency: USDA

Period: 7/1/2013 - 7/30/2015

Amount: \$50,013

New

The United States Department of Agriculture (USDA) initiated a Specific Cooperative Act (SCA) with University of Washington (UWA) in 1998. The purpose of that agreement was to initiate and monitor large-scale restoration efforts on hard rock mining sites that had been listed under the US Environmental Protection Agency (EPA) Superfund program. Restoration efforts included the use of locally available residuals including municipal biosolids, composts, wood ash and log yard wastes. Research and Demonstration sites were established at uplands and wetlands areas at the Bunker Hill mine in ID, on alluvial tailings in Leadville, CO, on chat and tailings at Jasper County, MO and on tailings in Tar Creek, OK. In addition to field scale installations, the work also included greenhouse trials to develop remedial mixtures.

The success of these research and demonstration sites has led to an interest in additional research, publications, outreach and education on use of residuals to restore ecological function and reduce contaminant bioavailability at a wider range of sites within the US EPA Superfund program. Research efforts to this end have already commenced at USDA with field and greenhouse trials on use of composts for restoration at an asbestos mine site in VT and a mercury tailings site in CA. The USDA would like to set up a new SCA with Sally Brown at UW SEFS to continue with this work.

This new SCA includes work to interpret and write up sampling data from a recent trip to the restored areas in Jasper County, MO. It also includes outreach and education efforts for US EPA including but not limited to participating in Webinars and training sessions in the different EPA regions. Work includes consultation and potential research (greenhouse and field trials) for different restoration sites. Work may also include calculating the carbon balance for different restoration options at different sites. This funding is intended as a means to re-involve Dr. Brown in the restoration efforts. Dr. Brown will work with Dr. Chaney at USDA Agricultural Research Service and staff at EPA including Michele Mahoney, Mark Sprenger and on site project managers and remedial project managers to develop remedial options for sites and evaluate success of these options. This is a general statement of the work that will take place. Specific projects, outside of the Jasper County data, and outreach and education efforts will be based on requests from within EPA, in conjunction with work at USDA.

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Application Number: A87562

Faculty Member: Sally Brown

Role: Principal Investigator

Title: **Biosolids Information & Education Program**

Agency: Northwest Biosolids Management Association

Period: 7/15/2013 - 3/14/2015

Amount: \$12,837

Non-Competing Supplement

Through a proposed agreement with the USDA ARS, Dr. Sally Brown will be funded to assist in projects using municipal biosolids to restore mine sites. This work is expected to include presentations, site visits and potentially controlled studies on different mine sites or material from mine sites. As the work will involve the use of biosolids and research related to the benefits of biosolids, it is within the scope of the NBMA Biosolids Information agreement with the NBMA and the UW. Broadening the scope of work on use of biosolids to include partnerships with USDA and US EPA advances our knowledge of biosolids as well as disseminates information on biosolids use.

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Application Number: A86434  
Faculty Member: Jerry Franklin  
Role: Principal Investigator  
Title: **Wind River Field Station**  
Agency: US Forest Service  
Period: 10/1/2011 - 7/31/2016  
Amount: \$86,665  
Non-Competing Supplement

Faculty Member: Ken Bible  
Role: Co-Investigator

Project will continue support of the Wind River Field Station long-term monitoring of key ecosystem processes and climate variables, development of new monitoring capabilities as appropriate in cooperation with the Forest Service and other institutions, and to partner with the UW in the management and oversight of ongoing research and education activities in the Wind River Experimental Forest (WREF), and the promotion of new research, education and outreach activities in the WREF.

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Application Number: A86875  
Faculty Member: James Fridley  
Role: Principal Investigator  
Title: **College Affordability Model for Use by the Washington Student Achievement Council**  
Agency: Washington Student Achievement Council (WSAC)  
Period: 8/1/2013 - 9/30/2013  
Amount: \$20,028  
New

This project will continue the development of Jim Fridley's college affordability model. The model will be provided to the Washington Student Achievement Council (WSAC) for use in council, legislative and other meetings. The version of the affordability model provided to WSAC will include:

- Manipulated variables for years of saving, percent of expected family contribution, interest earned on savings, years of college attendance, income level, cost of attendance, sector, interest on debt, loan duration.
  - Incorporation of financial aid data by income levels to offset savings expectation or unmet need.
  - A display that can be viewed in Powerpoint presentations.
  - A "user guide" for the model.
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Application Number: A86492  
Faculty Member: L. Monika Moskal  
Role: Principal Investigator  
Title: **Large Wood and Riparian Forest Data Development Using Remote Sensing**  
Agency: King County Department of Natural Resources and Parks  
Period: 7/15/2013 - 12/31/2014  
Amount: \$45,344  
New

Faculty Member: Jeffrey Richardson  
Role: Co-Investigator

Remote Sensing datasets will be used to identify coarse woody debris (CWD) and individual riparian trees in six spatial extents within King County. Aerial LiDAR will be the primary remote sensing dataset

used in this study, and object based image analysis (OBIA) the principle methodology. A field campaign will occur in the summer of 2013 to collect spatial information and attributes of CWD and individual riparian trees within the study areas. The results of this study will be delivered to King County in a report. A workbook and one day training will be created in order to train King County staff on the methodologies used in this project.

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Application Number: A86741  
Faculty Member: John Perez-Garcia  
Role: Principal Investigator  
Title: **Exploring the Economics of Forest Restoration**  
Agency: US Forest Service  
Period: 7/15/2010 - 7/14/2015  
Amount: \$19,999  
Non-Competing Supplement

The Pacific Northwest Research Station's Urban Wildland Interaction Team (UWI) is developing a new program focusing on forest restoration economics. We will generate, disseminate, and integrate economic analysis techniques into forest restoration activities in the Pacific Northwest region. Specifically, the objectives are to investigate the state of economics as an analysis tool for restoration projects, estimate market and non-market impacts of restoration activities in the Pacific Northwest, identify ways to incorporate economics into restoration planning and evaluation, describe barriers to integration, and develop and communicate a baseline understanding of methods and data required to estimate benefits and costs to land owners and managers. Knowledge gaps and research needs of forest managers and landowners conducting restoration activities in the region will also be examined. Washington and Oregon will be the study area. We will expand the analysis completed to estimate input/output multipliers and their impacts on rural communities in the east Cascade counties of Chelan, Kittitas, Yakima and Klickitat. We will compare multipliers with western Washington counties using the input/output model developed in the previous task to examine economic impacts of ecological restoration. The model addresses direct, indirect, and induced employment as well as employment multipliers resulting from a set of restoration activities. Activities range from highly skilled engineering or technical jobs to unskilled manual labor. We will expand literature and other published research regarding linking economic analysis with ecological restoration outcomes to include the TAPASH Sustainable Forest Collaborative. We will calculate the impacts restoration has on ecological benefits in the four county region using results from the above analysis.

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Application Number: A85619  
Faculty Member: Sarah Reichard  
Role: Principal Investigator  
Title: **2013 Seattle reLeaf Project**  
Agency: Seattle Public Utilities  
Period: 6/1/2013 - 12/31/2016  
Amount: \$36,000  
New

The University of Washington Botanic Gardens will work with the City of Seattle to support the Trees for Neighborhoods program. The Trees for Neighborhoods program is a City of Seattle initiative to meet their goal to reach 30% canopy cover by 2037, as outlined in the Urban Forest Management Plan

(UFMP). This project most directly meets the goals of the UFMP's community framework. The planting and maintenance of trees in urban areas provides important environmental, social, economic, and public health benefits including the reduction of stormwater runoff and the consequent pollution of nearby waterways such as Puget Sound. UWBG will provide outreach to the public; organize and host planting training and tree distribution events for the public; provide nursery and workshop space; and find appropriate homes for all unclaimed trees. Supporting the Trees for Neighborhoods program will further the University of Washington Botanic Gardens' mission by engaging residents in tree planting and care and by educating the public on both the proper care of trees on residential property and the larger concept of the benefits trees provide, particularly in urban environments.

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Application Number: A86739

Faculty Member: Sandor Toth

Role: Principal Investigator

Title: **Integrating Carbon and Other Ecosystem Services into a Framework for Forest Management**

Agency: US Forest Service

Period: 9/1/2013 - 7/18/2015

Amount: \$59,998

Non-Competing Supplement

The extension of the Deschutes Ecosystem Services project includes detailed research on carbon storage assessment under different management scenarios. We will project future carbon storage and flux, and assess the effects of management activities on carbon storage. Also, the project will continue the research on integration of ecosystem services into forest management decision making. Within the scope of the project we will work on methods to estimate carbon in forest ecosystems, including changes after management activities designed to increase the provision of forest ecosystem services. In addition, we plan to assess cultural ecosystem services, evaluate how forest management activities might compromise them, and understand the relationships between these services and other conservation objectives. This research will allow the estimation of the provision of services under different scenarios that might include, but are not limited to, restorative management for reducing fire hazard and management for maximizing carbon sequestration. An improved understanding of the tradeoffs among the provision of ecosystem services could not but enhance forest stewardship.

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Application Number: A87719

Faculty Member: Miranda Wecker

Role: Principal Investigator

Title: **North Pacific Coast Lead Entity Neutral Forum**

Agency: Washington State Recreation and Conservation Office

Period: 7/1/2012 - 8/31/2013

Amount: \$12,439

Non-Competing Supplement

The University of Washington's Olympic Natural Resources Center proposes to facilitate two neutral forums for development of salmon habitat restoration plans on the western side of the Olympic Peninsula. One neutral forum called the "North Pacific Coast Lead Entity" (NCPLE) is responsible for the development of ranked lists of restoration and protection projects in western Clallam and Jefferson counties. The other forum operates in the Quinalt region. Both must be based on the best available science, community principles, and the integration of environmental and ecological interests.

UW-ONRC will assist the forum members in scientifically-grounded and objective monitoring of the implementation of the selected projects. UW-ONRC will also prepare a compilation of restoration project outcomes in the state-wide Habitat Work Schedule data base; and coordinate with other relevant forums in the region that are addressing endangered salmon recovery efforts.

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Application Number: A81106  
Faculty Member: Kathy Wolf  
Role: Principal Investigator  
Title: **Urban Forest Health Benefits Mapping**  
Agency: WA Department of Natural Resources  
Period: 4/1/2013 - 5/31/2014  
Amount: \$9,512  
New

Urban forests and other urban greening environments provide ecosystem services. This funding will contribute to development of a benefits assessment tool - greenHEAL - that can be used to determine the human health and well-being benefits provided by parks, gardens, open spaces and city trees. A prior project has compiled the research literature, building a collection of more than 2,300 scientific publications. Summaries of nearly 40 years of studies are at [www.greenhealth.washington.edu](http://www.greenhealth.washington.edu) Now underway is a study to translate these health and well-being benefits to economic value. Using both market-based and non-market valuation approaches a team of economists and social scientists are developing theoretical and practical estimations of urban greening contributions to community health. A trio of efforts will be eventually be combined to create greenHEAL: 1) evidence of health and well-being benefits, 2) economic valuation, and 3) spatial and map analysis. This proposal will jumpstart the third component that is needed to create a benefits assessment tool. The funding will support development of the spatially explicit approaches to determine the locations, proximities, and spatial relationships of urban nature, human populations, and benefit levels. The project work will involve a literature review, contacts of key informants about mapping techniques, and preliminary techniques for integrating geocoded data with economic valuation.

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Application Number: A86641  
Faculty Member: Kathy Wolf  
Role: Principal Investigator  
Title: **Stewardship Mapping Geocoding for the Seattle Green Cities Research Alliance**  
Agency: US Forest Service  
Period: 8/1/2011 - 4/30/2014  
Amount: \$25,087  
Non-Competing Supplement

Forest health is an important goal across the landscape gradient throughout the Puget Sound region. Civic environmental stewardship is one potential strategy to improve forest conditions. Current project activity is providing a preliminary, baseline assessment of stewardship activity and locations, focusing on the metro Seattle area. Project support to date (budget IDs: 2011-JV-11261985-071 (USFS) and 62-2991(UW)) is funding a geospatial mapping analysis of stewardship organizations (that includes stewardship programs and volunteer participant densities) in association with an organizational network analysis. This supplemental request extends the end date of the project, and provides funds to support the development of technical reports, journal manuscripts, and other written products.

## August Proposals

Application Number: A87613

Faculty Member: Ernesto Alvarado

Role: Principal Investigator

Title: **Solutions to Current and Future Wildfires: Physical and Ecological Models for Fire, Fuels, and Smoke in Ecosystems and the Wildland Urban Interface**

Agency: US Forest Service

Period: 7/31/2013 - 7/30/2016

Amount: \$271,264

Non-Competing Supplement

This Joint Venture Agreement (JVA) with the USFS PNW Research Station will generate science-based information, strategies and tools for current and future fire management needs in public, tribal lands, and the wildland urban interface. This joint research is aimed to promote attainment of desired future ecosystem conditions and ensure the long-term integrity of ecosystems under a changing climate scenario, reduce air quality impacts and carbon emissions, and contribute to carbon management; enhance restoration of healthy, resilient, fire-adapted ecosystems through evaluation of integrated fire/fuel management practices; and to develop WUI hazard reduction guidelines to prevent home losses from WUI fires across the United States.

Specific objectives of this amendment to the JVA are:

- To develop a vulnerability assessment for the three USFS national forests, Tribal, and other federal lands in the Blue Mountains region of Eastern Oregon.
  - To develop an improved version of the Fuel Characteristic Classification System to be applicable to forest health restoration in federal lands under current and future climate scenarios.
  - To continue investigating the relation between thermal environment during pile burning and changes due different pile ages and how those changes affect the amount of biomass consumed, the rate of pile combustion, carbon dynamics, soil characteristics, and vegetation response under spring and fall burning conditions. The study is conducted in the Okanogan and Wenatchee National Forest and Pueblo Tribal Lands in New Mexico.
  - To develop a model to predict occurrence of megafires under future climate scenarios in the Western United States by combining MTBS and federal fire records.
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Application Number: A87699

Faculty Member: Gordon Bradley

Role: Principal Investigator

Title: **Pacific NW Coop Ecosystem Studies Unit Program Support**

Agency: USDI National Park Service

Period: 7/15/2012 - 3/1/2016

Amount: \$37,316

Non-Competing Supplement

The University of Washington (UW) and the National Park Service (NPS) have been collaborating since 2001 to host and administer the Pacific Northwest Cooperative Ecosystem Studies Unit (PNW CESU) program. The PNW CESU is part of the national CESU network, which is a consortium of federal agencies, universities, and other partners with a mission to work together on research, technical assistance, and education projects to enhance understanding and management of natural and cultural resources. Currently, staff at the PNW CESU is also servicing some of the administrative and business needs for the Great Basin Cooperative Ecosystem Studies Unit (GB CESU), also a member of the national CESU

network. This project is a continuing collaboration between UW and NPS to support administrative functions of the PNW CESU and GB CESU including public outreach and development of financial assistance agreements for a wide variety of technical, research, and educational projects relevant to the mission of the CESU network. The project objectives are to provide program support to the PNW CESU, including funding for the Program Coordinator (PC). The duties of the PC include acting as the primary point of contact for the 28 PNW CESU members, providing assistance to the NPS Research Coordinator (RC) in reviewing and processing Task Agreements and modifications, overseeing the maintenance of the unit's project tracking database and website, managing the production of newsletters, and providing logistical support in holding periodic partner meetings. The PC and NPS RC also work together in reviewing and processing Task Agreements and modifications for the GB CESU, and maintaining a GB CESU project tracking database. NPS will be substantially involved in collaborating with UW to review and process Task Agreements, produce summary reports, provide advice on maintaining databases and on web site maintenance, and by coordinating on partner meetings and newsletters for the PNW CESU. Public benefits include cooperative research concerning the resources of the National Park System and other federal agencies, maintenance of a public web site that contains current and searchable information on all research, technical assistance, and education projects funded by NPS and other federal agencies through the PNW CESU, publicly-available newsletters (posted on the web site), and annual reports to Congress for both the PNW and GB CESUs.

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Application Number: A87562  
Faculty Member: Sally Brown  
Role: Principal Investigator  
Title: **Biosolids Information & Education Program**  
Agency: Northwest Biosolids Management Association  
Period: 7/15/2013 - 3/14/2015  
Amount: \$12,837  
Non-Competing Supplement

Through a proposed agreement with the USDA ARS, Dr. Sally Brown will be funded to assist in projects using municipal biosolids to restore mine sites. This work is expected to include presentations, site visits and potentially controlled studies on different mine sites or material from mine sites. As the work will involve the use of biosolids and research related to the benefits of biosolids, it is within the scope of the NBMA Biosolids Information agreement with the NBMA and the UW. Broadening the scope of work on use of biosolids to include partnerships with USDA and US EPA advances our knowledge of biosolids as well as disseminates information on biosolids use.

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Application Number: A87477  
Faculty Member: Sharon Doty  
Role: Principal Investigator  
Title: **Engineering Microbiomes for Bioremediation of Organic Pollutants**  
Agency: DARPA Defense Sciences Office  
Period: 1/1/2014 - 12/31/2016  
Amount: \$588,990  
New

A recurring problem for the U.S. Department of Defense is the contamination of military sites with man-made organic compounds (xenobiotics) that are byproducts of industrial manufacturing or munitions. 1,4-dioxane is classified as a Group B2 human carcinogen by the U.S. EPA and is a known contaminant of

many federal sites including DOD bases in the U.S. and abroad. Its prevalence as a pollutant stems from its use in many products including paint strippers, dyes, greases, varnishes and waxes. Like many toxic xenobiotics, 1,4-dioxane is recalcitrant to natural biodegradation by most indigenous microorganisms, and so if left untreated, it persists in the environment for long periods of time. Furthermore, 1,4-dioxane is highly soluble in groundwater and thus contaminates large areas quite distant from the source rendering conventional pump-and-treat options infeasible. Our approach leverages the extensive expertise and capabilities of the synthetic biology company Ginkgo BioWorks to rapidly design and assemble combinatorial libraries of engineered elements and screen them for function. Ginkgo's synthetic biology technologies are complemented by extensive experience in bioremediation by Gary Saylor and colleagues from the Center for Environmental Biotechnology at the University of Tennessee-Knoxville and in plant-endophyte symbiosis and phytoremediation by Sharon Doty from the University of Washington. Engineering microbial communities in situ represents a new approach to remediation and lessons learned here will also be applicable to the degradation of other pollutants of relevance to DoD that share the intractability to remediation of 1,4-dioxane, such as hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX), a major component of many military explosives.

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Application Number: A87370

Faculty Member: Gregory Ettl

Role: Principal Investigator

Title: **The Western Mountain Initiative: Vulnerability and Adaptation to Climate Change in Western Mountain Ecosystems**

Agency: USDI US Geological Survey

Period: 8/15/2013 - 12/31/2015

Amount: \$90,000

Supplement and Extension

Faculty Member: David Peterson

Role: Co-Investigator

Climate warming is affecting Western mountain ecosystems, directly through changes in water dynamics and indirectly through altered disturbance regimes. The Western Mountain Initiative team explores the effects of climate change on ecological disturbance, responses of forest vegetation, mountain hydrology, and the coupled hydro-ecological responses that determine vulnerability of Western mountain ecosystems to change. Extensive data sets, empirical studies, surveys, and monitoring programs are linked via models to hindcast and forecast the effects of changing climate on forest dynamics, distribution, and productivity; fire occurrence and insect outbreaks; recovery of vegetation after disturbance; hydrologic changes and glacier dynamics; and the consequences of an altered water cycle for terrestrial and aquatic ecosystems and chemistry. We will address the extent to which climate drivers are mediated by regional- or watershed-scale controls on ecosystem processes, thus quantifying vulnerability to climate change in mountain ecosystems. Region-specific results and emergent West-wide patterns will be shared with resource managers through workshops and a comprehensive web-based toolkit on climate-change science and adaptation management.

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Application Number: A87413

Faculty Member: Jerry Franklin

Role: Principal Investigator

Title: **Characterizing Forest Structure Using Airborne LIDAR**

Agency: US Forest Service

Period: 7/1/2013 - 6/30/2018

Amount: \$80,746

Resubmission

Faculty Member: Van Kane

Role: Co-Investigator

This project will extend current research methods to new forest regions, currently planned to be a study area in the Blue Mountains in Oregon and Washington State and on the Kenai Peninsula, Alaska. Existing methods for examining forest structure and health developed for forests in California, Oregon, and Washington State developed by the collaborators will be applied the new study areas. The results will then be analyzed both to study forest structure and health within the study area and within the larger context of forests across these states.

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Application Number: A87475

Faculty Member: Jerry Franklin

Faculty Member: Van Kane

Role: Principal Investigator

Role: Co-Investigator

Title: **Characterizing Forest Structure Using Airborne LIDAR**

Agency: US Forest Service

Period: 7/1/2013 - 6/30/2018

Amount: \$129,984

Resubmission

This project will extend current research methods to new forest regions, currently planned to be a study area in the Blue Mountains in Oregon and Washington State and on the Kenai Peninsula, Alaska. Existing methods for examining forest structure and health developed for forests in California, Oregon, and Washington State developed by the collaborators will be applied the new study areas. The results will then be analyzed both to study forest structure and health within the study area and within the larger context of forests across these states.

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Application Number: A84053

Faculty Member: Joshua Lawler

Faculty Member: Theresa Nogeire

Role: Principal Investigator

Role: Co-Investigator

Title: **Helping Shrub-steppe Communities Adapt to Climate Change Using Valuation of Ecosystem Services**

Agency: USDI Bureau of Land Management

Period: 10/1/2013 - 10/1/2016

Amount: \$32,942

New

We propose to provide planning tools that facilitate cross-jurisdictional management to maximize support of shrub-steppe habitat resilience and human community resilience in Douglas County, Washington in the face of climate change. We will create a geodatabase useful for implementation of resilience strategies, including information on current and projected future distribution of critical habitat for wildlife connectivity, forage, dryland wheat, and cheatgrass. We will recommend management strategies to optimize social and environmental goals.

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Application Number: A87677

Faculty Member: Joshua Lawler

Role: Principal Investigator

Title: **Climate Change Vulnerability in the Pacific Northwest: a Comparison of Three Approaches**

Agency: Oregon State University

Period: 9/1/2012 - 8/31/2014

Amount: \$98,821  
Non-Competing Supplement

Some species and some ecological systems will be more vulnerable to changes in climate than others. Thus, managing natural resources in the face of climate change will require an understanding of the relative vulnerabilities of species and systems. Although several different approaches have been proposed for assessing relative climate-change vulnerabilities (Dawson et al. 2011, Glick et al. 2011), no systematic comparisons of these approaches have been conducted and thus there is little guidance on how to select an appropriate approach and little understanding of how the outputs of approaches differ. Here, we propose to compare three approaches to assessing the vulnerability to climate change of species and ecological systems in the PNW.

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Application Number: A87791  
Faculty Member: Joshua Lawler  
Role: Principal Investigator  
Title: **Monitoring and Modeling of Climate Change Effects on Pacific Northwest Wetlands**  
Agency: Oregon State University  
Period: 9/21/2013 - 9/20/2014  
Amount: \$142,737  
Non-Competing Supplement

Wetlands are widely recognized as important ecosystems that provide critical services for natural communities and human society, including nutrient cycling, wildlife provisioning, water storage & filtration, carbon sequestration, agriculture & recreation, and core habitat for mammals, birds, and amphibians. However, wetlands challenge our current scientific capacity because of their sheer number (10,000's-100,000's for the Pacific Northwest alone), their wide range of sizes (<100 to >10,000 m<sup>2</sup>), and dynamic nature (intermittent to permanent). Wetlands are also thought to be among the most sensitive ecosystems to climate change via changes in temperature and precipitation and resulting changes in hydroperiod and water temperature. Our research aims to develop new approaches and technical tools needed to sustainably manage wetlands in a changing climate.

Background: Our proposed study areas include wetlands of both biological and economic significance (e.g. montane wetlands, wetlands in the Puget Sound lowlands and Columbia Plateau wetlands), and this combination of sites span a broad enough range of physical and 2 hydrologic controls that the hydrologic models we develop will be relevant to wetlands across the Pacific Northwest and the western U.S. as a whole. The technical challenge that motivates our collaboration is the need to connect methods across multiple disciplines to predict the dynamics of wetlands across a broad range of scales, ranging from projections of hydroperiod and water temperature at individual wetlands that are often <100m<sup>2</sup> in size to regional-scale changes in wetland extent and connectivity.

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Application Number: A87719  
Faculty Member: Miranda Wecker  
Role: Principal Investigator  
Title: **North Pacific Coast Lead Entity Neutral Forum**  
Agency: Washington State Recreation and Conservation Office  
Period: 7/1/2012 - 8/31/2013  
Amount: \$12,439  
Non-Competing Supplement

The University of Washington's Olympic Natural Resources Center proposes to facilitate two neutral forums for development of salmon habitat restoration plans on the western side of the Olympic Peninsula. One neutral forum called the "North Pacific Coast Lead Entity" (NCPLE) is responsible for the development of ranked lists of restoration and protection projects in western Clallam and Jefferson counties. The other forum operates in the Quinalt region. Both must be based on the best available science, community principles, and the integration of environmental and ecological interests.

UW-ONRC will assist the forum members in scientifically-grounded and objective monitoring of the implementation of the selected projects. UW-ONRC will also prepare a compilation of restoration project outcomes in the state-wide Habitat Work Schedule data base; and coordinate with other relevant forums in the region that are addressing endangered salmon recovery efforts.