



School of Environmental and Forest Sciences

UNIVERSITY *of* WASHINGTON

College of the Environment

Research Newsletter

Volume III, Issue 5

NEWS: New benefit rates; SAGE approval on mobile devices; RA wage increase coming; Carol Rhodes Interim Director of Office of Sponsored Programs; Federal budget cuts: Page 1

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News

New benefit rates have been implemented, effective July 1. Faculty and graduate student rates are going down, but staff rates, including hourly are rising. The rates & percent of change are: faculty 26.9% (-.3%), grad students 14.2% (-1.9%), classified staff 37.7% (+4.3%), professional staff 34% (+.1%), and hourly 16.5% (+1.6%). For an explanation of why each rate was changed, see <http://www.washington.edu/admin/finacct/preliminaryrates2013.pdf>.

As a result of the recent union negotiations, research assistants will be receiving a pay increase, which should be taken into consideration when anticipating your expenses. The new rate will be a minimum of 4%, but has not yet been set, as it is dependent upon a survey of pay rates at peer institutions, but for planning purposes, expect a 4% increase beginning July 1, 2013, 2014, and 2015.

SAGE (System for Administering Grants Electronically) has been upgraded to allow eGC1 approval using mobile devices. The system will recognize whether you are accessing from a computer or a mobile device so what you see on screen will be appropriate for the type of device. If you are on a mobile and want to see the full eGC1, you will need to toggle out of the approval screen.

Carol Rhodes has been appointed Interim Director of the Office of Sponsored Programs, replacing Lynne Chronister, who has left to become vice-president of research at South Alabama University.

Federal Budget cuts are mandated under the Budget Control Act (BCA) implemented by Congress a year ago (the 2011 debt ceiling crisis). You will recall that a special bipartisan committee was charged with identifying cuts. When they were unsuccessful, an automatic sequestration procedure was implemented, to begin January 2, 2013. Although it is still possible that Congress will take action, the UW Federal Relations Office has prepared a document explaining how the sequestration process will work; see <http://www.washington.edu/federalrelations/sequestration-what-it-means-for-federal-research-funding/>. The Office of Research has outlined some potential outcomes that we may see in 2013 as a result:

- 1) Across the board budget cuts for new awards in FY13, starting in January.
- 2) Reduction in project period that is funded. May lead to revised SOWs.
- 3) Request for revisions to proposed budgets at JIT (just-in-time).
- 4) Reduction in federal employees, due to furlough or other agency personnel cuts. This could reduce response times by sponsors.
- 5) Increase in outgoing proposals to both federal agencies and non-federal sponsors.
- 6) Awards with no funding (see example from CDC).
- 7) Delay or reduction in solicitations by federal agencies and less opportunities posted.
- 8) Agencies may not exercise options on some contracts.
- 9) Increased spending on sponsored programs in the first quarter of federal fiscal year (not subject to sequestration).

Opportunities

As much as possible, new opportunities will be sent directly to those faculty who are most apt to be interested in each announcement. To be most effective, you need to make sure that Sally Morgan (206-897-1754 or slm@uw.edu) is aware of the areas you are interested in, especially if you are seeking new areas or directions. The obvious source of interests is the faculty list on the SEFS website, but any additional guidance you can provide will make the targeting more effective.

Royalty Research Fund: the next deadline is September 24, 2012.

Awards April, 2012

Application Number: A73374
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Green Diamond Resource Company
Period: 1/1/2012 - 12/31/2012

Amount: \$22,727
Supplement and Extension

2012 Stand Management Coop Membership Dues for Green Diamond Resource Co.

Application Number: A74975
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: WA Department of Natural Resources
Period: 1/1/2012 - 12/31/2012
Amount: \$24,581
Supplement and Extension

2012 Membership Dues for WA State Dept of Natural Resources to Stand Management Coop.

Application Number: A74978
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Quinault Indian Nation
Period: 1/1/2012 - 12/31/2012
Amount: \$8,387
Supplement and Extension

2012 membership dues to Stand Management Coop from Quinault Indian Nation

Application Number: A75266
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: TimberWest - Coast Timberlands
Period: 1/1/2012 - 12/31/2012
Amount: \$36,553
Supplement and Extension

2012 Membership dues to Stand Management Coop from Timberwest

Application Number: A73474
Faculty Member: Jerry Franklin
Role: Principal Investigator
Title: **Wind River Field Station**
Agency: USDA Forest Service
Period: 2/1/2012 - 9/30/2016
Amount: \$120,000

Faculty Member: Ken Bible
Role: Co-Investigator

Non-Competing Supplement

This Joint Venture Agreement (JVA) between the UW and the USFS PNW Research Station is to conduct research and educational outreach activities at the Wind River Field Station (WRFS), formerly the Wind River Canopy Crane Research Facility. The purpose of the WRFS is to monitor key ecosystem processes and climate variables, develop new monitoring capabilities, provide management and oversight for ongoing projects and promote new research and educational/outreach activities. This project is to continue support of the UW's long-term monitoring of key ecosystem processes and climate variables, development of new monitoring capabilities utilizing the potential of the Climate Tower Network and to allow 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.

Application Number: A74958

Faculty Member: Richard Gustafson

Role: Principal Investigator

Title: **CORRIM**

Agency: Consortium for Research on Renewable Industrial Materials

Period: 1/10/2009 - 6/30/2013

Amount: \$106,719

Supplement and Extension

At both local and national scales, long term forest sustainability and the carbon consequences of biomass removal have emerged as critical issues in our decision matrix for climate change mitigation and energy security. Biomass removal rates for a forest area are sustainable if they can occur while maintaining or enhancing a range of forest conditions and inventory characteristics. Our objective is to identify sustainability criteria for biomass removal to constrain the amounts of biomass to be obtained under different forest treatments and conditions, link them to estimates of available biomass supply on a regional basis, use detailed site specific modeling efforts to begin to assess fragmentation issues and place those results in a carbon impact framework that takes into account the eventual use of the product.

The University of Washington has developed a decision support tool capable of extracting plot specific data from inventory databases such as the FIA database and simulating a range of treatment options across the entire landscape without the need to aggregate samples. Under the supervision of the Principal Investigator, Elaine Oneil, at the University of Washington, support will be provided to use this tool to develop woody biomass supply information for alternate forest treatments for the NE, and SE regions by owner, forest type, and treatment type constrained by regional sustainability criteria and to characterize the carbon consequences of a range of treatment options and uses for the material including comparisons of different uses for the material in such as way as to be useful input for the USFS climate scorecard process. For those regions where FVS- FFE provides for robust fire impact estimation, a range of assumptions about fire rates will be tested and integrated into carbon assessments.

Application Number: A75712

Faculty Member: Robert Harrison

Role: Principal Investigator

Title: **Effects of Organic Matter Retention & Management on Long-Term Productivity of Pacific Northwest Coastal Douglas-Fir Plantations**

Agency: National Council for Air and Stream Improvement
Period: 4/1/2012 - 3/31/2013
Amount: \$40,000
Supplement and Extension

The goal of this project is to gain a better understanding of the long-term consequences of various levels of organic removals, nutrient allocation, and soil compaction, as well as the appropriate ameliorative or growth enhancement treatments that can be used to sustain productivity through multiple rotations on the Pacific Northwest's most productive soils. Although N fertilization is commonly used in Pacific Northwest Douglas-fir stands for enhancing, it is not known to what extent organic matter will be enhanced by N fertilization through successive applications, or how it compensates for the nitrogen removed from the system through harvest. This study will begin to fill this critical data gap in the Pacific Northwest Region.

This amendment is to extend the MOA and supplement this project.

Application Number: A74280
Faculty Member: Thomas Hinckley
Role: Principal Investigator
Title: **Eastside Forest Health Forum**
Agency: USDA Forest Service
Period: 4/1/2012 - 3/31/2013
Amount: \$10,000
New

The purpose of this funding is to support the planning, management and facilitation, of the Water Markets from Sustainable Forestry Forum to be held in Seattle on April 16, 2012.

Application Number: A75002
Faculty Member: Thomas Hinckley
Role: Principal Investigator
Title: **2012 McIntire Stennis**
Agency: USDA
Period: 10/1/2011 - 9/30/2012
Amount: \$550,656
New

The McIntire-Stennis act of 1962 provides the basis for federal funding in forestry research and graduate education programs at state-certified schools of forestry in the United States. The School of Forest Resources, University of Washington, is eligible for McIntire-Stennis funding. This is a long-standing program, formerly administered by the Cooperative State Research, Education and Extension Service (CSREES); effective 10/1/2009, the program has been administered through the National Institute of Food and Agriculture (NIFA). Funds are used to conduct research in areas such as: (1) ecological restoration, (2) catastrophe management, (3) valuing and trading ecological services, (4) energy conservation, biomass and bio-based materials development; and (5) ways of fostering healthy forests and a globally competitive forest resources sector. At the University of Washington research will focus on: Forest management, coarse woody debris, and soil processes, wildlife use of managed forests,

modeling branch dynamics in coastal Douglas-fir and western hemlock plantations as affected by silvicultural treatments, understanding the systematics of commercial ornamental plants, and natural stand development in western coniferous forests. A proportion of the funds will be used for program administration.

Application Number: A71035
Faculty Member: Miranda Wecker
Role: Principal Investigator
Title: **Wild Salmon Center**
Agency: Wild Salmon Center
Period: 10/1/2011 - 2/15/2012
Amount: \$16,000
New

Project goal is to assist the Wild Salmon Center in creating a series of NetMap salmonid habitat intrinsic potential model analyses and maps for chinook, coho, steelhead, chum, and sockeye species in the Quiollayute, Hoh, Queets, and Bear rivers using a methodology that is transparent and replicable across the Washington Coast Salmon Recovery Region.

Awards, May, 2012

Application Number: A73573
Faculty Member: Jonathan Bakker
Role: Principal Investigator
Title: **Coordination of Protocol Reviews for Long-Term Monitoring in the Pacific West Region of the National Park Service**
Agency: USDI National Park Service
Period: 3/1/2012 - 12/31/2013
Amount: \$35,379
New

The Pacific West Region (PWR) of the National Park Service seeks expert assistance from Professor Jon Bakker at the University of Washington to function as the Protocol Review Coordinator (PRC) and accomplish the coordination, tracking, oversight, and synthesis of blind peer reviews for protocols associated with PWR Inventory and Monitoring (I&M) network monitoring plans over a period of several years. The Protocol Review Coordinator will contact and negotiate with academic reviewers, arrange for appropriate 'honoraria' to be paid, and synthesize review comments. The PRC in collaboration with the PWR I&M Program Manager (RPM) will make final decisions as to the adequacy of the submitted protocols according to their scientific merit and ability to meet management needs. Ensuring that scientifically credible long-term monitoring protocols are used on public lands is a core service from which the public benefits by gaining an understanding of the status of natural resources at any given time, and the long-term dynamics of species and communities as they vary with biological, climate, and human stressors over time.

Application Number: A75818
Faculty Member: Soo-Hyung Kim
Role: Principal Investigator

Title: **Development of a Process-based Plant Growth Model for Garlic**

Agency: National Center for Agricultural Meteorology

Period: 3/1/2010 - 12/31/2012

Amount: \$25,000

Non-Competing Supplement

Process-based crop simulation models have become an important tool for researchers who study crop responses to environmental changes as well as growers who need make economically and environmentally sound crop management decisions. Mechanistic crop models that are based on solid science can provide critical insights for understanding the linkages among individual components of the complex agroecosystems. These models can play a central role in developing adaptive solutions and strategies to sustain crop productivity while protecting the environment by optimizing resource management in a changing climate. Although numerous models have been developed and utilized for various major field crops, few models exist for specialty crops such as garlic. Garlic is an essential crop in many cultures and countries including Korea, United States, China, and European nations. The primary objective of this project is to develop a process-based crop simulation model for garlic by integrating up-to-date scientific knowledge and compiling experimental data on the physiology and ecology of this widely used, important specialty crop.

Application Number: A68188

Faculty Member: Aaron Wirsing

Role: Principal Investigator

Title: **Collaborative Research: Does Anti-predator Behavior Modify Indirect Effects of Top Predators?**

Agency: National Science Foundation

Period: 10/1/2012 - 9/30/2017

Amount: \$811,384

Resubmission

A recent review reveals that spatial responses to predators can vary with prey escape mode. By implication, predators could exert multiple and spatially opposing indirect effects on species serving as food for prey that are mediated by divergent spatial shifts of sympatric prey species with different means of escape. No study to date has explored this intriguing possibility. Accordingly, we propose to test whether recolonizing gray wolves (*Canis lupus*) in the Methow Valley of north-central Washington State, USA exert contrasting indirect effects on plants by inducing divergent winter habitat shifts by two sympatric herbivores – mule deer (*Odocoileus hemionus*) and white-tailed deer (*Odocoileus virginianus*) – with different escape tactics. Mule deer escape predators by stotting, a tactic that ostensibly provides an advantage against coursing predators over rugged terrain. In contrast, white-tailed deer escape predators with sprints that are most effective on gentle terrain with few obstacles. Thus, we predict that mule deer exposed to wolves will shift to, and forage more heavily in, shrub-steppe habitats where the terrain is broken, whereas white-tailed deer should shift to riparian habitats where the terrain is gentle. As a result, we expect that wolves will indirectly shelter plants growing in shrub-steppe habitats from white-tailed deer herbivory while exposing them to increased pressure from mule deer, and that these top predators will exert the opposite indirect effect in riparian habitats.

Awards, June, 2012

Application Number: A73366
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Roseburg Resources Company
Period: 1/1/2012 - 12/31/2012
Amount: \$22,869
Supplement and Extension

2012 Membership Dues payment to Stand Management Coop by Roseburg Forest Products

Application Number: A75911
Faculty Member: Charles Halpern
Role: Principal Investigator
Title: **Meadow restoration in the Oregon Cascades: Long-term responses to tree removal and fire**
Agency: USDA Forest Service
Period: 6/30/2012 - 8/31/2016
Amount: \$45,000
New

Project goal is to test whether large-scale restoration treatments (tree removal with or without fire) can reverse the ecological effects of encroachment by grand fir and lodgepole pine into dry, montane meadows in the Cascade Range of Oregon. Managers facing the worldwide phenomenon of tree invasion need to balance the ecological vs. operational need for fire in ecosystem restoration. Forest encroachment threatens the biological diversity of grasslands globally. Positive feedbacks between established and newly establishing trees can accelerate the process, with profound consequences for vegetation and soils. Our short-term (3-yr) observations suggest that there is strong potential for reversing these effects—with or without fire—even in areas in which trees have been present for well over a century. Given the equivocal role of fire in short-term responses, longer term assessments appear critical. It is not clear whether future recovery of native meadow systems will be limited by species' dispersal, interactions with residual forest herbs, or ongoing recruitment of conifer seedlings. The project will address these questions by re-examining patterns of vegetation recovery 7-8 yr after treatment.

Application Number: A76269
Faculty Member: Thomas Hinckley
Role: Principal Investigator
Title: **Center for Tropical Forest Science Workshop 2012**
Agency: Harvard University
Period: 5/1/2012 - 9/30/2012
Amount: \$17,818

New

Project will host, and manage logistics and financial aspects of the 2012 Center for Tropical Forest Science (CTFS) annual analytical workshops for students and scientists engaged in the global CTFS Network.

Application Number: A76376
Faculty Member: John Perez-Garcia
Role: Principal Investigator
Title: **Exploring the Economics of Forest Restoration**
Agency: USDA Forest Service
Period: 7/15/2010 - 12/31/2013
Amount: \$30,000
Supplement and Extension

The PNW Research Station's Urban Wildland Interaction Team (UWI) is developing a new program focusing on forest restoration economics. The purpose of this agreement is to generate, disseminate, and integrate economic analysis techniques into forest restoration activities in the Pacific Northwest region. Specifically, the objectives of this agreement 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.

Proposals April, 2012

Application Number: A75763
Faculty Member: Ernesto Alvarado
Role: Principal Investigator
Title: **Will climate change increase fire severity in the Pacific Northwest? Using regional fire years to anticipate fire severity in a warmer future**
Agency: USDI US Geological Survey
Period: 7/1/2012 - 7/1/2013
Amount: \$86,397
New

Fire is a key ecological disturbance in the Pacific Northwest (PNW) and fire frequency, area, and severity will likely be affected by climate change. To date, analysis of fire-climate relationships and projections of climate-driven changes in fire disturbances have focused on area burned or fire season length. As part of a regional science-management partnership on climate change adaptation in the North Cascades, state and federal agency resource managers identified a need for information on the effects of climate change on the ecological function of fire, which is difficult to infer from area burned or fire occurrence alone. Fire severity influences ecological processes and ecosystem services more directly. Climate and weather affect fire severity, especially in regional fire years (years with widespread synchronized fire), which typically have warm temperatures, dry fuels, and low relative humidity. The

climate that now occurs during regional fire years is projected to be more common in the PNW in the future, with warmer, drier summers and lower snowpack. Thus quantification of fire severity during recent regional fire years can provide an indication of future fire severity in the PNW by estimating the likelihood of having years in the future in which fire severity is driven principally by climate.

This research will address the following questions:

1. Does the proportion of area burned at low, moderate, and high severity change in regional fire years for forested and rangelands systems?
 2. Do spatial patterns of high-severity fire (e.g. patch size and arrangement) change in regional fire years in forested and rangelands systems?
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Application Number: A75233

Faculty Member: Renata Bura

Role: Principal Investigator

Faculty Member: Richard Gustafson

Role: Co-Investigator

Title: **Drinking water or Driving: technical, ecological, issues and policy in low water use to produce biofuels**

Agency: US Department of Energy

Period: 1/1/2013 - 12/31/2015

Amount: \$2,106,065

Pre-Application

Faculty Member: Joshua Lawler

Role: Co-Investigator

Faculty Member: Clare Ryan

Role: Co-Investigator

The overarching goal of this project is to successfully develop innovative, and environmentally and economically favorable technologies that will enable minimal water usage for biomass and biofuels production. In addition, we plan to use the outcomes of the integrated research program to assess the potential impacts of biomass and biofuels production on future water availability and terrestrial ecological systems. Ultimately, we plan to evaluate policy approaches and tools that could support sustainable water use in feedstock production and for conversion in biofuels facilities. The research has six main goals:

1. Develop biomass production strategies to minimize the impact on water resources.
 2. Develop low-water-use technologies appropriate for biomass-to-biofuels facilities.
 3. Complete a technical-economic assessment and LCA for biomass-to-biofuels facilities to identify opportunities for water recycling and use of low grade water.
 4. Provide a detailed assessment of large-scale water availability over the continental U.S. and growing conditions/water demand for biofuels crops production and processing.
 5. Assess the potential impacts of biomass and biofuels production on water availability and terrestrial ecological systems.
 6. Evaluate policy approaches and tools that could support sustainable water use in feedstock production and for conversion in biofuels facilities.
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Application Number: A75343

Faculty Member: Sharon Doty

Role: Principal Investigator

Title: **Dimensions: Diversity and Functional Importance of Endophytes of Pioneer Plants**

Agency: National Science Foundation

Period: 10/1/2012 - 9/30/2017

Amount: \$1,953,977

Faculty Member: Soo-Hyung Kim

Role: Co-Investigator

Competing Revision

There is currently a major gap in our understanding of how plants adapt to challenging environments. It has long been assumed that plants rely purely on specific genetic traits for successful adaptations. But how do perennial plants respond and adapt to rapid environmental changes such as fire, volcanic activity, shifts in rivers, or glacial retreats? How might they adapt quickly enough to survive rapid global climate changes? Recent evidence points to symbiosis with microbial partners as a critical mechanism for adaptation. The proposed project seeks to fill the substantial gap in knowledge of the microbial biodiversity within non-leguminous pioneer plant species and how this diversity is critical for the ability of plants to survive in challenging environments.

Application Number: A75266
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: TimberWest - Coast Timberlands
Period: 1/1/2012 - 12/31/2012
Amount: \$36,553
Supplement and Extension

2012 Membership dues to Stand Management Coop from Timberwest

Application Number: A75401
Faculty Member: E. David Ford
Role: Principal Investigator
Title: **Pioneer Seed**
Agency: Pioneer Hi-Bred International, Inc.
Period: 4/16/2012 - 4/15/2013
Amount: \$0
New

The sponsor regularly releases seeds to students for research projects for no charge. They do not have a proprietary interest in the research; nor do they provide any support other than supplying the seeds. However, they require that the institution sign a technology agreement which limits the usage by the student and the institution.

Application Number: A75470
Faculty Member: Jerry Franklin
Role: Principal Investigator
Title: **Integrated, observation-based carbon ecosystems in integrated into NASA's System**
Agency: Boston University
Period: 7/1/2012 - 12/31/2013
Amount: \$60,061
New

Faculty Member: Van Kane
Role: Co-Investigator

The project goal is to integrate methods and data products developed in an on-going carbon monitoring project into the on-going NASA Carbon Monitoring System (NASA ROSES 2011 A.45).

Through USDA-NIFA funded research, our team is developing a system to integrate Landsat satellite imagery, maps of environmental characteristics, Forest Inventory and Analysis (FIA) plot data, small-footprint lidar data, and aerial photos to characterize key carbon dynamics in forested ecosystems across all ownerships in the states of Washington, Oregon, and California from 1985 to 2010. Our system will provide explicit and transparent estimates of uncertainties in carbon stocks and changes.

Our objectives for the NASA Carbon Monitoring System are to: 1) bring our data, methods, and lessons-learned to NASA CMS Science Definition Team, and work closely with other SDT members to link our approaches into those analytical and modeling frameworks to further the overarching goals of the CMS. 2) Relevance at the national scale requires methods that are generalizable to other forest types and to ecosystems where different disturbance agents dominate. A key goal of this project will be to enhance our current methods and tools to provide accurate measurements of forest change, above ground carbon stocks, and error assessment to work with a wider range of forest types. We will use an East Coast site (currently planned to be the NASA Carbon System Maryland study site) to test and enhance our methods and tools as necessary to accurately measure current and past stocks of above ground carbon.

Application Number: A75712

Faculty Member: Robert Harrison

Role: Principal Investigator

Title: **Effects of Organic Matter Retention & Management on Long-Term Productivity of Pacific Northwest Coastal Douglas-Fir Plantations**

Agency: National Council for Air and Stream Improvement

Period: 4/1/2012 - 3/31/2013

Amount: \$40,000

Supplement and Extension

The goal of this project is to gain a better understanding of the long-term consequences of various levels of organic removals, nutrient allocation, and soil compaction, as well as the appropriate ameliorative or growth enhancement treatments that can be used to sustain productivity through multiple rotations on the Pacific Northwest's most productive soils. Although N fertilization is commonly used in Pacific Northwest Douglas-fir stands for enhancing, it is not known to what extent organic matter will be enhanced by N fertilization through successive applications, or how it compensates for the nitrogen removed from the system through harvest. This study will begin to fill this critical data gap in the Pacific Northwest Region.

This amendment is to extend the MOA and supplement this project.

Application Number: A75818

Faculty Member: Soo-Hyung Kim

Role: Principal Investigator

Title: **Development of a Process-based Plant Growth Model for Garlic**

Agency: National Center for Agricultural Meteorology

Period: 3/1/2010 - 12/31/2012

Amount: \$25,000
Non-Competing Supplement

Process-based crop simulation models have become an important tool for researchers who study crop responses to environmental changes as well as growers who need make economically and environmentally sound crop management decisions. Mechanistic crop models that are based on solid science can provide critical insights for understanding the linkages among individual components of the complex agroecosystems. These models can play a central role in developing adaptive solutions and strategies to sustain crop productivity while protecting the environment by optimizing resource management in a changing climate. Although numerous models have been developed and utilized for various major field crops, few models exist for specialty crops such as garlic. Garlic is an essential crop in many cultures and countries including Korea, United States, China, and European nations. The primary objective of this project is to develop a process-based crop simulation model for garlic by integrating up-to-date scientific knowledge and compiling experimental data on the physiology and ecology of this widely used, important specialty crop.

Application Number: A75369
Faculty Member: Joshua Lawler
Role: Principal Investigator
Title: **Climate Change Vulnerability in the Pacific Northwest: a Comparison of Three Approaches**
Agency: USDI US Geological Survey
Period: 9/1/2012 - 8/31/2014
Amount: \$117,538
New

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.

Application Number: A75332
Faculty Member: L. Monika Moskal
Role: Principal Investigator
Title: **City of Snoqualmie Canopy Cover**
Agency: Pending - OSP to be notified
Period: 5/15/2012 - 9/15/2012
Amount: \$5,998
New

The City of Snoqualmie has taken many steps is to make conservation and environmental sustainability a priority. We recognize that one of the key focal components to this is the City's sustainability initiative; a set of actions that includes an urban tree canopy program. This project would provide a sound scientific basis for ongoing regulation and management of the urban tree canopy by establishing an urban forest

canopy baseline as a basis for setting future management goals for Snoqualmie's urban tree canopy and a tool to measure progress towards those goals. We propose using object based image analysis (OBIA) to map tree canopy and other cover types within the City of Snoqualmie. Traditional remote sensing techniques are not generally appropriate for assessing complex scenes like that of urban areas using high resolution imagery. The recent development of object-based image analysis (OBIA) offers a new cost-effective approach to observing environmental changes at a fine scale. While traditional pixel-based remote sensing techniques use the spectral (color) information of an object to classify individual pixels, object-based image analysis mimics the way that humans identify objects through pattern recognition. Because OBIA uses additional feature characteristics of an object, not just the spectral characteristics, it can be used on high resolution imagery with limited spectral information such as aerial imagery. This can both improve accuracy results and allow us to map very small urban features, such as mature individual trees or small clusters of shrubs. We will prepare a final report that will include maps and a detailed summary of the methods used to map tree canopy in the City of Snoqualmie. The technical report will describe: (i) the steps taken, assumptions and decisions made in developing this product, and appropriate quality and accuracy measures; (ii) an evaluation of the advantages and limitations of this methodology for tree canopy assessment; and (iii) specific recommendations on inputs, analyses and outputs (with appropriate justifications) to use for interpretation of the results and future analysis.

Application Number: A75780

Faculty Member: Clare Ryan

Role: Co-Investigator

Title: **Environmental and human dimensions science to support sustainable geoduck aquaculture**

Agency: National Oceanic and Atmospheric Administration

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

Amount: \$341,032

Competing Supplement

Pacific geoduck clams (*Panopea generosa*) have been cultured in intertidal environments of Puget Sound on a commercial scale since 1996. Annual cultured production value now exceeds \$20 million with potential for considerable expansion on privately owned tracts and public lands managed by the State of Washington. However, advancement of geoduck aquaculture (where advancement is defined as moving toward socially and environmentally responsible practices that are economically viable) is complicated currently by a complex permitting process, limited scientific information to guide decision-making, and vocal public opposition. Initial research findings conducted under the legislatively mandated Geoduck Aquaculture Research (GAR) Program in Washington indicate some environmental impacts of existing industry practices. Additional investment is required to apply alternative analytical procedures to GAR Program data, evaluate extrapolation of results to larger spatial scales and to apply results in policy and management contexts. Critics of the industry continue to appeal permit applications and identify the need to address uncertainties regarding the broader ecosystem effects of continued expansion, particularly as they relate to iconic taxa such as salmon, in the Pacific Northwest US. Given the contentious nature of the issue and requirements of resource managers, provision of best available ecosystem science must be coupled with an understanding of relevant human dimensions including analysis of the existing regulatory framework and accommodation of stakeholder perspectives.

Our overall project goal is to synthesize best available science on ecological and human dimensional aspects of geoduck aquaculture in Puget Sound to inform sustainable management and address

stakeholder concerns. Some specifics of the methodologies employed are indicated within objectives of project elements as follows:

ELEMENT 1: Analyses and Reporting of GAR Program Results

- Provide robust analyses of data collected to examine the ecological effects of planting and harvest disturbances associated with geoduck aquaculture using multivariate autoregressive state space statistical methods and Bayesian numerical methods.
- Provide epidemiological information on geoduck parasites and disease, by applying multivariate and univariate statistical techniques to explore patterns of geoduck pathogen presence and abundance in relation to locale, water depth, and season.
- Compile results of the GAR Program on ecosystem impacts associated with geoduck aquaculture, and disseminate findings to stakeholders.

ELEMENT 2: Human dimensions research and modeling efforts to facilitate decision-making.

- Identify stakeholder interests and concerns, examine areas of consensus and dissent, and provide information necessary for developing a conflict resolution framework useful to decision makers
- Leverage existing resources by using existing infrastructure and data in a widely accepted modeling framework to explore the ecosystem-level consequences of industry expansion

ELEMENT 3: Integration of ecological and social science to support management

- Integrate available ecological and social science research to provide holistic understanding of the impacts of geoduck aquaculture and effective management response.
-

Application Number: A75473

Faculty Member: Kristiina Vogt

Role: Principal Investigator

Faculty Member: Daniel Vogt

Role: Co-Investigator

Faculty Member: Sandor Toth

Role: Co-Investigator

Faculty Member: John Perez-Garcia

Role: Co-Investigator

Title: Feedstock development, technology refinement and sustainable product assessment of liquid fuels from forest wastes and oil crops in Washington and Oregon

Agency: US Department of Energy

Period: 8/3/2012 - 8/2/2015

Amount: \$5,375,113

Pre-Application

The proposed project will simultaneously address the life-cycle of feedstock development, biofuels and bio-based products biomass-conversion technology development, and biofuels and bio-based products development analysis. The proposed project has nine objectives and five of the major objectives are summarized here: (1) to develop tools for evaluating the soil and climatic thresholds of biomass waste collection from federal, industrial and tribal forest and agricultural lands in Oregon; (2) to develop a streamlined process for linking the harvest, handling, preprocessing, transport and storage of liquid fuels compatible with our indirect liquefaction technology; (3) to refine the indirect liquefaction technology to increase liquid fuel production from lignocellulosic wastes; (4) to evaluate the sustainable feedstock availability for biofuels for rural energy production using an approach which includes environmental, economic and social parameters; and (5) develop a novel private and public partnership to coordinate the development of biofuel enterprises. These factors will be integrated using the internationally developed 'Roundtable for Sustainable Biofuels' approach, LCA, economic modeling, and forest certification to evaluate the human development benefits of rural biofuel production from locally available lignocellulosic wastes. Multiple-objective mathematical programming will be used in conjunction with a bidding/voting mechanism called Ecosel, to examine the tradeoffs behind the competing uses of feedstock resources and to derive the optimal design of the proposed liquid fuels

production system with respect to cultural, economic and environmental objectives. Lastly, we will perform policy analyses in an attempt to inform legislation to increase the commercialization and development of business entrepreneurs in bio-energy in rural areas. Legislative bio-energy work can be used to identify where and what type of incentives could expand the biofuels industry in rural areas.

Proposals May, 2012

Application Number: A76092

Faculty Member: Ivan Eastin

Role: Principal Investigator

Title: **Potential for the Lacey Act to Expand International demand for US Wood Products**

Agency: USDA

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

Amount: \$80,378

New

Faculty Member: Indroneil Ganguly

Role: Co-Investigator

The recent adoption of timber legality legislation in the US requiring that all timber imports be sourced from legally harvested wood provides an opportunity to expand exports of sustainably managed US wood products to China. Unfortunately, industry awareness of these regulatory changes and their potential impact on the competitiveness of US forest products is low, particularly among small and medium-sized manufacturers (SME's) and exporters who often lack the managerial resources and expertise to track and analyze changing market conditions. The Center for International Trade in Forest Products proposes to implement a program of market research and extension activities designed to assist SME's and native American enterprises understand and adapt to these changing market conditions and identify export opportunities in new and emerging market segments in China. Specifically we propose to: 1) analyze timber legality policies and their impact on the competitiveness of US forest products to assist policymakers and industry managers understand and respond to these policies and 2) conduct market research to identify new and emerging markets for US wood products in China. This project addresses the main program scope described in the FAS EMP RFP: "to support export market development efforts of the private sector" and "provide assistance to teams consisting primarily of U.S. individuals expert in assessing the food and rural business systems of other countries".

Application Number: A76427

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: 8/1/2012 - 12/31/2014

Amount: \$140,000

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.

Application Number: A75032
Faculty Member: Dean Glawe
Role: Principal Investigator
Title: **WSU Admin Budget**
Agency: Washington State University
Period: 7/1/2006 - 7/31/2014
Amount: \$0
Non-Competing Renewal

Fungi are of tremendous economic and ecological importance. Throughout history they have caused enormous economic damage and human suffering in situations ranging from the Irish potato famine of the mid-19th century (Large, 1962) to the ongoing Sudden Oak Death problem in the Pacific Coast states (Davidson et al., 2003). Permanent, drastic changes to North American ecosystems and landscapes resulted from the introduction of exotic fungal pathogens causing White Pine Blister Rust, Chestnut Blight, and Dutch Elm Disease (Agrios, 1988). Fungi also can be serious pathogens on animals, including humans, (Alexopolous, et al., 1996). Molds and related fungi increasingly are recognized as major causes of indoor air-quality problems such as "sick building syndrome" (Graveson et al., 1999; Vesper et al., 2000). Although much attention is paid to the roles of fungi as pathogens and spoilage organisms, they also are economically valuable as sources of food (Alexopoulos et al., 1996), pharmaceuticals, and food ingredients (Demain and Solomon, 1985). They also are essential in natural ecosystems as decomposers and symbionts with insects, other animals, microbes, and plants (Alexopolous, 1996).

Application Number: A76116
Faculty Member: Thomas Hinckley
Role: Principal Investigator
Title: **Memorandum of Understanding between USGS Forest and Rangeland Ecosystem Science Center (FRESC) the University of Washington**
Agency: USDI US Geological Survey
Period: 5/10/2012 - 5/9/2017
Amount: \$0
New

This Memorandum of Understanding will serve as the basis for developing procedures for cooperation and partnership between the USGS and the University. This Memorandum is entered into to continue the cooperative relationship between the University and the Department of Interior. This relationship was originally established by the National Park Service, continued by National Biological Survey and subsequently USGS, due to the transfer of the research responsibility within the Department of Interior. Specifically, this Memorandum provides for the continuation of the Federal field station now identified as the Cascadia Field Station (hereafter known as the Station) and the research originated under the

National Park Service/National Biological Survey Agreement CA 9000-8-0007/1445-0009-94-1 118, and to facilitate and conduct new research of mutual benefit.

Application Number: A76269

Faculty Member: Thomas Hinckley

Role: Principal Investigator

Title: **Diversity and forest change: Characterizing functional, phylogenetic and genetic contributions to diversity gradients and dynamics in tree communities**

Agency: Harvard University

Period: 5/1/2012 - 9/30/2012

Amount: \$17,818

New

The University of Washington (UW) School of Environmental and Forest Sciences (SEFS) will host the 2012 Center for Tropical Forest Science (CTFS) annual analytical workshops for students and scientists engaged in the global CTFS network. This project is to manage the logistics and financial aspects of the workshops.

Application Number: A76123

Faculty Member: Soo-Hyung Kim

Role: Principal Investigator

Title: **Development and Dissemination of Agro-meteorological Information Systems**

Agency: Rural Development Administration (RDA)

Period: 6/1/2012 - 12/31/2013

Amount: \$103,400

New

The objective of this collaborative project is to 1) provide and disseminate agro-meteorological information for climate change adaptation in agricultural communities, and 2) develop tools to couple agro-meteorological data products with agricultural systems models for secure and sustainable agricultural productivity in a changing climate. Critical components in the proposed research are to 1) survey and collect existing data products for provision of agro-meteorological information services and link them with agricultural models, 2) link the agro-meteorological data with agricultural production models, and 3) test model performance, apply the models for current and future climate scenarios, and disseminate relevant agro-meteorological information and model outputs.

Application Number: A76477

Faculty Member: L. Monika Moskal

Role: Principal Investigator

Title: **SPATIOTEMPORAL ASSESSMENT OF WETLANDS AND PONDS IN DOUGLAS CO**

Agency: Foster Creek Conservation District (FCCD)

Period: 6/1/2012 - 6/30/2013

Amount: \$174,808

New

The watershed wide project will include mapping the hydroperiod (inundation timing and duration) of wetlands and will be used to classify wetland types. The project will also measure and quantify changes to the hydroperiod and composition of wetland types in the watershed over the last forty years. Using this information the project will assess the dependence of individual wetlands and ponds on groundwater. The project will also assess the presence of vernal pools not tied to groundwater, but to temperature and precipitation patterns. The diversity of species in vernal pools surveyed elsewhere is extremely high, and includes large numbers of endemic invertebrate species. These pools have the potential to be greatly affected by climate change. The assessment will provide knowledge for development of strategies to conserve the biodiversity supported by these systems, and prioritize and/or help stratify wetlands for further study and conservation action. The project will publish the resulting wetland inventory through an interactive online map

Application Number: A76376
Faculty Member: John Perez-Garcia
Role: Principal Investigator
Title: **Exploring the Economics of Forest Restoration**
Agency: USDA Forest Service
Period: 7/15/2010 - 12/31/2013
Amount: \$30,000
Supplement and Extension

The PNW Research Station's Urban Wildland Interaction Team (UWI) is developing a new program focusing on forest restoration economics. The purpose of this agreement is to generate, disseminate, and integrate economic analysis techniques into forest restoration activities in the Pacific Northwest region. Specifically, the objectives of this agreement 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.

Application Number: A76587
Faculty Member: John Perez-Garcia
Role: Co-Investigator
Title: **Forest Biomass Supply Assessment**
Agency: WA Department of Natural Resources
Period: 11/17/2010 - 6/30/2012
Amount: \$21,070
Supplement and Extension

Our work plan strategy consists of (i) building upon the existing Washington State Forestland Database to provide a flexible platform for modeling and supply assessment, (ii) utilizing the modeling and assessment expertise at the University of Washington and (iii) capitalizing on TSS Consultant's capacity to provide technological and economic knowledge of biomass resource collection and utilization alternatives.

Application Number: A76353

Faculty Member: Fernando Resende

Faculty Member: Richard Gustafson

Role: Principal Investigator

Role: Co-Investigator

Title: **Bio-Oil Upgrade to Naphtenes for FCC Cracking**

Agency: US Department of Energy (DOE)

Period: 1/1/2013 - 12/31/2015

Amount: \$622,283

New

In the concept of a biorefinery, lignocellulosic biomass is used as feedstock to generate the fuels and chemicals that our society needs. Substantial research efforts are currently being devoted to the development of technologies that will be part of the future biorefineries. Until the biorefineries are structured and well established, one short-term and promising solution for the use of biofuels is their insertion into the existing oil refineries. Bio-oils produced from fast pyrolysis are a viable candidate for this purpose. However, bio-oil has a high oxygen content that makes it incompatible with the infrastructure of oil refineries, and therefore must be upgraded. The goal of this work is to upgrade bio-oil from catalytic fast pyrolysis for use in Fluid Catalytic Cracking (FCC) in an oil refinery. Catalytic fast pyrolysis with zeolite catalysts (mostly HZSM-5) produces a bio-oil rich in aromatic hydrocarbons. In this project, we will produce bio-oil via catalytic fast pyrolysis and upgrade the aromatic hydrocarbons to naphtenes (cycloalkanes) via hydrogenation. The naphtenes produced can then be used in oil refineries, being converted into a range of valuable aliphatic hydrocarbons via FCC. An LCA study will be conducted to evaluate the life cycle environmental impacts and resources required for the production of drop in fuels using this approach.

Proposals June, 2012

Application Number: A76741

Faculty Member: Stanley Asah

Role: Principal Investigator

Title: **Communicating and Reaching out About Forest Fires and Smoke: A Social Marketing Approach to Attitude Change**

Agency: USDA Forest Service

Period: 5/17/2012 - 12/31/2014

Amount: \$40,000

New

This proposal will expand our understanding of public perceptions of the tradeoffs between fuel treatments, smoke, and wildfire risk in diverse community settings. Dr. Stanley Asah of the University of Washington is currently conducting focus groups with managers, Yakima Tribal members, and public stakeholders in communities around the Okanogan-Wenatchee NF. The results will be used to identify how different segments of the public view prescribed fire, wildfire, and smoke, and to develop targeted messages, workshops, and other outreach methods to help improve fire managers' consideration of public perceptions and attitudes. But the social and political acceptability of fire is context dependent (Wigand 2012). This focus area project will replicate the study on the Mt. Hood NF to allow us to identify and compare a broader array of manager and stakeholder perceptions and outreach needs. We propose the Mt. Hood because it is an urban forest that conducts fuel treatments in both wet and dry forest types. This will enable comparisons between urban and rural perceptions of fire and smoke, and expand our design and execution of attitude and behavior change strategies. Comparing results from the Mt.

Hood with the Okanogan-Wenatchee presents a unique opportunity to compare a diverse mosaic of different types of urban, suburban, agricultural, and amenity-based communities. The Mt. Hood also abuts the Warm Springs Indian Reservation, which will enable comparisons with Forest Service managers, and also with Yakima tribal natural resource managers who were interviewed for the Okanogan-Wenatchee focus groups.

This will be the first study of this type ever conducted. It meets several fire focus area goals. Results will provide an in-depth understanding of key social and ecological contexts of fire settings found in the Pacific Northwest, and addresses the need for an “all lands” approach to fire management in complex social-ecological systems. Training and outreach materials will help managers increase collaboration and trust with landowners and communities, and help deliver fire knowledge and tools.

Application Number: A76511

Faculty Member: Stanley Asah

Role: Principal Investigator

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

Agency: USDA Forest Service

Period: 10/1/2010 - 12/31/2014

Amount: \$15,000

Non-Competing Supplement

Stewardship organizations continue to emerge and some blossoming across the Seattle-Tacoma area. These organizations are of various types, private, community-based, nonprofit, and governmental (city, county, state, federal, etc.). They seek to accomplish a variety of goals including restoration of degraded ecosystems and neighborhoods, preserving desired social-ecological conditions and landscapes, sustainable design, community coherence and bonding, etc. Preliminary examination of the missions of these stewardship organizations suggests that two dimensions of motivations, ecological and social, influence the creation and operation of these organizations. There are preliminary indications that both social and ecological motivations have equal influences on involvement and participation in these organizations and their activities. However, there is less thorough empirical evidence supporting this suggestion. Knowledge of what and to what degree motivates involvement and participation will enhance efforts to create and sustain stewardship within and beyond the Seattle-Tacoma area.

The Pacific Northwest Station of the USDA Forest Service is exploring various facets of stewardship organizations within the Seattle-Tacoma area as part of the Green Cities Research Alliance (GCRA). 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. A secondary goal of the Pacific Northwest Station’s efforts is to facilitate transferability of insights that may foster stewardship towards achieving social-ecological sustainability goals across the nation. 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.

Using the database of over 700 stewardship and sustainable design organizations within the Seattle-Tacoma area, this study will:

(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.

Application Number: A77630

Faculty Member: Sally Brown

Role: Principal Investigator

Title: **Biosolids Information and Education Program**

Agency: Northwest Biosolids Management Association

Period: 7/1/2012 - 6/30/2013

Amount: \$114,300

Supplement and Extension

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.

Application Number: A77547

Faculty Member: Douglas Deur

Role: Principal Investigator

Title: **Cultural Landscape Inventory of the Chulitna River-Sixmile Lake Area**

Agency: USDI National Park Service

Period: 8/15/2011 - 8/13/2014

Amount: \$68,310

Non-Competing Supplement

This project is a collaborative effort to conduct consultation, planning, and completion of a Cultural Landscape Inventory (CLI) for the Chulitna River-Sixmile Lake area within Lake Clark National Park and Preserve (LACL). The Chulitna-Sixmile Lake cultural landscape is important to present-day Dena'ina and may be threatened by proposed development in the immediate area. For the past 100 years, the people of Nondalton have largely derived their subsistence fish, game, and water fowl from the Chulitna River and Sixmile Lake drainages. Archeological sites in the nearby Kijik National Historic Landmark Archeological District document sites associated with at least 900 years of Dena'ina history. A CLI will be undertaken to document the entire array of historic and contemporary resources of cultural significance to the Dena'ina in the Chulitna and Sixmile drainages, including the Tazimina River and the upper Newhalen River. This effort will be supported by a current partnership between LACL and the Nondalton

Tribal Council to complete an Integrated Resource Management Plan for the study area. National Park Service (NPS) staff will work with University of Washington (UW) in planning the initial consultation with the state of Alaska, Nondalton Tribal Council, the Kijik Corporation, and other interested tribes. UW staff will be responsible for data collection and analysis, and will produce a final report in collaboration with NPS. The CLI can be used by park associated tribes to support their efforts to identify and preserve traditionally significant resources. The project report and products can be used by other NPS units and other resource management agencies as a template to help inventory important ethnographic landscapes.

Application Number: A75832
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Cooperative**
Agency: Oregon Department of Forestry
Period: 1/1/2012 - 12/31/2012
Amount: \$37,517
Supplement and Extension

2012 Membership Dues to Stand Management Coop from Oregon Department of Forestry, State of Oregon.

Application Number: A77665
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Pilchuck Tree Farm
Period: 1/1/2012 - 12/31/2012
Amount: \$11,672
Supplement and Extension

2012 Membership Dues to Stand Management Coop from Pacific Denkmann Tree Farm

Application Number: A75042
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Establishing the Mount Rainier Institute at the Center for Sustainable Forestry at Pack Forest**
Agency: USDI National Park Service
Period: 5/25/2012 - 11/30/2014
Amount: \$30,000
New

This collaborative project will lay the groundwork for a partnership between Mount Rainier National Park (MORA) and the University of Washington (UW) to plan and launch a residential environmental education program entitled "The Mount Rainier Institute." The Institute will initially provide residential environmental education programs and services for school children during the school year but, over time, will grow to include year round programming for families and adult learners. In particular, the

Institute will emphasize programming and services designed to address two key societal issues: 1) engaging diverse youth in outdoor and environmental education potentially leading to higher education and career pathways in related fields; and 2) increasing youth competency in math and science, particularly among traditionally underrepresented students. The Institute will be located at the University of Washington's Center for Sustainable Forestry at Pack Forest. This facility is just 30 minutes from Mount Rainier National Park. Students will benefit not only from the opportunity to study forest ecology and management at Pack Forest—a research and demonstration forest showcasing various best practices in forest management—but also from the opportunity to make multiple visits to MORA and other regional destinations to learn about geology, ecology, Northwest heritage, and sustainability in magnificent outdoor classrooms. During Phase 1 of this project (FY 2012), the UW and National Park Service will work together to hire a Program Manager to oversee the development of a business plan for the implementation and operation of the Institute. The business plan will assess the feasibility of the project and describe components including, but not limited to, the following: 1) Institute mission, purpose and goals; 2) partner roles and responsibilities; 3) curriculum development; 4) costs of facilities, utilities, and other supporting infrastructure; 5) staffing and human resources; 6) marketing and advertising; 7) potential audience; and 8) budget (income and expenditures). This Task Agreement funds Phase 1. Phase 2 (FY 2013) will be devoted to preparations for the first year of operations based on the recommendations emerging from the business plan. This will include activities such as: procuring funding; developing curriculum; and completing marketing materials. Phase 3 (FY 2014) will involve logistical preparations for operation of the Institute: setting up business administrative structure and systems; hiring instructors; logistical preparations (i.e., transportation, facilities, and equipment); and student registration. The result will be full implementation of a world-class environmental education program beginning in the fall of 2014.

Application Number: A77471

Faculty Member: Jerry Franklin

Role: Principal Investigator

Faculty Member: Jim Lutz

Role: Co-Investigator

Faculty Member: Van Kane

Role: Co-Investigator

Title: **Relationship between Fire History and Forest Structure at Crater Lake National Park Using LiDAR**

Agency: USDI National Park Service

Period: 9/1/2011 - 10/1/2014

Amount: \$3,948

Non-Competing Supplement

There is a strong need for research at Crater Lake National Park and other parks aimed at quantifying long-term effects of fire on forest structure across broad spatial scales to facilitate the development and evaluation of fire management objectives. The goal of this research is to use existing LiDAR data to understand how time-since-fire (TSF) and fire severity controls patterns of forest structure development across elevation and compositional gradients. This research directly addresses three key impediments related to the successful implementation and monitoring of fires for resource objectives. First, the data will provide the basis for evaluating the effectiveness of contemporary fires at restoring and/or maintaining landscape-scale forest structures. Secondly, it allows fire managers to develop relationships between burn severity signatures and long-term successional probabilities for modeling future landscape patterns. Third, spatially explicit data on forest structure will be useful for managing for a wide variety of resource goals such as wildlife habitat or watershed health for endangered fisheries.

Our specific research objectives are: (1) Determine how post-fire development of forest structure varies along gradients of elevation, fire severity, and TSF by directly mapping stand development stage, canopy height, height to live crown, canopy vertical structure, basal area, and gap and patch size; (2) Compare forest and patch structures created by contemporary wildland fires with pre-20th century fires; (3) Develop park-wide atlases of fire severity measurements and forest structural attributes.

Application Number: A76394

Faculty Member: Jerry Franklin

Role: Principal Investigator

Faculty Member: Jim Lutz

Role: Co-Investigator

Title: **Validating Forest Inventories and Biomass Estimates using LiDAR**

Agency: UC Davis Medical Center and Children's Hospital

Period: 7/1/2012 - 12/31/2012

Amount: \$247,650

New

Faculty Member: Van Kane

Role: Co-Investigator

We propose to use research-level LiDAR analysis to test and validate FIA site level biomass estimates for forests in California, Oregon and Washington having different species composition and structure. We will validate the LiDAR estimates using four extensive fully stem-mapped sites from two different biomes (western Cascades and Sierra Nevada) and two more extensively sampled areas. This analysis will provide an independent estimate of FIA biomass accuracy and test the significance of structural attributes in error estimation. The accuracy tested LiDAR data will be used to produce spatially explicit carbon biomass estimates for the full extent of the flightlines using existing LiDAR data from California and west coast forests and new LiDAR data that will be acquired in the 2012-2013 period overlapping with this study. These LiDAR datasets will be used to test and validate NASA's California prototype Carbon Monitoring System (CMS) biomass product, produced for the CMS team, headed by our collaborator, Dr. Sassan Saatchi at JPL. The large extent of the data, combined with the high spatial resolution, will allow comparison of subpixel variability and how these affect the accuracy of the CMS at the prototype's scale (250m pixels).

Post-doc Kane and Research Scientist Lutz will contribute to the development of biomass estimates from the LiDAR point clouds using statistical methods. Error assessments will be created organized by forest biome and forest structure type. They will be responsible for identifying potential contributing factors to differences between LiDAR-derived and CMS-derived biomass estimates. They also will contribute to the management and use of the LiDAR and field data for the larger study areas used in this project.

Application Number: A76335

Faculty Member: Jerry Franklin

Role: Principal Investigator

Title: **Wind River Field Station**

Agency: USDA Forest Service

Period: 10/1/2011 - 7/31/2016

Amount: \$95,000

Non-Competing Supplement

Faculty Member: Ken Bible

Role: Co-Investigator

This Joint Venture Agreement (JVA) between the UW and the USFS PNW Research Station is to conduct research and educational outreach activities at the Wind River Field Station (WRFS), formerly the Wind River Canopy Crane Research Facility. The purpose of the WRFS is to monitor key ecosystem processes and climate variables, develop new monitoring capabilities, provide management and oversight for ongoing projects and promote new research and educational/outreach activities. This project is to continue support of the UW's long-term monitoring of key ecosystem processes and climate variables, development of new monitoring capabilities utilizing the potential of the Climate Tower Network and to allow 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.

Application Number: A76967

Faculty Member: James Fridley

Role: Principal Investigator

Title: **SmartWEPP: A New Generation Water Management Tool Using Mobile Technologies**

Agency: USDA

Period: 9/16/2012 - 9/16/2016

Amount: \$439,544

New

This study will develop SmartWEPP, a water management tool using smartphone technology for improving site-specific local decision-making. SmartWEPP will be based on the USDA's Water Erosion Prediction Project (WEPP) model of which interface is currently under development for online geospatial information system (GIS) application. SmartWEPP will allow in-field professionals, stakeholders and interested general public to estimate watershed discharge and sediment yield with minimum amount of inputs, using built-in global positioning system (GPS) within smartphones, a complex hydrology model, and comprehensive online database on a public server.

Specifically, we propose to (1) engage stakeholders to further develop our understanding of (a) how they use 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) improve and develop online GIS WEPP interfaces and database that are specifically designated for the smartphone applications; (3) develop smartphone applications for three major smartphone platforms (Android, Symbian, and Apple); (4) acquire the stakeholders' feedback on the developed smartphone applications and further improve them; (5) disseminate and transfer information and technology derived in this study to stakeholders and decision-makers through various technology transfer venues, including a website, classroom education, extension programs, workshops, conferences, and peer-reviewed publications.

Application Number: A76033

Faculty Member: L. Monika Moskal

Role: Principal Investigator

Title: **BROAD SCALE STAND ESTABLISHMENT OF RESEARCH PLOTS FOR INVENTORY AND TREE SPECIES IDENTIFICATION USING LIDAR**

Agency: USDI Bureau of Land Management

Period: 5/1/2012 - 5/1/2014

Amount: \$130,000

Supplement and Extension

PROJECT SUMMARY: 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 laser scanning have become invaluable datasets for precision forestry applications. This project will establish a 2-state sampling system acquiring individual decimeter tree mapping with real-time positioning using Global Positioning System (GPS) for forest inventory (and potential species identifications) at the Rouge River research sites in the state of Oregon, for the purpose of acquiring individual tree location from lidar data, forest inventory driven habitat assessment and leaf area. Field plot data will be specifically utilized for extraction of Lidar-driven inventories and compared to traditional methods of forest inventory. Moreover, the new innovative aspect of the research proposed in this project will focus on deriving forest inventories, leaf area and tree species information from lidar for habitat assessment. This will serve as the basis for future work to use the data to calibrate other remote sensing approaches as well as explore additional potential of the data in conjunction with the wide array of scientific project at the Rouge River research site.

Application Number: A77661

Faculty Member: Luke Rogers

Role: Principal Investigator

Title: **Data processing and field sample design for Medford, OR LIDAR acquisition and related modeling to characterize forest structure**

Agency: USDA Forest Service

Period: 7/1/2012 - 6/30/2017

Amount: \$55,000

New

The primary purpose of the proposed project is to process LIDAR point data and canopy surfaces to derive descriptive statistics for a LIDAR acquisition centered on Medford, OR. The area covered by the acquisition (approx. 1,000,000 acres) includes federal land managed by the Bureau of Land Management (BLM) and USDA Forest Service (USFS) as well as privately-owned lands. In addition, SEFS will apply a LIDAR-optimized sampling protocol, built on earlier work by Hawbaker et al. (2009) and a prior SEFS-PNW project, to develop sample locations (plot locations) that sample the full range of variability in forest types over the acquisition area. Finally, SEFS will use survey-grade GPS receivers to collect accurate locations for plots in various study areas (not in the Medford, OR area) to support additional analysis being conducted by PNW scientists.

Application Number: A49412

Faculty Member: Clare Ryan

Role: Co-Investigator

Title: **Kids in the Woods leads to Adults in the Woods: The role of childhood experiences in enduring Involvement in nature-based activities and environmental stewardship**

Agency: USDA Forest Service

Period: 8/1/2009 - 3/31/2014

Amount: \$40,000

Transfer from Another Institution

Project goal is an empirical analysis of role of various childhood experiences with the outdoors in constraints-negotiation and enduring involvement in nature-based activities. The issue of reconnecting people, especially children, with nature is at the core of the project. The Forest Service's "Kids in Woods" initiative states: "Growing evidence shows that today's children are gravitating away from outdoor experiences and towards a virtual indoor reality. This disconnect from nature has serious long-term implications for the health and well-being of nation's children and future stewardship of our public lands. Approaches employed in current and previous efforts to get kids in the woods include school programs, after school programs, family activities, summer camps, etc. Project will determine the relative significance of each of these approaches by examining the mechanisms through which present adult nature-based participants were exposed to specific nature-based activities as children.

Application Number: A76939
Faculty Member: Miranda Wecker
Role: Principal Investigator
Title: **Data entry and Committee Facilitation Support**
Agency: Clallam County
Period: 1/1/2012 - 6/30/2012
Amount: \$22,124
Non-Competing Supplement

The North Pacific Coast Lead Entity (NPCLE) requires technical assistance for entering new and historical project information into the Habitat Work Schedule (HWS) program it utilizes as a monitoring and public access portal for its contracted activities with the Salmon Recovery Funding Board.

The North Pacific Coast Marine Resources Committee (NPC MRC) requires public meeting facilitation support for researching and preparing meeting materials and documenting and preparing meeting records.

Olympic Natural Resources Center (ONRC) will provide NPCLE with professional services necessary to compile historical watershed and salmon restoration project records undertaken in WRIA 20 and to enter this information into the HWS on-line data portal. They will also provide meeting facilitation support in the form of researching and compiling meeting documents and assisting in documentation of meeting proceedings for the North Pacific Coast Marine Resources Committee.

Application Number: A77277
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 - 6/30/2013
Amount: \$55,000
New

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" (NPCLE) 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 Quinault 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.

Application Number: A76616
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 - 6/30/2013
Amount: \$67,385
New

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 Quinault 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.

Application Number: A76673
Faculty Member: Aaron Wirsing
Role: Principal Investigator
Title: **The effects of environment and animal behavior on reliability of Argos satellite telemetry locations for wolverines in the North Cascades of Washington**
Agency: USDA Forest Service
Period: 3/16/2012 - 9/24/2012
Amount: \$20,668
New

Use of automated telemetry systems, particularly Argos-compatible satellite transmitters, to track wide-ranging terrestrial species in remote areas has become widespread in recent years as systems become more affordable and improvements are made in transmitter design, satellite constellation, and data-processing techniques. However, there has been little published research evaluating Argos location reliability in terrestrial systems, and none with the new Kalman filtering algorithm. The North Cascades wolverine (*Gulo gulo*) program uses Argos-compatible collars to track its animals in an area characterized by highly variable vegetation and topography that may in turn have variable effects on Argos location reliability. My objectives are to evaluate the effects of multiple environmental variables

as well as animal behavior on the accuracy and precision of Argos locations in this study area. This information will be used to determine the scales at which Argos locations for wolverines are useful and where bias in location quality or quantity may exist. A better understanding of the magnitude of error attributable to the Argos system, animal behavior, and environmental factors will help inform decisions about the appropriateness of Argos technology for specific research applications.

Application Number: A77414

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: \$82,800

New

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.