School of Environmental and Forest Sciences

UNIVERSITY of WASHINGTON

College of the Environment

Research Newsletter **Volume III, Issue 4**

News

The Office of Research has issued the annual report for Fiscal Year 2011. The report covers a broad range of measures of research activity (see the full report at http://www.washington.edu/research/.SITEPARTS/.documents/.reportsAnnual/Annual_Report_-_Fiscal_Year_2011.pdf). SEFS is listed as having received $8,203,361 in awards for July 1, 2010 – June 30, 2011. Comparing that figure with the numbers from the preceding 2 years is interesting: $8,521,749 for FY 2010 and $8,923,633 for FY2009. It is difficult to extract much meaning from these numbers, however, because there are so many variables (example: ARRA funding pumped over $1,000,000 into our figures in FY2010, but how much of that might we have received without ARRA?) Nonetheless, it is interesting to be able to easily compare our statistics with those of other units.

The Dean's office has asked us to provide more budget detail on eGC1s at the time they are routed for approval. Specifically, they need to see a budget justification on any project that is submitted on an on-line system (and so isn't visible except to the PI and OSP) or for which there is not yet a full submission package attached to the eGC1. A proposal that does not have the budget, justification, and other supporting business documents will not be returned rather than reviewed. This requirement does not apply to pre-proposals.

The Dean's office will be reviewing and forwarding GIM19 waiver requests to OSP, per new OSP guidelines. However, the procedure for SEFS PIs will be the same as before: submit to the Director. Please remember that the approved request for waiver must be attached to the eGC1 when it is routed for review and approval.

Opportunities

A recent "Dear Colleague" letter from NSF reminds that the directorates welcome proposals from interdisciplinary teams: "While many strong, vibrant interactions currently exist between the three directorates, this letter is to remind our research communities that BIO, MPS and ENG strongly encourage proposals from interdisciplinary research teams that involve collaborations among investigators from the biological, mathematical, and physical sciences and engineering to support new interactions that span interfaces between BIO, ENG, and MPS." (http://www.nsf.gov/pubs/2012/nsf12057/nsf12057.jsp?WT.mc_id=USNSF_25&WT.mc_ev=click)

As much as possible, new opportunities will be sent directly to those faculty who are most apt to be interested, rather than just listed as a block. To be most effective, you need to make sure that Sally Morgan is aware of the areas that interest you (206-897-1754 or slm@uw.edu). 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.

Awards (January, 2012)

Application Number: A67499
Faculty Member: Ernesto Alvarado
Role: Principal Investigator
Faculty Member: James Agee
Role: Co-Investigator
Title: **Wildland Fuel and Fire Management in a Changing Climate**
Agency: USDA Forest Service
Period: 4/1/2009 - 3/31/2014
Amount: $582,224
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. This agreement supports USFS PNW FERA and School of Forest Resource's research vision to:

A. Enhance programmatic fire planning, large fire decision support, hazardous fuel characterization and management, hazard assessment, fire behavior prediction, fire danger rating, and carbon flux assessments.
B. Promote attainment of desired future 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.
C. Improve fire management effectiveness and safety of firefighters and communities, and advance national and regional policy goals to reduce management costs.
D. Enhance restoration of healthy, resilient, fire-adapted ecosystems through evaluation of integrated fire/fuel management practices.
E. Develop a research-management partnership of USFS research stations and national forests to develop the decision support needed by the US Forest Service to incorporate climate change into management and planning of federal lands in the western US.

Specific objectives for this amendment to the joint venture agreement are: To continue a third phase of data collection in the spring and fall of 2011 of live fuel consumption and environmental variables from a series of prescribed fires in federal lands of Florida to improve fuel consumption models for the southern forest region of the United States. To continue a second year study of fuel amount and composition following dormant and growing season prescribed fires for flatwoods pine ecosystems in the Florida Panhandle. To continue the work for integration of the forest vegetation simulator (FVS) and FCCS to generate dynamic fuelbeds derived from stand data collected from FIA and CFI plots, and silvicultural treatments. Recode CONSUME 3.0 into python programming language to make this fire management tool a web application for fuel consumption and smoke emissions from wildfires.

Application Number: A71820
Faculty Member: Jonathan Bakker
Role: Principal Investigator
Title: **Grazing and Afforestation Effects on Understory Community Composition and Diversity in Uruguayan Grasslands**
Agency: Weyerhaeuser Company
Period: 11/5/2011 - 4/30/2012
Amount: $10,000
Supplement and Extension

The landscape of Uruguay is dominated by the South American Campos ecoregion, 85% of which is considered natural grassland and composed primarily of perennial grass and herb species, although shrubs and trees can be sparsely present. The Campos is important for the country's livestock production; currently, it supports 10 million head of cattle and 13 million head of sheep. Although its climate is suitable for forest development, the Campos has not been forested. Grazing is the primary factor maintaining the Campos as grassland, essentially creating an herbaceous pseudoclimax phase. Afforestation efforts began a few decades ago. To date, little research has been conducted on the effects of afforestation or the combined effects of grazing and afforestation on vegetation community dynamics. The objectives of this research are to:
1. Quantify changes in vegetation structure and function associated with afforestation,
2. Examine community composition and response to management over multiple scales and grazing histories: across regions and between similar sites within regions,
3. Determine if grasslands are able to re-establish following tree harvest, and

4. Compare the vegetation responses of Uruguayan and Pacific Northwest grasslands to afforestation and tree harvest.

Application Number: A69883
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **CSF-PF/WA Stte Parks on-Call Projects**
Agency: WA Parks and Recreation Commission
Period: 10/1/2011 - 6/30/2013
Amount: $25,000
Non-Competing Renewal

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.

Application Number: A68984
Faculty Member: Sarah Reichard
Role: Principal Investigator
Title: **Rare Plant Monitoring**
Agency: USDI Fish and Wildlife Service
Period: 4/1/2011 - 3/31/2012
Amount: $5,000
Non-Competing Supplement

The purpose of this conference is to bring together practitioners, consultants, and experts in the field of rare plants to share and update their findings on the distribution, abundance and threats to plant biodiversity in the Pacific Northwest. The conference offers an opportunity to share new information and collaborate with regional botanists, and plant population biologists to find solutions to sustaining plants for the long-term in the face of a changing climate. on by Rare Care, and approximately 20 new volunteers will be trained in rare plant monitoring techniques.

Application Number: A69641
Faculty Member: Sarah Reichard
Role: Principal Investigator
Title: **National Arboretum Collections**
Agency: USDA
Period: 9/1/2010 - 8/31/2013
Amount: $14,000
Non-Competing Supplement

The US Department of Agriculture, Agricultural Research Service has requested the assistance of the Otis Douglas Hyde Horticultural Herbarium to collect and ship specimens of horticultural interest to US National Arboretum. Upon review of the national collection, the USNA determined that cultivated plants of the Pacific Northwest are grossly underrepresented in their holdings. Specimens from and number of gardens, including the Washington Park Arboretum, Center for Urban Horticulture and Union Bay Gardens, Hill-Crest, the residence of the UW President, and Windcliff, a private garden owned by horticulturist Dan Hinkley will be visited to obtain specimens of their horticulturally significant plants.

Proposals (January, 2012)

Application Number: A72845
Faculty Member: Susan Bolton
Role: Principal Investigator
Title: **Analysis of Vegetation Effects on Levees**
Agency: King County Department of Natural Resource and Parks, Water and Land Resources Division
Period: 12/16/2011 - 1/15/2013
Amount: $89,449
New

Since the 1990s, King County floodplain managers have observed that incorporating native vegetation in flood facility repairs decreases susceptibility to damage while supporting the objectives of the Clean Water Act and Endangered Species Act. Conversely, the U.S. Army Corps of Engineers (Corps) has hypothesized that woody vegetation increases the risk of flood damage to levees. Thus woody vegetation must be removed from levees for local governments to be eligible for Corps cost-sharing programs to repair damaged levees and revetments.

According to the 2008 Biological Opinion on the National Flood Insurance Program, there are 115 levees throughout Puget Sound enrolled and eligible for federal cost-sharing under Public Law (PL) 84-99. In King County, 46 miles of levees out of the County's 120-mile inventory of flood facilities are enrolled in the PL 84-99 program. All are subject to the vegetation removal requirements. While an abundance of information has been gathered about the effects of native riparian vegetation on habitat characteristics natural riparian areas, little information is available on the role of vegetation in the structural integrity of levees and revetments, particular those in the Puget Sound basin. We seek to help fill these data gaps, thereby enabling resource managers to make informed decisions about ways to balance regional flood protection and environmental restoration goals.

Specifically, we seek to determine whether levee vegetation makes levees and revetment more or less susceptible to flood damage. The answer to this question is important because of the enormous public expense of repairing and maintaining flood infrastructure on rivers, and the need to conduct these public works in a most cost-effective manner. Our hope is to provide scientific information that can be used to evaluate and propose modifications to levee design, operation, and maintenance standards.

Application Number: A72816
Faculty Member: Gordon Bradley
Role: Principal Investigator
Title: **Preliminary Proposal: Conservation in social-ecological systems: quantifying biodiversity and conservation motives at business sites**
Agency: National Science Foundation
Period: 2/1/2013 - 1/31/2015
Amount: $2
Pre-Application

The loss of biodiversity is one of the most important issues that society faces, driven by factors including urbanization and land use cover change (Dawson et al., 2011). Major motivations for conserving biodiversity in cities range from the nature centric (e.g. preserving local biodiversity) to the human centric (e.g. improving human well-being, connecting people with nature and providing environmental education; Dearborn and Kark, 2009). If funded, this research would address opportunities and motivations for conservation on business sites—a novel area of study with the potential for wide societal influence—in order to provide critical scientific feedback and best management practices to support biodiversity conservation on private land. Conserving biodiversity in urban areas needs to include methods other than restoration and preservation, since political and practical opportunities for protecting land are limited. This research builds on existing trends in business sustainability and will help generate alternative approaches to biodiversity conservation in urban areas. Key questions asked by this research include what landscaping techniques are used at business sites; what motivations managers have for using those techniques; what species currently inhabit business sites; and if landscaping techniques are correlated with current biodiversity. The dual social and natural science approach of the research creates opporutnities for interdisciplinary research and more robust results. The proposed research will involve collaboration with UW scientists, business leaders, and students. Broader impacts of the proporsed research include opportunities for undergraduate research, graduate student funding, creating connections between researchers and business leaders, and broad dissemination of results.

Application Number: A72586
Faculty Member: Sharon Doty
Role: Co-Investigator
Title: **Effects-Related Biomarkers of Environmental Neurotoxic Exposures**
Agency: National Institute of Environmental Health and Science (NIEHS)
Period: 3/1/2012 - 3/31/2013
Amount: $2,454,740
Non-Competing Renewal

The theme of this Program Project is that biomarkers measured in accessible tissues are predictive of: a) toxicant exposures; b) early indicators of damage; and/or c) unusual susceptibility to toxic agents that

commonly occur at hazardous waste sites. The proposed UW Program includes 5 research projects (3 biomedical, 2 ecological/bioremediation), an Administrative Core, a Research Translation Core, a Functional Genomics and Bioinformatics Core, and an Outreach Core. The Program will focus most intensively on biomarker applications for investigations of adverse effects to human health and the environment from neurotoxic chemicals, primarily metals and pesticides. Collectively, these projects will develop and validate biomarkers for elucidating underlying neurotoxicity mechanisms, characterizing risks to humans, animals, and the environment, identifying host susceptibility traits that modify exposure/risk relations, and for implementing phytoremediation techniques. The research projects include studies of: 1) a mouse model of susceptibility to the neurodevelopmental toxicity of methyl mercury; 2) investigations of genetically-determined susceptibility factors predictive of mercury-related neurobehavioral impairment in children and adults; 3) animal models of susceptibility to organophosphate pesticides, with applications to human Parkinson's disease; 4) environmental and genetic determinants of Parkinson's disease; 5) sub-lethal neurotoxic effects of metals and pesticides in free-living Coho salmon; 6) phytoremediation methods for organic solvents and pesticides. The Functional Genomics and Bioinformatics Core will provide extensive molecular biology laboratory and data analysis support to all research projects. Multi-disciplinary collaborations among scientists specializing in neurotoxicology, epidemiology, molecular genetics, and bioinformatics will be emphasized as an essential feature of this highly integrated research program. The Administrative Core, directed by the Program Director, will oversee all major budgetary and personnel aspects of the program project, and will coordinate multidisciplinary interactions among research projects and cores. An External Science Advisory Board, composed of scientists from academia and government agencies, and an Internal Executive Committee that includes the Program Director, the Deputy Director, and selected Program investigators, will provide scientific advice and oversight. The Research Translation Core will be responsible for communicating our research findings to community, government, and private sector stakeholders. This Core will also supervise technology transfer activities. The Outreach Core will coordinate efforts with the Research Translation Core to ensure appropriately tailored dissemination of research findings to community groups, government agencies, health professionals, and the broader scientific community.

Application Number: A72884
Faculty Member: Robert Edmonds
Role: Principal Investigator
Faculty Member: Peter Kiffney
Role: Co-Investigator
Title: **Preliminary Proposal: Salmon recolonization of the Cedar River: linking population dynamics to ecosystem processes**
Agency: National Science Foundation
Period: 6/1/2013 - 5/31/2018
Amount: $2
Pre-Application

Construction of the Landsburg Dam on the Cedar River, WA in 1901 blocked the upstream movement of threatened fish species, notably Chinook (Oncorhynchus tshawytscha) and coho (O. kisuth) salmon, and steelhead trout (anadromous form of O. mykiss) from 43 km of habitat, extirpating these iconic fish above the dam for 100 years. A fish passage facility built in 2003 reconnected this migratory corridor and provides a novel opportunity to examine the population dynamics of keystone species from the very first generation and the factors that modify population processes. Extensive baseline data allow us to test the hypothesis that reintroducing these fish will have effects at multiple levels of organization with some of these effects ultimately feeding back to influence salmon population dynamics. The 2009

reconnection of Walsh Creek with Rock Creek provides an opportunity to examine how interactions between native and non-native fish populations develop as Walsh lake contains two non-native fish species. Additionally, there are numerous other salmon rivers with extensive population data available that we can use to examine the generality of our model and results. We propose three approaches to quantify population processes in pacific salmon following reintroduction including: 1) continuation of our intensive long-term research program and initiating a new study on non-native/native species interactions, 2) comparative surveys and analyses across seven basins (Cedar below and above Landsburg, Elwha River, Sauk River, South Fork Stillaguamish, South Fork Skykomish River, Deschutes River, Goldsborough Creek) in Puget Sound where the presence of salmon varies in time (continual, 1-55 years), and 3) small-scale experiments and observational studies to quantify the effects of salmon-derived nutrients on stream and riparian food webs.

Application Number: A73375
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Rayonier Timberlands Operating Company
Period: 1/1/2012 - 12/31/2012
Amount: $24,582
Supplement and Extension

2012 Membership dues from Rayonier Forest Resources L.P. to Stand Mgmt Coop.

Application Number: A73594
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Longview Timberlands, LLC
Period: 1/1/2012 - 12/31/2012
Amount: $35,620
Supplement and Extension

Stand Management Coop Membership Dues for Longview Timberlands for 2012.

Application Number: A73593
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Campbell Group, Inc.
Period: 1/1/2012 - 12/31/2012
Amount: $25,697
Supplement and Extension

2012 Membership dues to Stand Management Coop from Campbell Group.

Application Number: A73369
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Stimson Lumber Company
Period: 1/1/2012 - 12/31/2012
Amount: $18,441
Supplement and Extension

2012 Membership Dues to Stand Management Coop by Stimson Lumber Co.

Application Number: A73373
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Port Blakely Tree Farms LP
Period: 1/1/2012 - 12/31/2012
Amount: $17,338
Supplement and Extension

2012 Stand Management Coop Membership Dues for Port Blakely Tree Farms.

Application Number: A73370
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: West Fork Timber Company, LLC
Period: 1/1/2012 - 12/31/2012
Amount: $8,008
Supplement and Extension

Membership dues for 2012 from the West Fork Timber Co. to the Stand Management Coop.

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: A73372
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Cascade Timber Consulting, Inc.
Period: 1/1/2012 - 12/31/2012
Amount: $17,411
Supplement and Extension

2012 Stand Management Coop Membership Dues for Cascade Timber Consulting Inc.

Application Number: A73371
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Forest Capital Partners, LLC
Period: 1/1/2012 - 12/31/2012
Amount: $17,248
Supplement and Extension

2012 Membership dues to the Stand Management Coop

Application Number: A73368
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: International Forestry Consultants, Inc.
Period: 1/1/2012 - 12/31/2012
Amount: $7,615
Supplement and Extension

2012 Membership dues payment to Stand Management Coop from International Forestry Consultants, Inc.

Application Number: A73367
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Weyerhaeuser Company
Period: 1/31/2012 - 12/31/2012
Amount: $78,917
Supplement and Extension

2012Membership dues from Weyerhaeuser Company NR. CO. to Stand Mgmt CO-OP.

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

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Application Number: A73365
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Lone Rock Timber Company
Period: 1/1/2012 - 12/31/2012
Amount: $16,650
Supplement and Extension

2012 Membership dues to Stand Management Coop from Lone Rock Timber Mgmt. Co.

Application Number: A73595
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Plum Creek Timber Company
Period: 1/1/2012 - 12/31/2012
Amount: $27,052
Supplement and Extension

2012 Membership dues to Stand Management Coop from Plum Creek Timber Company.

Application Number: A72928
Faculty Member: E. David Ford
Role: Co-Investigator
Title: **IOS Preliminary Proposal: Plasticity of Response in Bean and Corn**
Agency: National Science Foundation
Period: 1/1/2013 - 12/31/2015
Amount: $2
Pre-Application

Within a species, adaptation to a wide range of habitats can lead to genetic variation in the timing of reproduction, allocation to shoot versus root, canopy and root architecture, and responsiveness to stressors. These traits, or aspects of them, are selected and recombined by breeding programs aimed at improving plant performance (yield) in agriculture. Based on preliminary work in corn (Zea mays), we propose to investigate the physiological basis for plasticity in the regulation of leaf expansion and display in the common bean (Phaseolus vulgaris) and in corn plants subjected to density and drought stress.

Application Number: A72979
Faculty Member: Jerry Franklin
Role: Principal Investigator
Title: **Wind River Field Station**
Agency: USDA Forest Service
Period: 10/1/2011 - 7/31/2016
Amount: $151,200
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: 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
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: A73563
Faculty Member: James Fridley
Role: Principal Investigator
Title: **SEP Collaborative: Characterization of Material and Process Parameters for Energy Efficient Drying in Woody Biomass Feedstock Production**
Agency: National Science Foundation
Period: 10/1/2012 - 9/30/2016
Amount: $603,418
New

The proposed research focuses on a critical element in the preparation of woody biomass as an energy production feedstock: the removal of water from the raw material. Dry feedstock provides substantially greater energy conversion efficiencies and lower emissions. But current industrial drying processes consume a great deal of energy and this stands to be a significant limitation to the effective implementation of a sustainable woody biomass energy conversion pathway. Low temperature drying preserves energy content, improves conversion efficiency and enables the use of “waste heat” for drying.

Our project goals are to (a) generate fundamental knowledge and understanding of key parameters and computational methods associated with low-temperature, energy efficient drying of woody biomass, (b) develop an educational platform to increase the expertise of the future workforce in woody biomass drying, and (c) effectively disseminate our research findings in a way that elevates the general knowledge base and provides practical design parameters for industry.

Application Number: A72763
Faculty Member: Soo-Hyung Kim
Role: Co-Investigator
Title: **IOS Preliminary Proposal: Interactive regulation of flowering by temperature and photoperiod: linking the mechanism with models**
Agency: National Science Foundation
Period: 1/1/2013 - 12/31/2015
Amount: $2
Pre-Application

Anthropogenic climate change has dramatically altered the seasonal responses and development of organisms especially in the last 50 years. It is imperative that we understand precisely which organisms will be able to adjust their behavior and development to a new climate, and how these adjustments will occur. In this proposal, we will focus on elucidating the molecular mechanism of seasonal flowering. Further, based on our findings, we aim to establish new computational models that could be used to predict flowering time in a changing climate.

Application Number: A73542
Faculty Member: Joshua Lawler
Role: Principal Investigator

Title: **Landscape Conservation in a Changing Climate: Implementing and Communicating Research Results**
Agency: Wilburforce Foundation
Period: 4/1/2012 - 12/31/2012
Amount: $40,000
New

Climate change poses significant challenges to conservation planners, resource managers, and policy makers. Addressing climate change requires novel research, but perhaps even more importantly, it requires the rapid translation and dissemination of findings. In the face of a changing climate, it is imperative that research results go quickly and efficiently from researchers to practitioners. Although many valuable research projects are designed with the intent of directly informing conservation policy and management, few research grants provide funding that enable timely connection between science and practice. The activities proposed here will facilitate the communication of the results of several on-going research projects to state, NGO, federal, and private conservation practitioners and mangers, as well as to broader public audiences. Activities will include travel to give talks, participate in workshops, and serve in an advisory capacity; graphic design, publication, and the preparation of talks, web pages, and other outreach materials; communication trainings for post-docs and graduate students; and administrative and managerial activities to support research and outreach efforts. These activities will greatly increase the impact of several timely climate-related conservation research projects.

Application Number: A72708
Faculty Member: John Marzluff
Role: Principal Investigator
Title: **Preliminary Proposal: Learning the Face of Danger**
Agency: National Science Foundation
Period: 2/1/2013 - 1/31/2017
Amount: $2
Pre-Application

One of neurobiology's grand challenges is to understand how the brain integrates diverse sensory information into commands that produce complex behaviors. Centuries of investigation have made it clear that multiple brain regions integrate sensation, context, history, and emotion into muscular response. But our detailed understanding of these interactions in the brain of a human, let alone a bird, is limited. I propose a 4-year research project intended to help fill this void by mapping the response of a bird's brain as it addresses important tasks including individual and social learning about dangers. This research builds on field studies that demonstrated the ability of American crows to recognize human faces and pilot research with Drs. Donna Cross and Robert Miyoaka into the neurobiological underpinning of this ability. Together we have used positron emission tomography (PET) to investigate learning about danger. We immediately confirmed that the primary visual pathway used by crows is the same as the typical one used by birds in discrimination tasks (tectofugal). But our approach enabled us to simultaneously observe the use of other brain regions during this cognitive task. Crows that viewed a dangerous person showed more activity in their hippocampus and nidopallium than did crows that viewed a familiar but neutral person. This suggests that visual sensory information, which is processed in the entopallium and nidopallium was influenced by memory from hippocampal activity. Here we propose a series of experiments that will investigate the whole brain responses of crows as they aquire and recall learned information about dangerous people. We will contrast learning by adult and young

crows, and learning by direct and indirect (social) means. We will deterime if young crows learn equally well from observing their parents versus strangers, and if adults learn equally well by observing their mates versus strangers. Our research will advance the basic understanding of how birds learn, and how the avian brain processes and accesses new information. By drawing parallels between the complex way the brain of a bird and a human work to solve problems, we will also foster greater appreciation for the natural world.

Application Number: A73461
Faculty Member: L. Monika Moskal
Role: Principal Investigator
Title: **Modeling Wetland Dynamics Across Spatial Scales & Over Time**
Agency: National Aeronautics and Space Administration
Period: 9/1/2012 - 8/30/2015
Amount: $30,000
New

Wetland ecosystems are especially sensitive to climate change. Changes in precipitation & temperature can significantly alter wetland hydrology and hence the ecosystem services they provide. Although climate models exist for large spatial extents it is difficult for natural resource managers to downscale this information to the local scale for long-term planning. As the impacts of climate change amplify, understanding consequences for wetland dynamics will be critical for sustainable management and conservation, particularly in arid regions. The goal of this research is to develop remote sensing techniques for range of understudied but ecologically important wetland habitats, which can be used both to understand historical changes in wetland function and composition and to forecast future changes. The specific objectives of this research are to use satellite remote sensing techniques & time series analysis to 1.) develop a repeatable cost-effective approach to map and measure the hydroperiod of wetlands over large spatial extents and classify wetland types based on this 2.) measure and quantify changes to the hydroperiod and composition of wetland types in the Columbia Plateau ecoregion over the last forty years 3.) forecast changes in the hydroperiod of wetlands using downscaled climate models under future scenarios. This proposal represents an understudied area of research that is directly relevant to NASA's strategic goal "to study Earth from space to advance scientific understanding and meet societal needs" by providing immediately useful methods and tools for monitoring wetland change, forecasting future impacts, assessing needs, and developing viable conservation and planning strategies.

Application Number: A72260
Faculty Member: Sergey Rabotyagov
Role: Co-Investigator
Title: **SEP Sustainable Energy Solutions: Converting Waste Methane into Biofuels**
Agency: National Science Foundation
Period: 8/1/2012 - 7/31/2016
Amount: $1,998,799
New

Many human-related activities, including biofuel related feedstock cultivation, agriculture, animal husbandry operations, biomass decomposition, waste water treatment and landfills contribute to global

methane emission. New technologies for effective conversion of this potent greenhouse gas into valuable compounds, such as next generation fuels or chemical/petrochemical feedstock may open new venues to reduction/stabilization of global warming. The major goal of the present proposal is to establish reliable catalytic platform for targeted production of valuable chemicals using methane as a carbon feed-stock.

Application Number: A73326
Faculty Member: Clare Ryan
Role: Co-Investigator
Title: **The Effect of Policy Tools on Collaborative Organizations: Testing Agency Theory and Resource Dependence Theory in a New Empirical Domain**
Agency: National Science Foundation
Period: 9/1/2012 - 8/31/2014
Amount: $309,440
Resubmission

This research will answer the question: How can public agencies use policy tools to shape the behavior of collaborative organizations? Collaborative organizations are voluntary partnerships among public, private, and nonprofit actors that collectively deliver public services. Our research will examine how the use of non-contractual policy tools shapes the behavior of collaborative partnerships under different circumstances. Specifically, we will analyze how the rules embedded in policy tools affect the operating rules and outputs of collaborative watershed partnerships. Given that policy tools do not operate in a vacuum, we will include additional independent variables that measure the pre-existing contextual rules within which collaborative partnerships operate, such as state and federal laws and regulations.

Intellectual Merit. Collaborative organizations are transforming policymaking processes, yet the role of policy tools in shaping collaborative organizations is woefully understudied relative to other research on collaborative processes. Existing research on collaborative partnerships typically focuses on the internal dynamics of the organizations, rather than how public agencies can affect the internal dynamics of collaborative partnerships. There is a theoretical void in explaining how policy tools can shape the behavior of collaborative partnerships in the absence of contracts. Our research will build new theory on principal-agent relationships between public agencies and collaborative partnerships by focusing on non-contractual policy tools. Specifically, our research will generate and test hypotheses regarding the use of policy tools as causal mechanisms lying between the intent of principals (government policy makers) and the behavior (rules and outputs) of agents (i.e., the partnership organizations). Second, we will build theory in terms of the interactions among rules in a nested context. While institutional scholars have argued that rules interact across levels, little research has examined how they interact.

Broader Impacts. Our findings will have important implications for public policy and society. Collaborative organizations are an increasingly important mechanism for delivering public services across a wide range of issue areas; but relatively little is known about the effects of policy tools on collaborative organizations, the tangible outputs they produce, and the extent to which collaborative outputs are congruent with state goals. This knowledge gap is problematic given that local, state, and federal agencies are making substantial and increasing investments in collaborative organizations. The findings will provide evidence of the effect of policy tools on the operational rules of collaborative organizations, and will aid policymakers in designing policy tools that shape collaborative organizations in ways that improve service delivery (i.e., outputs). By drawing attention to interactions among

different policy tools, existing institutions, and collaborative partnerships, policy makers can make better informed choices in fostering collaborative activities that meet policy objectives. The research will be disseminated through interdisciplinary conference papers, reports, web content, peer-reviewed articles, and presentations to practitioners. The project will also enhance networks of collaborative research among two universities, support the training of graduate students, and expand research and curricula in three interdisciplinary graduate programs.

Awards (February, 2012)

Application Number: A69558
Faculty Member: Ernesto Alvarado
Role: Principal Investigator
Title: **Fire, Climate, and Smoke Research**
Agency: USDA Forest Service
Period: 7/19/2010 - 6/30/2013
Amount: $297,800
Supplement and Extension

This Joint Venture Agreement will support the USFS Atmosphere and Fire Interactions Research Team (AIRFire) research to improve understanding of the role of weather and climate in fire and other ecological disturbances and to develop decision support tools for ecosystem management, fire operations, planning, and smoke management based on meteorology, air quality engineering, and climate dynamics.
The purpose of this agreement is to advance climate, fire, and smoke science in support of building a better understanding of how fire is 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.
Specific objectives for this joint venture agreement are:
Specific Tasks for this agreement:
• To continue participating in the development of the next generation of a Wildland Fire Scenario Builder.
• To analyze the relationship between fire season ending event and climate in coordination with the USFS Region 6 and the USFS PNW Research Station.
• To analyze fire–weather, climate, vegetation relationships using gathered and modeled indices to determine statistical relationships that can utilize these indices for predicting the likelihood of fire occurrence in various fire size classes, as well as overall fire size.
• To improve existing wildland fire modeling capabilities for fuel consumption, emissions, and smoke impacts, for example as developed in the BlueSky Smoke Modeling Framework.
• To develop and improve tools for use in wildland fire decision support as part of the Wildland Fire Decision Support System smoke component.
• To support the growth, development, and research of graduate students and undergraduates at the School of Forest Resources as their research pertains to fire, climate, and smoke research.
• To support high-end computer modeling and analysis of large data sets of fire, climate and smoke at the Pacific Wildland Fire Sciences Laboratory.

Application Number: A71961
Faculty Member: Gordon Bradley

Role: Principal Investigator
Title: **DNR Snoqualmie Corridor Recreation Planning**
Agency: WA Department of Natural Resources
Period: 1/1/2012 - 3/15/2013
Amount: $49,365
New

The Department of Natural Resources (DNR) is seeking assistance with the Snoqualmie MTS Greenway Corridor Recreation Planning project. This project will determine the recreation management direction and priorities for the next 10-15 years. It will include establishing a citizen-based recreation planning committee who will work with the agency throughout plan development. The plan will be based on a broad scale land suitability analysis and will include establishing recreation management goals, objectives and strategies for the planning area.

Application Number: A67579
Faculty Member: David Briggs
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Lone Rock Timber Company
Period: 1/1/2011 - 12/31/2012
Amount: $15,818
Non-Competing Renewal

2011 Membership dues to Stand Management Coop from Lone Rock Timber Mgmt. Co.

Application Number: A73365
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Lone Rock Timber Company
Period: 1/1/2012 - 12/31/2012
Amount: $16,650
Supplement and Extension

2012 Membership dues to Stand Management Coop from Lone Rock Timber Mgmt. Co.

Application Number: A73367
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Weyerhaeuser Company
Period: 1/31/2012 - 12/31/2012
Amount: $78,917
Supplement and Extension

2012Membership dues from Weyerhaeuser Company NR. CO. to Stand Mgmt CO-OP.

Application Number: A73368
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: International Forestry Consultants, Inc.
Period: 1/1/2012 - 12/31/2012
Amount: $7,615
Supplement and Extension

2012 Membership dues payment to Stand Management Coop from International Forestry Consultants, Inc.

Application Number: A73369
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Stimson Lumber Company
Period: 1/1/2012 - 12/31/2012
Amount: $18,441
Supplement and Extension

2012 Membership Dues to Stand Management Coop by Stimson Lumber Co.

Application Number: A73370
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: West Fork Timber Company, LLC
Period: 1/1/2012 - 12/31/2012
Amount: $8,008
Supplement and Extension

Membership dues for 2012 from the West Fork Timber Co. to the Stand Management Coop.

Application Number: A73371
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Forest Capital Partners, LLC
Period: 1/1/2012 - 12/31/2012
Amount: $17,248

Supplement and Extension

2012 Membership dues to the Stand Management Coop

Application Number: A73372
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Cascade Timber Consulting, Inc.
Period: 1/1/2012 - 12/31/2012
Amount: $17,411
Supplement and Extension

2012 Stand Management Coop Membership Dues for Cascade Timber Consulting Inc.

Application Number: A73373
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Port Blakely Tree Farms LP
Period: 1/1/2012 - 12/31/2012
Amount: $17,338
Supplement and Extension

2012 Stand Management Coop Membership Dues for Port Blakely Tree Farms.

Application Number: A73375
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Rayonier Timberlands Operating Company
Period: 1/1/2012 - 12/31/2012
Amount: $24,582
Supplement and Extension

2012 Membership dues from Rayonier Forest Resources L.P. to Stand Mgmt Coop.

Application Number: A73593
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Campbell Group, Inc.
Period: 1/1/2012 - 12/31/2012
Amount: $25,697

Supplement and Extension

2012 Membership dues to Stand Management Coop from Campbell Group.

Application Number: A73594
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Longview Timberlands, LLC
Period: 1/1/2012 - 12/31/2012
Amount: $35,620
Supplement and Extension

Stand Management Coop Membership Dues for Longview Timberlands for 2012.

Application Number: A73595
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Plum Creek Timber Company
Period: 1/1/2012 - 12/31/2012
Amount: $27,052
Supplement and Extension

2012 Membership dues to Stand Management Coop from Plum Creek Timber Company.

Application Number: A70101
Faculty Member: Richard Gustafson
Role: Principal Investigator
Title: **CORRIM**
Agency: Consortium for Research on Renewable Industrial Materials
Period: 1/10/2009 - 6/30/2012
Amount: $62,000
Non-Competing Supplement

Under the supervision of co-PI Richard Gustafson, processing models for biochemical biofuel processing will be developed detailing all the inputs and outputs needed to develop LCI/LCA burdens for the production of ethanol and other co-products sourced by a biomass feedstock of clean hardwood chips with bark in the mix. The LCI/LCA for the feedstock will be provided by other biomass collection participants under this same master grant so that an integrated cradle to gate LCI/LCA can be developed. There will be collaboration with other institutions on the process model development, including North Carolina State University and Mississippi State University, as well as other CORRIM module participants.

Application Number: A69082
Faculty Member: Clare Ryan
Role: Principal Investigator
Title: **Integrated "All Lands" Approach to Public Land Use Planning: A Case Study of Prince William Sound**
Agency: USDA Forest Service
Period: 10/1/2011 - 9/30/2013
Amount: $29,001
New

The purpose of this project is to investigate an “all lands approach” to planning that is being used by Chugach National Forest (CNF) to develop a visitor use plan for Prince William Sound in Alaska. Using Prince William Sound as a case example, the PI will collaborate with PNW scientists:
(1) Work with the CNF to develop an interdisciplinary, issue-based planning approach for managing visitor use in Prince William Sound. This will include providing editorial advice on the presentation of the PWS visitor use plan and one trip to the CNF to meet with planning staff and the Forest Leadership Team to discuss and present the results of the PWS plan.
(2) Evaluate the value of the CNF planning approach and use the results to contribute to a general conceptual model for future planning efforts in other National Forests.
(3) Investigate implementation of the new planning rule with the goal of integrating collaboration, social science and the “all lands” approach to planning. This will include an up-to-date review of the proposed/new planning rule and a review of the Forest Service’s new Recreation Sustainability Framework, in order to provide an analysis of these documents and related requirements in the context of Forest Service planning activities.

Application Number: A68318
Faculty Member: Christian Torgersen
Role: Principal Investigator
Title: **Imprinting salmon to targeted spawning waters**
Agency: Grant County Public Utility District
Period: 1/1/2012 - 7/31/2012
Amount: $24,996
New

The need to rear salmon at large centralized hatcheries and then release them offsite to supplement specific populations or fisheries is a practical reality of artificial production in the Pacific Northwest. However, this practice can dramatically increase stray rates. Homing is governed by the olfactory discrimination of home-stream water and exposure to the home stream during appropriate juvenile stages is critical for olfactory learning (imprinting) and successful completion of the adult homing migration. Smolt acclimation and imprinting facilities have been developed or proposed as part of most hatchery supplementation programs in the Pacific Northwest and hundreds of millions of dollars have been spent or proposed for construction, operation and maintenance of these facilities. However, several recent studies of the efficacy of these facilities have indicated that physical and logistical constraints on where these facilities must be sited relative to appropriate spawning habitat (typically downstream of target sites) can result in a large percentage of fish spawning in non-target or inappropriate locations. In this proposal, we plan to develop and test a novel, cost-effective, approach for achieving successful imprinting and homing fidelity to target spawning locations without moving fish

from their central rearing hatchery prior to release. We hypothesize that if salmon are exposed as embryos to water derived from a targeted location upstream of their release site, they will ultimately migrate past the release site to the target areas to spawn. We believe that if successful, this approach could be used to facilitate re-establishment of sustainable natural populations of upper Columbia River spring and summer Chinook, steelhead, coho and sockeye salmon spawning without the need for expensive and logistically challenging acclimation facilities. For the first phase of this project, we will assess different strategies for collecting, storing and concentrating imprinting waters to retain chemical properties that are critical for olfactory discrimination.

Application Number: A69436
Faculty Member: Miranda Wecker
Role: Principal Investigator
Title: **Data entry and Committee Facilitation Support**
Agency: Clallam County
Period: 7/1/2011 - 6/30/2012
Amount: $11,554
New

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.

Proposals (February, 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: A73219
Faculty Member: Susan Bolton
Role: Co-Investigator
Title: **Gardens, Green Space and Health in the Informal Urban Settlements of Lima, Peru**
Agency: National Institutes of Health (NIH)
Period: 9/1/2012 - 8/31/2014
Amount: $154,500
New

As increasing numbers of impoverished households migrate from rural areas to urban areas, and their ability to grow food, direct access to ecosystem services and contact with natural environments decrease, often with negative impacts on their physical and psychological health. Numerous studies have documented agriculture's positive impacts in impoverished urban households. It increases access to high nutrition foods, diversifies diet, lessens exposure to volatile food prices, reduces under/malnutrition (especially in children, women of child-bearing age and the elderly), generates income and increases the time that mothers have available to raise their children. An interdisciplinary team of researchers from the University of Washington and the Universidad Nacional Mayor de San Marcos recently launched the Ecological and Healthy Community Initiative. Based in Lomas de Zapallall, an urban slum in northern Lima, Peru of 27,000 inhabitants, the initiative integrates interdisciplinary research and education. It involves the design and implementation of ecologically intelligent interventions in community infrastructure, related capacity building programs and the monitoring and evaluation of their environmental, economic and human health impacts.
The present study focuses on the participatory implementation of household vegetable gardens/green spaces and their impacts on nutrition and mental health in the Eliseo Collazos (EC), an impoverished urban community of 94 households in LdZ. The project has three primary aims;
1) Establish baseline data on the socio-economic characteristics, environmental conditions, nutrition and mental and physical health of 60-80 households in EC and evaluate changes in the nutrition and mental and physical health of study participants at 6 month intervals for 1 year.
2) Design and construct 60-80 household vegetable gardens/green spaces through a participatory process that draws upon participatory action research (PAR) and related methodologies and document the productivity of vegetable gardens/green spaces on a weekly basis over an 12 month period through a voluntary self-reporting journal entry system.
3) Collect updated qualitative and quantitative data on changes to social capital, income generation, and improved health at 6 month intervals for 1 year.

We will use questionnaires at baseline six and twelve month that have been previously tested in EC to assess mental and physical health, social capital, demographic data, and food intake. We will conduct participatory workshops to develop educational trainings for garden design, construction and maintenance. At six and twelve month we will conduct focus groups to hear about their experiences and changes that they have experienced since the gardens were introduced. Journals will be collected at 6 and 12 month to evaluate successful and unsuccessful practices.
This implementation project is taking advantage of previously established methods to increase nutrition, well-being and strengthen social capital in an impoverished slum community in Lima Peru. This project is a demonstration project to become a model for disseminating successful interventions across Lima's urban slums.

Application Number: A73453
Faculty Member: Sally Brown
Role: Principal Investigator
Title: **Sowing seeds in the city- Quantifying benefits of small-scale agriculture in urban areas**
Agency: National Academies Keck Futures Initiative
Period: 6/1/2012 - 12/31/2013
Amount: $99,988
New

A majority of the world's population lives in cities where they are disconnected from their food supply and have lost a familiarity with ecosystem services that comes with growing food. A broad range of community efforts have emerged to reconnect people in urban areas to fresh foods with expected benefits for public health. These efforts can be found in cities across the country and cross both economic and ethnic lines. They have been led by the non- scientific community and are best characterized as social movements. Expansion of agriculture to non- traditional areas including community or kitchen gardens in urban or peri- urban environments has the potential to provide partial solutions to many of the questions posed at the recent NAKFI meeting (#s 1, 2, 4, 5, 7, and 9). A large-scale urban agriculture system, supported by state and federal policy, can alleviate pressure on traditional agricultural lands. We are proposing engage in bottom up information dissemination by bringing together leaders of the local food system movement to communicate and educate leaders of the scientific community on the workings and potential for these systems. Scientists can partner with community leaders to quantify potential benefits of these systems, potentially leading to increased recognition and support for urban agriculture.

Application Number: A74405
Faculty Member: Renata Bura
Role: Principal Investigator
Title: **Pre-steaming of lignocellulosic biomass: A major step towards commercialization of biomass to biofuels and biochemicals**
Agency: UW Royalty Research Fund
Period: 9/16/2012 - 9/15/2013
Amount: $37,799
Resubmission

The production of biobased fuels and chemicals is becoming of increased importance due to environmental concerns relating to climate change, depletion of fossil fuel reserves, and reduction of reliance on foreign oil. Lignocellulosic feedstocks variability and low conversion yields are one the most important factors impeding the widespread commercialization of converting biomass to biochemicals. Pre-steaming of biomass has a potential of reduce fluctuation in biomass supply and increase the overall ethanol yield. The goal of this proposal is to determine the feasibility of utilizing pre-steaming as a pre-pretreatment method for a hybrid poplar to ethanol process. Proven technically feasible, it would improve the overall process yields which could lead to the development of a new technology and bring us closer towards commercialization of biomass to biofuels and biochemicals processes.

Application Number: A73653
Faculty Member: Sharon Doty
Role: Principal Investigator
Title: **Endophytes for improved bioremediation**
Agency: National Science Foundation
Period: 9/15/2012 - 9/14/2015
Amount: $300,059
New

Over the decades, a variety of organic pollutants including solvents, PAHs, PCBs, pesticides and explosives have been released into the environment. Bacteria have evolved mechanisms to degrade these pollutants, and some of these strains have been harnessed for bioremediation practices. Phytoremediation, the use of plants for environmental restoration of polluted areas, couples the natural ability of plants to extract chemicals from soil, water, and air with a host of plant enzymes for pollutant detoxification. In a recent extension of this technology, endophyte-assisted phytoremediation partners the plant's ability to take up the pollutants with the faster and stronger adaptability of microbial endosymbionts. With previous NSF funding, a novel TCE-degrading endophyte of poplar trees was isolated that was tolerant to high levels of TCE that could be rapidly degraded aerobically without requiring inducing phenolics. In a parallel study, the investigators isolated endophytic bacteria capable of utilizing another common class of pollutants, polycyclic aromatic hydrocarbons (PAHs), as a sole carbon source. When poplar was inoculated with this strain, there was a strong reduction in the PAH phytotoxicity compared to the un-inoculated control plants. TNT-degrading endophytes were also isolated from poplar that similarly protected the host plants from the toxic effects of this pollutant. The proposed project seeks to understand the mechanisms by which poplar tree endophytes evolve pollutant degradation pathways. Through the completion of this project, data will be provided on the genetics and biochemistry as well as possible explanations for the ability of poplar trees, specifically, to host superior pollutant degraders. The information provided could lead to improved methods for the removal of common environmental pollutants, making this greener technology more accepted for widespread use.

Application Number: A74396
Faculty Member: Ivan Eastin
Role: Principal Investigator
Title: **CORRIM Life-Cycle Assessment**
Agency: Consortium for Research on Renewable Industrial Materials
Period: 3/1/2012 - 7/13/2012

Amount: $16,250
New

This project entails Integrating updated cradle to gate life cycle inventory and assessment data into revised LCA reports made available for use in environmental product declarations and uploading the full LCA reports for the cradle-to-grave life-cycle assessment as described in the scope of work Exhibit A attached hereto and by reference incorporated herein onto the CORRIM website.

Application Number: A73757
Faculty Member: Ivan Eastin
Role: Principal Investigator
Title: **Specialty Crop and Trade Center**
Agency: Washington State University
Period: 8/1/2012 - 7/31/2014
Amount: $250,441
New

The economic data shows that the forestry and wood products manufacturing sectors play an important role in the economy of Washington State, particularly in rural, timber-dependent communities. Not only did this sector provide over 25,000 jobs in 2011 but it also generated approximately $14.5 billion in gross business revenue and paid out over $1.5 billion in wages. However, weak domestic demand resulting from the continuing housing crisis in the US has devastated the forest products industry in Washington state. In response, forest products manufacturers are increasingly looking to offshore markets to supplement the weak domestic demand. In recent years, forest products exports from Washington state have increased substantially, reaching and estimated $2.7 billion in 2011. Washington is the largest exporter of forest products in the US and forest products exports from the state now represent almost 28% of total US exports. Wood exports provide particular economic benefits to rural areas in Washington since many of these companies and ports are located in rural, timber dependent communities. Recent trade related policies in the US and foreign markets have had dramatic impacts on US forest products manufacturers and exporters. Unfortunately, industry awareness of these regulatory changes and their potential impact on the competitiveness of US forest products is low. This is particularly true for small and medium-sized manufacturers (SMEs) and exporters in rural timber-dependent communities as well as native American tribal enterprises who often lack the managerial resources and expertise to track and analyzes changing market conditions. The Center for International Trade in Forest Products proposes to implement a program of research and extension activities designed to assist SME's and native American enterprises understand and adapt to these changing market conditions. Specifically we propose to conduct research in trade related policies in the US and foreign markets and their potential impact on forest products manufacturers and exporters in the US to assist policy makers and managers understand and respond to these policies; conduct trade analyses of these policies using the CINTRAFOR Global Trade Model to assess how these policies might affect the competitiveness of US forest products; conduct market research to identify new and emerging international markets for US wood products; develop and implement export marketing training programs for native American tribal forest managers; expand the US China-Build and Japan trade mission programs to assist SMEs and tribal enterprises develop export markets for their products.

Application Number: A73950

Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Hancock Forest Management
Period: 1/1/2012 - 12/31/2012
Amount: $34,130
Supplement and Extension

2012 Membership Dues from Hancock Forest Mgmt to Stand Mgmt Coop

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Application Number: A73951
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Olympic Resource Management (ORM)
Period: 1/1/2012 - 12/31/2012
Amount: $18,618
Supplement and Extension

2012 Membership dues to Stand Management Coop from Olympic Resource Mgmt

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Application Number: A70168
Faculty Member: Kern Ewing
Role: Principal Investigator
Title: **Native Plant Propagation Program**
Agency: King County Department of Natural Resource and Parks, Water and Land Resources Division
Period: 12/1/2008 - 4/30/2012
Amount: $8,204
Supplement and Extension

UW Botanic Gardens will work with community volunteers from Seattle Youth Garden Works and the Student Conservation Association to enhance the native plantings within the Holly Garden using native understory plants that have been salvaged and/or propagated on site. The installation of new native plantings will be undertaken to manage invasive weeds in this area.

Application Number: A74242
Faculty Member: Jerry Franklin
Role: Principal Investigator
Faculty Member: Jim Lutz
Role: Co-Investigator
Faculty Member: Van Kane
Role: Co-Investigator
Title: **Integrated, observation-based carbon monitoring for wooded ecosystems in Washington, Oregon, and California Park**
Agency: Oregon State University (OSU)
Period: 11/1/2011 - 12/31/2012
Amount: $33,304

Non-Competing Supplement

This is an additional subaward to University of Washington with a total requested budget of $33,304. This sub-award transfers funds currently in the OSU budget for the field GPS data collection UW. Money is already in the existing UW sub-award for the salary to perform post processing of the GPS data to be collected.

This project is an approved, funded project with an existing sub-award from OSU to UW. In the original proposal budget, we planned to have OSU PI Robert Kennedy manage this field work. Since then, we have realized that managing a field technician would be a unique activity for Kennedy during the period of the project, while UW co-I James Lutz will be managing several field crews during this period. Transferring this funding to UW allows for more efficient management of this task and allows Lutz to combine this funding with separate funding to hire a an experienced and qualified person since many of the best candidates seek full summer employment.

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.

Awards (March 2012)

Application Number: A72845
Faculty Member: Susan Bolton
Role: Principal Investigator
Title: **Analysis of Vegetation Effects on Levees**
Agency: King County Department of Natural Resource and Parks, Water and Land Resources Division
Period: 12/16/2011 - 1/15/2013
Amount: $89,449
New

Since the 1990s, King County floodplain managers have observed that incorporating native vegetation in flood facility repairs decreases susceptibility to damage while supporting the objectives of the Clean Water Act and Endangered Species Act. Conversely, the U.S. Army Corps of Engineers (Corps) has hypothesized that woody vegetation increases the risk of flood damage to levees. Thus woody vegetation must be removed from levees for local governments to be eligible for Corps cost-sharing programs to repair damaged levees and revetments.

According to the 2008 Biological Opinion on the National Flood Insurance Program, there are 115 levees throughout Puget Sound enrolled and eligible for federal cost-sharing under Public Law (PL) 84-99. In King County, 46 miles of levees out of the County's 120-mile inventory of flood facilities are enrolled in the PL 84-99 program. All are subject to the vegetation removal requirements. While an abundance of information has been gathered about the effects of native riparian vegetation on habitat characteristics natural riparian areas, little information is available on the role of vegetation in the structural integrity of levees and revetments, particular those in the Puget Sound basin. We seek to help fill these data gaps, thereby enabling resource managers to make informed decisions about ways to balance regional flood protection and environmental restoration goals.

Specifically, we seek to determine whether levee vegetation makes levees and revetment more or less susceptible to flood damage. The answer to this question is important because of the enormous public expense of repairing and maintaining flood infrastructure on rivers, and the need to conduct these public works in a most cost-effective manner. Our hope is to provide scientific information that can be used to evaluate and propose modifications to levee design, operation, and maintenance standards.

Application Number: A64772
Faculty Member: David Briggs
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Olympic Resource Management (ORM)
Period: 1/1/2011 - 12/31/2011
Amount: $17,698
Supplement and Extension

2011 Membership dues to Stand Management Coop from Olympic Resource Mgmt

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Application Number: A64774
Faculty Member: David Briggs
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Stimson Lumber Company
Period: 1/1/2011 - 12/31/2011
Amount: $17,523
Supplement and Extension

2011 Membership Dues to Stand Management Coop by Stimson Lumber Co.

Application Number: A74396
Faculty Member: Ivan Eastin
Role: Principal Investigator
Title: **CORRIM LCA updates for solid wood products**
Agency: Consortium for Research on Renewable Industrial Materials
Period: 3/1/2012 - 7/13/2012
Amount: $16,250

New

This project entails Integrating updated cradle to gate life cycle inventory and assessment data into revised LCA reports made available for use in environmental product declarations and uploading the full LCA reports for the cradle-to-grave life-cycle assessment as described in the scope of work Exhibit A attached hereto and by reference incorporated herein onto the CORRIM website.

Application Number: A73950
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Hancock Forest Management
Period: 1/1/2012 - 12/31/2012
Amount: $34,130
Supplement and Extension

2012 Membership Dues from Hancock Forest Mgmt to Stand Mgmt Coop

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Application Number: A73951
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: Olympic Resource Management (ORM)
Period: 1/1/2012 - 12/31/2012
Amount: $18,618
Supplement and Extension

2012 Membership dues to Stand Management Coop from Olympic Resource Mgmt

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Application Number: A65500
Faculty Member: Joshua Lawler
Role: Principal Investigator
Title: **Using Climate Change Vulnerability Assessment Tools to Plan for Climate Change Adaptation: Case Studies in the Great Northern LCC**
Agency: USDI Fish and Wildlife Service
Period: 9/16/2011 - 9/15/2013
Amount: $116,303
New

The Pacific Northwest Vulnerability Assessment team is producing databases of climate sensitivities for species and habitats, as well as projections of vegetation shifts due to climate change. Case studies have been planned to put these products in the hands of managers but key questions remain on how to best structure them. Our project will build on the existing work of the Vulnerability Assessment to develop and implement up to three case studies in the Great Northern LCC, in order to 1) engage users in the application of climate adaptation tools and obtain feedback on the design and utility of the databases

and products, 2) test the application of climate adaptation tools in specific areas with different climate shifts predicted in the future, and 3) test the application of climate adaptation tools across different spatial scales (small to large landscape extents).

For each case study we will work with our partners to produce the following deliverables, in addition to written reports: 1) a Climate Adaptation Plan that identifies its specific objectives and makes management recommendations based on the outcomes of the case study, 2) a list of specific recommendations for refinement of Vulnerability Assessment products and tools, and identify key information needs for the future, and 3) an evaluation of the outcome of the case study.

Application Number: A66467
Faculty Member: Joshua Lawler
Role: Principal Investigator
Title: **Assessing the vulnerability of species and ecosystems to projected future climate change in the Pacific Northwest**
Agency: USDI US Geological Survey
Period: 8/1/2010 - 7/31/2012
Amount: $136,309
Non-Competing Supplement

To develop effective adaptive management plans, conservation and natural resource managers need to know how climate change will affect the organisms and ecosystems they manage. To meet this need, we will model potential shifts in the distributions of at least 12 focal animal species (chosen in discussions with land managers) and assess the vulnerabilities of species and managed lands to future climate change. We will summarize the projected changes in climate and biota for the entire study region as well as for specific land management units including: national parks, fish and wildlife refuges (both state and federal), and The Nature Conservancy (TNC) owned and managed sites. This research contributes to USGS Science Strategy science directions, “Understanding Ecosystems and Predicting Ecosystem Change” and “Climate Variability and Change” (USGS Circular 1309) and USGS contributions to the U.S. Climate Change Science Program Strategic Plan Question 8.3 (Product 3) by enhancing our understanding of potential climate-change effects on important ecological systems.

Application Number: A69708
Faculty Member: Joshua Lawler
Role: Principal Investigator
Title: **Protecting the ecological stage: applying and testing a land-facet-based approach to conservation planning in a changing climate**
Agency: Yale University
Period: 1/1/2012 - 6/30/2012
Amount: $93,382
New

Climate change provides a clear challenge to the process of conservation planning. To date, systematic conservation planning has largely focused on identifying areas that protect current patterns of biodiversity. Although these areas may provide protection for today’s biodiversity, they may not provide adequate protection for biodiversity in a future world that looks very different from that of today. One

potentially promising strategy for protecting biodiversity in a changing climate is based on the idea of protecting the diversity of abiotic conditions that influence patterns of biodiversity. Although the idea of using abiotic variables as surrogates for biodiversity in the conservation-planning process is not new, the application of the concept to climate-change adaptation planning has only recently drawn interest. Thus, not surprisingly, there is limited evidence that the approach can be used in diverse regions to select areas that can capture current biodiversity, that the results of land-facet based analyses are robust to particular methodologies and data choices, or that the approach will be effective at protecting biodiversity in a changing climate. Additionally, it is not clear to what degree current protected lands already represent a diversity of land-facets (i.e., the "ecological stage"). We propose to address these questions by identifying and mapping land facets across multiple ecoregions in the Pacific Northwestern United States . We will then determine how sensitive the facets are to the methodological and data choices, use these land facets to identify priority conservation areas, evaluate how well land facets are represented in current protected areas, test the ability of land facets to capture current biodiversity.

Application Number: A72116
Faculty Member: Joshua Lawler
Role: Principal Investigator
Title: **DOD Environmental Postdoc**
Agency: Stanford University
Period: 1/1/2012 - 4/30/2013
Amount: $228,118
New

This project is for a post-doctoral associate to join a collaborative team including the Natural Capital Project, The Nature Conservancy, Industrial Economics, Stanford University, and two labs at the University of Washington, focused on mapping the quantity and value of the ecosystem services flowing from three demonstration DoD installations and surrounding landscapes, and illuminating the tradeoffs and broader implications of land-management decisions in a novel, practical, and powerful way that can be subsequently applied to additional installations. This collaborative project will estimate the relative benefits, measured in ecological or financial terms, of alternative future patterns of land use and land cover (including restoration and land purchases) on and around demonstration DoD installations.

Application Number: A73542
Faculty Member: Joshua Lawler
Role: Principal Investigator
Title: **Landscape Conservation in a Changing Climate: Implementing and Communicating Research Results**
Agency: Wilburforce Foundation
Period: 4/1/2012 - 12/31/2012
Amount: $40,000
New

Climate change poses significant challenges to conservation planners, resource managers, and policy makers. Addressing climate change requires novel research, but perhaps even more importantly, it requires the rapid translation and dissemination of findings. In the face of a changing climate, it is imperative that research results go quickly and efficiently from researchers to practitioners. Although

many valuable research projects are designed with the intent of directly informing conservation policy and management, few research grants provide funding that enable timely connection between science and practice. The activities proposed here will facilitate the communication of the results of several on-going research projects to state, NGO, federal, and private conservation practitioners and mangers, as well as to broader public audiences. Activities will include travel to give talks, participate in workshops, and serve in an advisory capacity; graphic design, publication, and the preparation of talks, web pages, and other outreach materials; communication trainings for post-docs and graduate students; and administrative and managerial activities to support research and outreach efforts. These activities will greatly increase the impact of several timely climate-related conservation research projects.

Application Number: A71693
Faculty Member: Luke Rogers
Role: Principal Investigator
Title: **2012 Washington State Parcel Database**
Agency: WA Department of Health
Period: 1/1/2012 - 3/31/2013
Amount: $100,000
New

The Washington State Department of Health (DOH) needs a spatially explicit database of land ownership in the state of Washington to use in drinking water protection efforts. The database assists DOH in the identification of potential sources of contamination near drinking water sources. Three previous efforts have led to the creation of integrated Washington State Parcel Databases in 2007, 2009, and 2010. This contract will contribute funds towards the development of a 2012 Washington State Parcel Database.

Application Number: A69203
Faculty Member: Clare Ryan
Role: Principal Investigator
Title: **Measuring Watershed and Climate Impacts of the 'Environmental Stewardship Footprint': A Framework for the Green-Duwamish Watershed**
Agency: USDA Forest Service
Period: 10/1/2011 - 9/30/2014
Amount: $50,001
New

This research will address the question: How do we assess the consequence of citizen-based environmental stewardship activities. Using the Green-Duwamish watershed as a case study, we will
(1) identify and map forest and watershed restoration activities;
(2) measure volunteers' and private landowners' interests in managing and restoring lands for watershed protection and for carbon sequestration purposes; and
(3) develop an analytic framework for linking social and ecological outputs of these stewardship activities to larger scale social and ecological goals and indicators identified by PSAA and regional climate change targets.

This study will build on a previous research conducted as part of the Integrated Urban Forest Assessment (IUFA) project, a collaborative effort between University of Washington School of Forest

Resources, U.S. Forest Service PNW Research Station, Cascade Land Conservancy, and King County Department of Natural Resources and Parks. This research is also part of a larger collaboration called the Green Cities Research Alliance (GCRA), which also includes City of Seattle, Washington DNR, and several conservation research and nonprofit organizations such as EarthCorps, International Forestry Consultants, Inc. There are currently several GCRA environmental stewardship assessment projects underway in Seattle and King County that would help address objectives 1 and 2. Workshops will be used for objective 3.

Application Number: A72689
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: $8,435
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.

Proposals (March, 2012)

Application Number: A74408
Faculty Member: Ernesto Alvarado
Role: Principal Investigator
Faculty Member: Robert Norheim
Role: Co-Investigator
Faculty Member: David Peterson
Role: Co-Investigator
Title: **Archival of data from JFSP-funded projects conducted by the Fire and Environmental Research Applications Team**
Agency: USDI Bureau of Land Management
Period: 6/1/2012 - 9/30/2013
Amount: $48,727
Non-Competing Revision

The Fire and Environmental Research Applications Team (USDA Forest Service, Pacific Northwest Research Station, Pacific Wildland Fire Sciences Lab) (FERA) proposes to document and archive datasets from eleven (11) completed JFSP-funded projects. FERA scientists have received funding for numerous projects since the inception of JFSP, and these eleven in particular have generated high quality datasets that are potentially valuable to other researchers. In addition, the two Co-PIs have a long track record of successful bioinformatics and metadata projects, funded by the Olympic Natural Resources Center, Federal Geographic Data Committee , National Biological Information Infrastructure, National Park Service, and JFSP. These projects have made numerous valuable datasets available online via PNWIN and FIREHouse, and developed over 800 metadata records for geospatial and biological datasets.

Application Number: A74232
Faculty Member: Susan Bolton
Role: Co-Investigator
Title: **Gardens, Green Space and Health in the Informal Urban Settlements of Lima, Peru**
Agency: UW Royalty Research Fund
Period: 8/15/2012 - 8/15/2013
Amount: $40,000
New

When impoverished households migrate from rural to urban areas, their ability to grow food and their contact with natural environments decrease, often with negative impacts on their physical health and overall well-being. Urban agriculture increases access to high nutrition foods, diversifies diet, lessens exposure to volatile food prices, improves nutrition, generates income and increases the time that mothers have to raise their children. Urban green space improves air quality and reduces respiratory disease. It provides opportunities for gathering and recreation improving physical fitness and building social capital. It reduces stress and mental fatigue. The proposed study is based in Eliseo Collazos(EC), an impoverished urban community in northern Lima, Peru. It will examine how socio-economic factors influence the efficacy of participatory garden implementation and how household gardens provide health and other benefits to community members. The study has three primary aims.

1) Assess how household socio-economic variables influence the successful implementation and cultivation of gardens in EC through demographic surveys, the participatory design and construction of 40-60 household gardens and garden diaries
2) Assess how household gardens impact the physical and mental health of individuals and households through repeated physical and mental health assessments
3) Assess how household gardens effect meaningful change in the lives of community members as defined
by community members through Participatory Impact Assessment (PIA) exercises

The study will provide evidence that interdisciplinary collaboration, participatory design and capacity building enhance the effectiveness of public health interventions. It will serve as pilot for a longer term NIH R01 grant.

Application Number: A74896
Faculty Member: Sharon Doty
Role: Principal Investigator

Faculty Member: Soo-Hyung Kim
Role: Co-Investigator

Title: **Alberta Oil Sands**
Agency: Oil Sands Leadership Initiative (OSLI)
Period: 4/16/2012 - 10/15/2012
Amount: $49,173
New

Microbial endophytes of plants are essential for optimal plant growth in stressful environments. Endophytes can provide fixed nitrogen, improve mineral uptake, produce plant growth hormones for improved rooting and overall growth, and provide tolerance to salt and heat. The current oil sands restoration projects and exploratory well site restoration projects rely on aspen seedlings from nurseries. These seedlings exhibit slow growth and poor form in some restoration sites, making them unable to compete with grasses. Our hypothesis is that this source of plant material lacks the microbial populations needed for the vigorous growth necessary in restoration projects. This proposed proof-of-concept study will involve testing a consortium of Doty's plant growth-promoting endophytes for improved hardiness of aspen seedlings.

Application Number: A75197
Faculty Member: Sharon Doty
Role: Principal Investigator
Title: **Developing engineered endophytes as a tool for engineering bioenergy crops and improving biomass yields on marginal soils**
Agency: Ginkgo BioWorks, Inc
Period: 9/1/2012 - 8/31/2017
Amount: $1,408,736
New

Our goal is to develop a novel technology for engineering bioenergy crops for biofuels production that overcomes the inherently slow process of engineering plant genomes (research area b). Specifically, we propose to develop endophytic bacteria that can enhance the growth and biomass production of bioenergy crops on marginal land. Endophytes are microbes that live either partially or fully within plants without causing disease [Perroti, 1926]. They offer a novel and appealing approach to engineering plants for three reasons: (1) endophytes are already known to have a significant impact on plant growth via nitrogen fixation, phytohormone production and pest resistance [Doty, 2011], (2) selected endophyte species can be easily cultured, rapidly grown and readily engineered using a broad array of genetic tools and (3) the impact of endophytes on plant growth can be measured in as little as two weeks. To achieve our goal of using endophytes as a tool for plant engineering, we couple systems biology approaches to elucidate endophyte-plant interactions with synthetic biology approaches to demonstrate that endophytes can be engineered to enhance plant growth. Our proposal brings together the deep expertise in endophyte-plant biology of Sharon Doty's lab at the School of Environmental and Forest Sciences at the University of Washington with extensive synthetic biology capabilities at Ginkgo BioWorks to rapidly design, build and test engineered bacterial strains. Engineered endophytes represent a radically new and promising approach to plant engineering that overcomes many of the inherent challenges of engineering plants.

Application Number: A74086
Faculty Member: Ivan Eastin

Role: Principal Investigator
Title: **The Potential of Legal Timber Trade Policies to Expand International Demand for US Wood Products**
Agency: USDA
Period: 9/1/2012 - 8/31/2014
Amount: $98,036
New

Washington is the largest exporter of forest products in the US with a 28% share of US exports. Wood exports provide particular economic benefits to rural, timber-dependent and Native American communities. The recent adoption of timber legality legislation in Japan, the US and the EU (in 2013) 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, Thailand and Vietnam. 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, Thailand and Vietnam. 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, Thailand and Vietnam. This project addresses the main program scope described in the USDA MIS RFP: "applied research that addresses barriers, challenges and opportunities in marketing US agricultural products domestically and internationally".

Application Number: A74628
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **Stand Management Coop**
Agency: King County Wastewater Treatment Division
Period: 1/1/2012 - 12/31/2012
Amount: $7,500
Supplement and Extension

2012 Membership dues to Stand Management Coop from Metropolitan King County.

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

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Application Number: A74697
Faculty Member: James Fridley
Role: Principal Investigator
Title: **Characterization of Material and Process Parameters for Energy Efficient Drying in Woody Biomass Feedstock Production**
Agency: UW Royalty Research Fund
Period: 9/16/2012 - 9/15/2013
Amount: $37,513
New

Woody biomass material from forests and mills is usually of very high moisture content – enough so that the water content often exceeds the dry wood mass. But both efficiency and environmental needs require biomass based feedstock material for use in energy / chemical production to be at low moisture content. Conventional drying technology as applied to woody biomass drying is energy inefficient, expensive and frequently difficult to control. Thus moisture removal is both a critical step in an overall biomass to energy process and a barrier to biomass energy production. This project is a preliminary investigation into woody biomass drying. The long term aim is to contribute to enabling economical, energy efficient, chemically inert and low loss drying in the overall woody biomass to useable feedstock production process. The specific objectives are to (1) Determine critical physical, thermal, and chemical characteristics and properties likely to be associated with a sustainable and commercially viable woody biomass low-temperature drying process; (2) Use knowledge of these characteristics and properties to design a reconfigurable laboratory bench-scale dryer for studying drying processes in woody biomass; (3) Fabricate and test the laboratory bench-scale dryer; (4) Use the laboratory-scale dryer in pilot-test level experiments to quantify drying parameters for raw woody biomass and woody biomass feedstock material and (5) Use the study outcomes to propose and conduct in-depth research that will lead to an ability to more fully characterize woody biomass drying and suggest optimal or near optimal drying equipment and process design and operation.

Application Number: A75063
Faculty Member: Jim Lutz
Role: Principal Investigator

Title: **Annually resolved impacts of fire management on carbon stocks in Yosemite and Sequoia & Kings Canyon National Parks**
Agency: USDI National Park Service
Period: 8/5/2010 - 12/31/2013
Amount: $36,398
Supplement and Extension

Forest biomass on Sierra Nevada landscapes constitutes one of the largest carbon stocks in the state of California, and the stability of that carbon stock is tightly linked to fire and the ecological factors that drive the fire regime. Recent research suggests that over a century of fire exclusion and fuel accumulation in Western forests have actually reduced the amount of carbon that such suppressed landscapes store, while increasing the likelihood of catastrophic, stand-replacing fire. For over 30 years, fire management at Yosemite (YOSE) and Sequoia and Kings Canyon (SEKI) National Parks has led the nation in restoring fire to park landscapes, however the impacts of that restoration on the stability and magnitude of carbon stocks are not yet known. This work proposes to quantify these effects over a 30 year timescale by leveraging detailed fire history, vegetation, and fuels datasets at YOSE and SEKI to quantify biomass in areas where fire has been suppressed vs. areas where fire has been restored.

Our dynamic approach to quantifying the carbon contained in trees will also involve dendrochronological analyses of recent tree growth. Although the dynamic approach will likely yield the best accounting of carbon pool dynamics over time, both the static and dynamic approaches need to be included in this project for the following reasons: 1) much of the information developed from the static approach (A51771) underpins the dynamic approach; 2) conducting the more complex dynamic approaches will allow us to evaluate how much more information is generated given the greater expenditure of time and funding required for the latter; and most importantly 3) the static approach is very feasible for any land management unit that has archived comprehensive vegetation plot data (e.g. FMH and FIA plots), and by "validating" this approach through the dynamic approach in our proposed study, potential users of these methodologies in other places can better decide which approach is best for their situation.

Application Number: A74895
Faculty Member: Miranda Wecker
Role: Principal Investigator
Title: **Forks GIS Mapping Services 2012**
Agency: City of Forks
Period: 3/1/2012 - 12/31/2012
Amount: $20,000
New

The Olympic Natural Resource Center will provide geographic information system (GIS) support and technical services that address the following priorities defined by the City of Forks:
1. City addressing: finalize the City's addressing overlay utilizing information provided inclusive of water meter databases.
2. Development of data dictionary associated with utilities that will become the basis for future utility overlays.
3. Map requests as needed.