



UNIVERSITY *of* WASHINGTON

## **School of Forest Resources**

### **RESEARCH NEWSLETTER ISSUE TWO, VOLUME 5**

**NEWS & INFORMATION Page 1**

**Dept. of Health & Human Services 2011 audits; Federal shutdown possible**

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#### **News and Information**

The Federal agency that reviews UW costs and approves our indirect rates, Department of Health and Human Services, has announced the areas that they will be targeting in the audits conducted this year. The first concern will be to identify charges to awards that should be paid out of the indirect costs charged to the projects. These will include such things as administrative or clerical salaries or postage or other services that have not been specifically approved for the project. Grants Information Memo 23 (<http://www.washington.edu/research/osp/gim/gim23.html> ) provides a thorough overview of the costing policy and describes the types of allowable expenses, and procedures to get approval for those that aren't ordinarily allowed. Any questions should be directed to your fiscal analyst.

With the possibility of a government shutdown on Friday, March 4, there is a great deal of uncertainty about how the grant world will be affected. A short term closure of government offices will not have much impact but a longer term closure will hinder awards, changes in awarded grants and contracts and reimbursements. No announcements have been made concerning deadlines, so the Office of Sponsored Programs is anticipating that there will be no change and is encouraging submission of any change requests (.g. non FDP Cost Extensions, carry forwards, changes of PI) as early in the week as possible so they can be processed.

## Awards

Application Number: A60096

Faculty Member: Ernesto Alvarado

Role: Principal Investigator

Title: **Fire, Climate, and Smoke Research**

Agency: USDA Forest Service-PNW

Period: 9/1/2010 - 8/31/2015

Amount: \$82,500

New

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 participate the development of the next generation of a Fire Scenario Builder.
- 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.
- Support high-end computer modeling and analysis of large data sets of fire, climate and smoke at the Pacific Wildland Fire Sciences Laboratory.

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Application Number: A63749

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: 5/1/2009 - 4/30/2012

Amount: \$20,000

Non-Competing Supplement

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.
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Application Number: A63889

Faculty Member: David Briggs

Role: Principal Investigator

Title: **Stand Management Coop**

Agency: Cascade Timber Consulting, Inc.

Period: 1/1/2011 - 12/31/2011

Amount: \$16,541

Supplement and Extension

2011 Stand Management Coop Membership Dues for Cascade Timber Consulting Inc.

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Application Number: A56686

Faculty Member: Joseph Roos

Role: Principal Investigator

Title: **Emerging Forest Products Markets: An Analysis of Vietnam, United Arab Emirates, and Saudi Arabia**

Agency: University of Alaska, Fairbanks

Period: 9/15/2010 - 6/1/2012

Amount: \$40,000

New

Alaska's reduced harvest volume has forced Alaska forest products manufacturers to seek out higher value added niche market. Three key emerging forest products markets are Vietnam, Saudi Arabia, and the United Arab Emirates (UAE). There is very little research regarding these three markets and the types of forest products they demand. The research will be exploratory and address the following research questions: <br> What species are being used in these emerging markets? <br> What are the potential niche markets for Alaska forest products in these emerging markets? <br> What niche marketing strategy could be used by Alaskan mills in these markets? <br> <br> A literature review will be conducted regarding the Vietnamese, UAE, and Saudi Arabia forest products markets, export statistics will be compiled, and case studies of each of these markets will be conducted. The reduced harvest volume has forced Alaska forest products manufacturers to seek out higher value added niche market. The Vietnamese and Middle Eastern forest products markets are a growing market that has the potential to contribute to Alaska's international forest products industry. The purpose of this research project is to research the possible niche markets for Alaskan forest products in Saudi Arabia, UAE, and Vietnam.

## Proposals

Application Number: A64028

Faculty Member: Sharon Doty

Faculty Member: Stuart Strand

Role: Co-Investigator

Role: Co-Investigator

Title: **Effects-Related Biomarkers of Environmental Neurotoxic Exposures**

Agency: National Institute of Environmental Health and Science (NIEHS)

Period: 4/1/2011 - 3/31/2012

Amount: \$2,399,071

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.

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Application Number: A64379

Faculty Member: Ivan Eastin

Role: Principal Investigator

Title: **Green Building Programs in Japan and China: Potential impacts on the competitiveness of US wood products**

Agency: USDA

Period: 9/1/2011 - 8/31/2013

Amount: \$148,763

New

Faculty Member: Indroneil Ganguly

Role: Co-Investigator

Environmentally friendly and energy efficient wood building materials are specified in the Green Building Programs (GBPs) recently introduced in Japan and China. The potential impact of GBPs on the competitiveness of US wood products in these markets could be significant. Requirements within the GBPs reward points for sustainably managed wood or wood products that meet specific energy efficiency criteria could provide a competitive advantage to US exporters. However, other criteria (e.g., providing preferential treatment for domestic wood), represent non-tariff trade barriers that could undermine the competitiveness of US wood products. Given the flexibility in material usage allowed within GBPs, the extent of their impact on the demand for wooden building materials will be largely influenced by the degree to which they are adopted by home builders in Japan and China. The goal of

the proposed research is to analyze the various technical, regulatory, market and non-market factors of the GBPs in Japan and China and understand their potential impacts on the international competitiveness of US wood products.

This interdisciplinary research between the University of Washington's School of Forest Resources and College of the Built Environment will provide: (i) the US wood products industry with the necessary information to compete effectively in these markets, (ii) UW faculty a nuanced understanding of emerging international market trends, and (iii) UW undergraduate and graduate students the opportunity to learn about emerging trends through research projects and classes.

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Application Number: A64012

Faculty Member: Richard Gustafson

Role: Principal Investigator

Title: **CORRIM**

Agency: Consortium for Research on Renewable Industrial Materials

Period: 1/1/2009 - 6/15/2011

Amount: \$20,000

Supplement and Extension

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.

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Application Number: A64726

Faculty Member: Soo-Hyung Kim

Role: Principal Investigator

Title: **Floral Report Card Project**

Agency: Chicago Botanic Garden

Period: 10/1/2011 - 9/30/2013

Amount: \$115,821

Faculty Member: Sarah Reichard

Role: Co-Investigator

New

Floral Report Card (FRC) represents a thematic partnership of botanic gardens, local high schools, academia, and climate researchers with a goal of creating a national network of botanic garden climate change resource centers and high school climate change gardens. The long-term goal of FRC is to implement, study, and improve a sustainable, dynamic STEM professional development model that uses observations of K-12 student learning to improve teaching practice in environmental science. Specific objectives of FRC are to: 1) provide research-driven, locally adaptable curricula, educator resources, climate change garden packages, and implementation support that develop local school teacher expertise and support student learning in climate science through engagement in phenology based climate research; 2) increase science teaching capacity of local high schools by adapting the collaborative "Lesson Study" professional development method to high school science classes; 3) create a national network of non-formal scientific institutions (i.e., botanic gardens) that act as regional climate education resource centers for K-12 schools. The UW Botanic Gardens will partner with the Chicago Botanic Garden to establish this national effort. As a regional resource center, we will coordinate and lead FRC project in the Pacific Northwest region by providing climate change garden packages to local high schools, installing climate change gardens at the schools, working with teachers and students to develop and disseminate climate change science curricula, and training teachers and students to collect, manage, and analyze phenology data from their own gardens and archive them to a national database to be used for national scale climate change research.

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Application Number: A64480

Faculty Member: L. Monika Moskal

Role: Principal Investigator

Title: **Monitoring the Impacts of Climate Change to Wetland Dynamics in the Columbia Plateau**

Agency: National Aeronautics and Space Administration

Period: 9/1/2011 - 8/31/2014

Amount: \$30,000

New

Wetlands are dynamic systems that have complex hydrological regimes, which are not well understood as it is time consuming and expensive to monitor wetland dynamics over time and across a broad landscape. Although many wetland biologists believe determining the hydroperiod of wetlands is critical for wetland assessment and planning most natural resource managers do not do so because the data is unavailable. Current remote sensing techniques do not satisfy the need to delineate wetlands at fine enough spatial scales and fail to capture wetland dynamics in a cost-effective way. This research combines Landsat satellite imagery with high-resolution aerial photographs to develop a new approach to monitor water resources in arid regions. The proposed research will use Hierarchical Object-based

Image Analysis (HOBIA) and Spectral Mixture Analysis (SMA) to create a time series analysis of wetland dynamics. The methodology developed with this fellowship will be used to analyze spatiotemporal patterns of wetland dynamics across the landscape at a finer spatial and temporal scale than previously achieved.

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Application Number: A64630

Faculty Member: L. Monika Moskal

Role: Principal Investigator

Title: **Determining Relationships Between Above- and Belowground Plant Carbon in Temperate Forests Using Field Metrics and LiDAR**

Agency: National Aeronautics and Space Administration

Period: 9/16/2011 - 9/15/2014

Amount: \$30,000

New

Accurate estimation of terrestrial carbon pools is a key focus in an age of concern over global carbon budgets. In the near future a change in climate could alter global CO<sub>2</sub> uptake and decomposition rates of forests, changing how carbon is stored both above- and belowground in these ecosystems. A better understanding of relationships between above- and belowground forest carbon dynamics is drastically needed, largely because forests store a vast majority of aboveground terrestrial carbon, and forest carbon dynamics respond so heavily to elevated levels of atmospheric CO<sub>2</sub>. Further study could provide refined estimates of the relationships between above- and belowground C pools and could produce a database of repeatable allometric biomass equations. Here we use a permanent plot network for estimations of above- and belowground plant carbon. Belowground carbon stocks are estimated using fine root turnover measured with minirhizotrons. Fine root turnover is correlated against traditional field based measurements of aboveground biomass to estimate the relationship between above- and belowground plant carbon. This relationship is then related to aerial LiDAR data sets of the same area to indirectly predict belowground plant carbon. This study provides a baseline for similar studies in need of predicting belowground plant carbon using a remote sensing tool. Further, we produce an allometric equation for predicting belowground carbon using non-invasive and non-destructive sampling.

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Application Number: A64685

Faculty Member: L. Monika Moskal

Role: Principal Investigator

**Title: Estimating Tree Species Diversity and Productivity with LiDAR and Multispectral Imagery in Complex Forest Ecosystems**

Agency: National Aeronautics and Space Administration

Period: 9/16/2011 - 9/15/2013

Amount: \$30,000

New

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Application Number: A64383

Faculty Member: Sarah Reichard

Role: Principal Investigator

**Title: CPC Dept of Defense Seed Collection 2011**

Agency: Center for Plant Conservation

Period: 2/1/2011 - 12/31/2011

Amount: \$3,520

New

Under this project, University of Washington Botanic Gardens will assist the Center for Plant Conservation with collecting and preserving seeds of sensitive plant species on US Department of Defence military bases. Under this authorization, Rare Care will collect seeds from a *Silene spaldingii* population on Fairchild Air Force Base in Spokane, WA. The seeds will be stored at the USDA-ARS National Center for Genetic Resources Preservation in Ft. Collins, CO and the Miller Seed Vault at the UW Botanic Gardens.

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Application Number: A64612

Faculty Member: Clare Ryan

Role: Co-Investigator

Title: **From Hierarchy to Collaboration: The Role of Policy Tools in Principal-Agent Relationships**

Agency: National Science Foundation

Period: 9/1/2011 - 8/31/2013

Amount: \$300,674

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.

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Application Number: A64757

Faculty Member: Daniel Vogt

Role: Principal Investigator

Title: **Integrating above- and belowground parameters to create a decision support tool for evaluating soil ecosystem health**

Agency: National Aeronautics and Space Administration

Period: 9/1/2011 - 8/31/2014

Amount: \$30,000

New

Alteration to the physical environment by humans has been continuously progressing for thousands of years but in the last one hundred years has seen a significant impact on the landscape. The impacts of these changes can be observed at many biological levels within the biomes of the earth but are connected by a single living system: soil or the living skin of the earth. Soil health as a function of quality, soil organisms, nutrients, organic matter and decomposition are key functions which affect vegetation communities, atmospheric composition, carbon sequestration, hydrologic conductivity, and other biological functions. Due to the complex interaction of different processes that initially form soil and continue to alter it through time, a dynamic modeling environment is needed to provide critical knowledge for managing our environment to meet the challenge of climate change. Use of existing spatial information which catalog both past and existing conditions of landscapes across the world in the form of vector and raster information derived from satellite and data centers provide the building blocks for recording changes to our environment. Intensive soil applications in agricultural industries such as food crops, lumber products, fiber products and raw materials remove nutrients from the soil which are never returned, reducing the quality of the soil in ecologically damaging ways. Development of tools which can monitor the change in soil quality on a continental scale will provide critical information needed to understand processes affecting changing atmospheric conditions, shifts of vegetation communities, migration of wildlife, and degradation of previously fertile landscapes. The trends observed attributed to climate change must be observed from many different aspects, soils provides a

integral part of the overall system which must be studied to provide critical information to understanding the overall process.

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Application Number: A63851  
Faculty Member: Miranda Wecker  
Role: Principal Investigator  
Title: **Habitat Work Schedule (HWS) Data Compilation and Entry - WRIA 20**  
Agency: Clallam County  
Period: 11/1/2010 - 6/30/2011  
Amount: \$6,769  
New

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

Olympic Natural Resources Center (ONRC) will provide NPCLE with professional services necessary to enter HWS data into the system and to compile all historical watershed and salmon restoration projects undertaken since 1990 in WRIA 20.

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Application Number: A64645  
Faculty Member: Sandy Wyllie-Echeverria  
Role: Principal Investigator  
Title: **IPA Supplement for Wyllie-Echeverria**  
Agency: US Environmental Protection Agency  
Period: 10/4/2009 - 10/3/2011  
Amount: \$11,901  
Supplement and Extension

This is a supplement to an existing interagency personnel agreement with the US Environmental Protection Agency. This supplement will enable UW's Dr. Sandy Wyllie-Echeverria (SWE) to continue his collaborative research with the EPA. He is working to compile and summarize information on estuarine and wetlands ecosystems in the Pacific NW. In particular, he is focusing on seagrasses.

The purpose of the IPA is to produce one or more journal article manuscripts on ecosystem services of estuarine wetlands of the Pacific Northwest. The first article will be a review of existing knowledge regarding ecosystem functions that support core ecosystem services. The first task for Dr. SWE is to prepare an annotated bibliography of the relevant scientific literature, to be completed by the end of FY09. Subsequently, Dr. SWE will begin writing manuscripts for journal articles.