



UNIVERSITY of WASHINGTON

**School of Forest Resources**

**RESEARCH NEWSLETTER ISSUE ONE, VOLUME 5**

February 17, 2010

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**NEWS –**

OSP reports that there were significant problems with backlogs on Grants.gov during the last big NIH deadline earlier this month and they are warning that Grants.gov proposals **must** be submitted earlier enough to allow time for multiple submission attempts. While it won't be a problem for us this month, keep in mind for the future that you want to finish proposals before there is any possibility of getting caught in a backlog.

**OPPORTUNITIES –**

**Royalty Research Fund:** It's not too late to submit for the March round, but you will need to get the process started this week. The link to the preparation instructions is at <http://www.washington.edu/research/main.php?page=rrflinstructions>. Start with the Grants Cover Sheet <http://www.cfr.washington.edu/sfrTools/forms/index.shtml>; as soon as I have the eGC1 started, I will send you the number for the cover sheet.

**NSF** has announced a new research proposal solicitation on Water Sustainability and Climate (WSC). This is a multi-directorate solicitation involving the Directorates of Engineering, Geosciences, Biology, and Social, Behavioral and Economic Sciences. The goal of the solicitation is to understand and predict the interactions between the water system and climate change, land use, the built environment, and ecosystem function and services through place-based research and integrative models. Studies of the water system using observations at specific sites in combination with models that allow for spatial and temporal extrapolation to other regions, as well as integration across the different processes in that system are encouraged, especially to the extent that

they advance the development of theoretical frameworks and predictive understanding. The full solicitation can be found in the [NSF program solicitation](#). Letters of Intent are due March 15, 2010. The full proposal deadline is April 15, 2010. <http://www.nsf.gov/pubs/2010/nsf10524/nsf10524.htm#prep> NOTE: the letter of intent is submitted via Fastlane, but does not require Office of Sponsored Programs (i.e., no need to prepare an eGC1 until the full proposal is submitted).

**The Washington Wildlife and Recreation Program** has issued calls for proposals for State Lands Restorations and for habitat conservation grants for these types of areas: Critical Habitat, Natural Areas, Riparian Protection, and Urban Wildlife Habitat. A letter of intent is due March 1. For more information, see <http://www.rco.wa.gov/grants/schedules/wwrp.shtml>.

## AWARDS –

Application Number: A55003

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: \$20,000.00

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: A54697

Faculty Member: David Briggs

Role: Principal Investigator

Title: **Stand Management Coop**  
Agency: Hampton Resources, Inc.  
Period: 1/1/2010 - 12/31/2010  
Amount: \$6,668.00  
Supplement and Extension

Stand Management Coop Membership Dues for Hampton Resources for 2010.

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Application Number: A54699  
Faculty Member: David Briggs  
Role: Principal Investigator  
Title: **Stand Management Coop**  
Agency: Longview Timberlands, LLC  
Period: 1/1/2010 - 12/31/2010  
Amount: \$28,496.00  
Supplement and Extension

Stand Management Coop Membership Dues for Longview Timberlands for 2010.

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Application Number: A55039  
Faculty Member: David Briggs  
Role: Principal Investigator  
Title: **Stand Management Coop**  
Agency: Quinault Indian Nation  
Period: 1/1/2010 - 12/31/2010  
Amount: \$6,710.00  
Supplement and Extension

2010 membership dues to Stand Management Coop from Qunault Indian Nation

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Application Number: A55612  
Faculty Member: David Briggs  
Role: Principal Investigator  
Title: **Stand Management Coop**  
Agency: WA Department of Natural Resources  
Period: 1/1/2010 - 12/31/2010  
Amount: \$24,581.00  
Supplement and Extension

2010 Membership Dues for WA State Dept of Natural Resources to Stand Management Coop.

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Application Number: A55697  
Faculty Member: David Briggs  
Role: Principal Investigator

Title: **Stand Management Coop**  
Agency: Cascade Timber Consulting, Inc.  
Period: 1/1/2010 - 12/31/2010  
Amount: \$13,929.00  
Supplement and Extension

2010 Membership dues from Cascade Timber Consulting Inc. to the Stand Management Coop

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Application Number: A55755  
Faculty Member: David Briggs  
Role: Principal Investigator  
Title: **Stand Management Coop**  
Agency: Hancock Forest Management  
Period: 1/1/2010 - 12/31/2010  
Amount: \$25,085.00  
Supplement and Extension

2010 Membership Dues from Hancock Forest Management to the Stand Management Coop.

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Application Number: A55761  
Faculty Member: David Briggs  
Role: Principal Investigator  
Title: **Stand Management Coop**  
Agency: Olympic Resource Management (ORM)  
Period: 1/1/2010 - 12/31/2010  
Amount: \$13,767.00  
Supplement and Extension

2010 Membership Dues to Stand Management Coop from Olympic Resource Management.

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Application Number: A55807  
Faculty Member: Sally Brown  
Role: Principal Investigator  
Title: **Biosolids information and education program**  
Agency: Northwest Biosolids Management Association  
Period: 7/1/2009 - 6/30/2010  
Amount: \$218,000.00  
Non-Competing Supplement

UW staff will continue to provide public information, regulation development, and technical support to the King County Biosolids program. As detailed in the Scope of Work, this will include the following: 1) providing public information through committee support, a community assistance/resource information center, information gathering, and assisting in the BW Biosolids Conference; 2) regulation development, including committee support and regulatory interpretation; 3) research and demonstrations to include W-170 group interaction and projects involving A. the fate of organic compounds in biosolids amended soils, B. Canola growth using biosolids,

and C. lead arsenic and compost; 4) continuing special research projects with the King County Biosolids Program on Canola for Biodiesel, gravel pit, biosolids basics, Class A soil mixes, and organic contaminants; 5) attending NBMA general and board meetings.

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Application Number: A53645

Faculty Member: Soo-Hyung Kim

Role: Principal Investigator

Title: **Climate change monitoring garden at the University of Washington Botanic Gardens**

Agency: Chicago Botanic Garden

Period: 11/1/2009 - 12/31/2012

Amount: \$6,360.00

New

Project goal is collaboration in the establishment of a network of climate change monitoring gardens as a platform to engage citizen scientists in informal science education. The monitoring gardens will provide opportunities for the general public and students to discover and understand how their environment, especially plant communities, is changing relative to climate, while collecting useable data that is of utmost importance to climate change researchers. The project will introduce the public to the issues of global climate change by integrating exhibits, internet-based interactions, self-driven citizen-science initiatives, and informal, community-based, and youth programs. Project objectives are: 1) establish and maintain an interpretive display garden ("climate change monitoring garden") at the University of Washington Botanic Gardens, 2) involve UW students and local community organizations in plant phenology monitoring, 3) collect and archive plant data on a central server. Project will collaborate with researchers at Chicago Botanic Gardens and other participating botanic gardens on developing proposals for further funding opportunities.

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Application Number: A26817

Faculty Member: Joshua Lawler

Role: Principal Investigator

Title: **Forecasting the relative and cumulative effects of multiple stressors on at-risk populations**

Agency: US Department of Defense-Strategic Environmental Research and Development Program

Period: 5/11/2007 - 5/10/2010

Amount: \$62,399.67

New

The project will provide the U.S. Department of Defense (DoD) with a general, easily applied, spatially explicit population model capable of evaluating both the relative and cumulative impacts of a variety of stressors on a wide range of species. The project has three phases. First, new software modules will be developed for the Environmental Protection Agency's Program to Assist in Tracking Critical Habitat (PATCH), an advanced spatially explicit population model. The proposed enhancements will allow PATCH to 1) model complex interactions among stressors, 2) simulate interactions among multiple wildlife populations, and 3) produce a set of easily interpreted graphical outputs and reports. Second, the improved model will be used to evaluate the relative and cumulative impacts of military activities, environmental stochasticity, anticipated climate change, and other species- and site-specific threats to three at-risk species at three DoD sites. Lastly, the project will culminate in a technology-transfer phase in which we provide DoD scientists with both the model and training in its use.

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Application Number: A54503

Faculty Member: L. Monika Moskal

Role: Principal Investigator

Title: **Forest health and green jobs: Natural resources and social data analysis**

Agency: USDA Forest Service

Period: 1/1/2010 - 12/31/2013

Amount: \$244,210.00

New

Project goal is to document a cooperative effort to provide data management, analytical support, and technical products and reports to support the ARRA Forest Health and Green Jobs in Puget Sound projects funding by the American Resource and Recovery Act. The project has the following objectives: (1) provide technical advice and products regarding data management and analysis activities for three Forest Health and Green Jobs JVAs in the Puget Sound region, (2) conduct assessments of forest conditions on select parcels in Washington State's King, Pierce, Snohomish, and Thurston Counties (3) develop and implement tools to evaluate how forested parklands and natural open spaces contribute to human health, (4) evaluate forest stewardship projects, activities, and participants to expand program capacity and operations, and (5) identify high value data sets and help acquire and store relevant data. Project will: (1) identify and provide data platform and develop analysis methods to improve forest health and resource inventory, (2) build understanding of the public values of forest parcels in the places where people live and work, (3) develop forest health assessment tools, (4) develop and use stewardship assessment tools, and (5) provide best management practices guidelines reports.

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Application Number: A49992

Faculty Member: Sandor Toth

Role: Principal Investigator

Title: **Multi-objective optimization to evaluate and sell forest ecosystem services**

Agency: USDA National Institute of Food and Agriculture (formerly CSREES)

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

Amount: \$499,986.00

New

Project goal is to build, test, and deploy a subscription mechanism for forest ecosystem services, ECOSEL. ECOSEL combines multi-objective optimization technology with an auction platform to match willing sellers of eco-services with willing buyers. Optimization is used to identify management plans that lead to Pareto-optimal bundles of forest benefits such as timber, carbon, and old-forest habitat. Bids are solicited for the bundles using the opportunity costs of the plans as reserve prices. The plan with bids whose combined value most exceeds the reserve price is implemented. The project will demonstrate the mechanics of the new technique in a real decision-making context. Specific objectives include: (1) building a web-based implementation of ECOSEL, (2) fine-tuning the design variables of the mechanism both theoretically and empirically, (3) running a real auction, and (4) studying participants' bidding behavior along with the winning scenario to better understand the stakeholders' monetary preferences with respect to ecosystem services. Other objectives are to expand the use of ECOSEL as an educational tool in resource management and environmental economics classes, and as laboratory equipment for economists to study public goods contribution games.

## **PROPOSALS SUBMITTED –**

Application Number: A55612

Faculty Member: David Briggs  
Role: Principal Investigator  
Title: **Stand Management Coop**  
Agency: WA Department of Natural Resources  
Period: 1/1/2010 - 12/31/2010  
Amount: \$24,581.00  
Supplement and Extension

2010 Membership Dues for WA State Dept of Natural Resources to Stand Management Coop.

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Application Number: A55697  
Faculty Member: David Briggs  
Role: Principal Investigator  
Title: **Stand Management Coop**  
Agency: Cascade Timber Consulting, Inc.  
Period: 1/1/2010 - 12/31/2010  
Amount: \$13,929.00  
Supplement and Extension

2010 Membership dues from Cascade Timber Consulting Inc. to the Stand Management Coop

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Application Number: A55755  
Faculty Member: David Briggs  
Role: Principal Investigator  
Title: **Stand Management Coop**  
Agency: Hancock Forest Management  
Period: 1/1/2010 - 12/31/2010  
Amount: \$25,085.00  
Supplement and Extension

2010 Membership Dues from Hancock Forest Management to the Stand Management Coop.

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Application Number: A55761  
Faculty Member: David Briggs  
Role: Principal Investigator  
Title: **Stand Management Coop**  
Agency: Olympic Resource Management (ORM)  
Period: 1/1/2010 - 12/31/2010  
Amount: \$13,767.00  
Supplement and Extension

2010 Membership Dues to Stand Management Coop from Olympic Resource Management.

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Application Number: A55805

Faculty Member: David Briggs  
Role: Principal Investigator  
Title: **Stand Management Coop**  
Agency: Rayonier Timberlands Operating Company  
Period: 1/1/2010 - 12/31/2010  
Amount: \$19,666.00  
Supplement and Extension

2010 Membership dues from Rayonier Timberlands Operating Company to Stand Mgmt Coop.

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Application Number: A55985  
Faculty Member: David Briggs  
Role: Principal Investigator  
Title: **Stand Management Coop**  
Agency: Campbell Group, Inc.  
Period: 1/1/2010 - 12/31/2010  
Amount: \$19,134.00  
Supplement and Extension

2010 Membership dues to Stand Management Coop from Campbell Group.

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Application Number: A55807  
Faculty Member: Sally Brown  
Role: Principal Investigator  
Title: **Biosolids information and education program**  
Agency: Northwest Biosolids Management Association  
Period: 7/1/2009 - 6/30/2010  
Amount: \$218,000.00  
Non-Competing Supplement

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

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Application Number: A54938  
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: 4/1/2010 - 3/31/2011

Amount: \$2,390,216.00

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 6 research projects (4 biomedical, 2 ecological/bioremediation), an Administrative Core, a Research Translation Core, a Functional Genomics and Bioinformatics Core, and an Outreach Core. The Just-in-time indicated on the Face page is for Project 5 (new, PI: Gallagher). 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: A55325

Faculty Member: Sharon Doty

Role: Principal Investigator

Title: **Genetic analysis of eukaryotic nitrogen fixation**

Agency: National Science Foundation

Period: 9/1/2010 - 8/31/2013

Amount: \$798,426.00

New

While studying the nitrogen-fixing endophytes within poplar trees, the profound discovery was made that some of the isolates were yeast, a eukaryotic organism. Since it is believed that only prokaryotic organisms can utilize nitrogen from the air, this was a paradigm shift in our current understanding of nitrogen fixation. We propose to identify and characterize the genes required for this activity thought to be only in the realm of

prokaryotes. We propose to 1) clone the sequences flanking the section of the nitrogenase gene we have so far cloned to obtain the full nitrogenase gene sequence; 2) identify and sequence the extrachromosomal element containing the nitrogenase sequences; 3) analyze the nitrogenase gene and its promoter sequence to elucidate the probable evolutionary origin; 4) use RNA sequencing methods to identify all the genes that are expressed specifically under nitrogen limitation, 5) subcellularly-localize the nitrogenase gene expression; and 6) determine how geographically widespread eukaryotic nitrogen fixation may be by comparison to other putative nitrogen-fixing endophytic yeast strains.

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Application Number: A55590

Faculty Member: Ivan Eastin

Role: Principal Investigator

Title: **Competitiveness in International Forest Products**

Agency: USDA

Period: 7/1/2010 - 6/30/2011

Amount: \$184,632.00

New

The past several years have seen a reversal in most of the macroeconomic factors affecting the US forest products industry, particularly the residential housing sector where housing starts dropped from 2.1 million in 2005 to just 551,000 in 2009. In contrast to the weak domestic market, US exports of wood products increased through 2008 before dropping in 2009, with the weak US dollar helping to improve the international competitiveness of US wood products. With prices low and domestic demand weak, many forest products manufacturers have begun looking to offshore markets again. However, by abandoning their traditional export markets over the past fifteen years, US forest products producers find themselves in the difficult position of reestablishing their presence in export markets. While the high quality and competitive prices of US forest products should help to ease their reentry into these markets, many exporters have lost touch with trends in international markets. In 2009 the US government amended the Lacey Act to require that imported wood products not be manufactured from illegally harvested wood while the Japanese and EU governments have implemented public procurement programs that require legality for imported wood. All of these developments will affect the international competitiveness of US wood exporters. Understanding these measures is critically important in helping guide US wood products exporters determine whether or not to export their products and identify which markets are the best match for their products and marketing capabilities. CINTRAFOR has consistently made the case that exporting broadens a forest products manufacturers' market portfolio, improves their competitiveness and helps offset the market volatility inherent in individual markets since the economies of most countries tend to be countercyclical. This project will provide timely and relevant market information to help manufacturers develop and implement their export strategies. The objectives of this project are: 1) identify changes in the business environment in traditional export markets, 2) identify emerging markets and evaluate potential export opportunities, 3) identify regulatory constraints that adversely impact the competitiveness of US wood products, and 4) broadly disseminate timely and relevant market research to US forest products exporters.

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Application Number: A55767

Faculty Member: Robert Edmonds

Role: Co-Investigator

**Title: Development of a Stormwater Retrofit Plan for Water Resources Inventory Area (WRIA) 9, and Estimation of Costs for Retrofitting all Developed Lands of Puget Sound**

Agency: King County Department of Natural Resource and Parks, Water and Land Resources Division

Period: 7/1/2010 - 6/30/2013

Amount: \$243,907.00

New

Contribute to hydrological modeling (calibration, tests, and simulations). Synthesize hydrological model results to identify advantages and disadvantages of the proposed numerical models (dhsvm, hspf) for various future applications (e.g., storm water quantity and quality management, land management) in the Green-Duwamish watershed as well as the Puget Sound basins. There is a benefit to compare the outputs from both the dhsvm and hspf for wider applicability. Model outputs from dhsvm will be provided using a NOAA grant.

Assess and establish subbasin (and/or regional) scale flow targets considering basin land use/cover, soils, and channel and landscape morphology.

Establishing, testing, and modifying the SUSTAIN model at UW. Implement the model for both dhsvm and hspf model outputs and compare-contrast and develop synthesis of the SUSTAIN model results for subbasins and the entire Green-Duwamish watershed. Develop methods (based on for example land cover/use, weather variables, and basin soils and morphology) for the extrapolation of SUSTAIN model results to the entire Puget Sound.

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Application Number: A55355

Faculty Member: Gregory Ettl

Role: Principal Investigator

Faculty Member: Soo-Hyung Kim

Role: Co-Investigator

**Title: Calculating C flux and storage at Fort Lewis, Washington**

Agency: US Department of Defense-Strategic Environmental Research and Development Program

Period: 7/1/2011 - 6/30/2016

Amount: \$4,663,711.00

New

The potential of managed forests to offset greenhouse gas emissions through forestry is possible under the UN Framework Convention on Climate Change as part of the Kyoto protocol under the Clean Development Mechanism (CDM). Ecological forestry holds the potential to satisfy CDM requirements if additionality and permanence can be adequately demonstrated. Therefore management for natural stand dynamics in the Pacific Northwest (PNW--e.g., Franklin et al. 2001) that could mimic landscape scale ecosystem integrity through incomplete harvests and/or long rotations. Forests have demonstrated C sequestration potential as undisturbed reserves and also under short rotations (reviewed by Malmshemer et al. 2008), and in the PNW the debate has simmered over the relative contributions of the amount of C stored in wood products (Perez-Garcia et al. 2005), C costs of substituting more energy intensive building materials (Lippke and Edmonds 2006), and the ability of old-growth forests to continue to sequester C for centuries (Zhou et al. 2006, Luyssaert et al. 2008). The storage and flux of C in forested ecosystems of Fort Lewis will be determined through a combination of forest inventory, silviculture manipulation, and physiological measurements along both a chronosequence of stand ages and experimental treatments. We focus on Douglas-fir dominated forests with the goal of quantifying C stores and fluxes in these systems under various management regimes. Stands

managed for ecological forestry will be compared with various harvest intensities, and no harvest controls, in at least one case in the presence and absence of fire. Our approach involves measurements over a space-for-time chronosequence to estimate C pools in forests of various ages both before and after specific silvicultural treatments. We also will take detailed measurements of C fluxes for 5 years by installing and maintaining Eddy covariance systems across replicated experimental treatments for purposes of measuring net carbon accumulation. Five years of flux measurements are required as temporal variation of C flux is expected to vary from year-to-year (Falk et al. 2008). Measurements of fluxes will be used in conjunction with chronosequence inventories and growth and C storage projections and life cycle analysis to determine the potential of forest management to impact C sequestration at Fort Lewis.

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Application Number: A53645

Faculty Member: Soo-Hyung Kim

Role: Principal Investigator

Title: **Climate change monitoring garden at the University of Washington Botanic Gardens**

Agency: Chicago Botanic Garden

Period: 11/1/2009 - 12/31/2012

Amount: \$6,360.00

New

Project goal is collaboration in the establishment of a network of climate change monitoring gardens as a platform to engage citizen scientists in informal science education. The monitoring gardens will provide opportunities for the general public and students to discover and understand how their environment, especially plant communities, is changing relative to climate, while collecting useable data that is of utmost importance to climate change researchers. The project will introduce the public to the issues of global climate change by integrating exhibits, internet-based interactions, self-driven citizen-science initiatives, and informal, community-based, and youth programs. Project objectives are: 1) establish and maintain an interpretive display garden ("climate change monitoring garden") at the University of Washington Botanic Gardens, 2) involve UW students and local community organizations in plant phenology monitoring, 3) collect and archive plant data on a central server. Project will collaborate with researchers at Chicago Botanic Gardens and other participating botanic gardens on developing proposals for further funding opportunities.

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Application Number: A55829

Faculty Member: L. Monika Moskal

Role: Principal Investigator

Title: **Time Series Analysis of Wetland Dynamics through Spectral Mixture Analysis (SMA) of Landsat Imagery**

Agency: National Aeronautics and Space Administration

Period: 9/1/2010 - 8/31/2011

Amount: \$30,000.00

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: A55838

Faculty Member: L. Monika Moskal

Role: Principal Investigator

Title: **Detecting Riparian Forest Structure and Function Change**

Agency: National Aeronautics and Space Administration

Period: 9/1/2010 - 8/31/2011

Amount: \$30,000.00

New

Detailed, spatially explicit information about the diversity and distribution of forest structure is essential to planning increasingly efficient management activities related to biomass, carbon sequestration, habitat, and fuels. As land use practices and wildfires continue to affect our forested and aquatic ecosystems it is imperative that methods are developed which allow for accurate predictions pertaining to changing forest stand structure and its relationship to healthy watershed functioning. In this research, computer models will be produced that expand upon existing LiDAR-based modeling techniques related to high resolution forest inventory and analysis as well as land cover and land use change detection. Novel riparian zone characterization techniques will be developed that more accurately account for vegetation shading/thermal loading and coarse woody debris (CWD) recruitment potential than existing models which are based on crude estimates. Maps will be generated which illustrate the spatial diversity of aquatic thermal loading and CWD recruitment potentials across the Ft. Lewis Military Installation. These activities will contribute strongly to NASA's strategic sub-goal 3A.3 [5] to progress in quantifying global land cover change and terrestrial and marine productivity, and in improving carbon cycle and ecosystem models. Aerial LiDAR systems provide a new tool for addressing these important issues as well as provide an opportunity to calibrate space borne LiDAR and RADAR sensors, both current and proposed.