



UNIVERSITY *of* WASHINGTON

School of Forest Resources

RESEARCH NEWSLETTER ISSUE ONE, VOLUME 12

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News

OSP Team B is coming to a “meet and greet” on October 7 at 10:00 a.m. in Rm. 22. In attendance will be Robin Mondares, the analyst we usually work with, Carol Rhodes, asst. director of OSP, and Kathryn Hovick and Janet Meadows, the other members of Team B. This is just to get acquainted; they will bring information about upcoming changes and initiatives and are interested in meeting with as many people as are available. Administrative staff (and PIs) are invited to bring any questions they may have about processing; PIs will also be asked to take just a minute or two to describe the research they are doing. Reservations are not necessary.

Awards

Application Number: A60009

Faculty Member: Ernesto Alvarado

Role: Principal Investigator

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

Agency: USDA Forest Service

Period: 4/1/2009 - 3/31/2014

Amount: \$404,209

Non-Competing Supplement

Faculty Member: James Agee

Role: Co-Investigator

This amendment to the Joint Venture Agreement (JVA) will continue the support of the research conducted by the Fire and Environmental Research Team (FERA) at the USFS Pacific Wildland Fire Sciences Laboratory for the Interagency Joint Fire Sciences Program. The research will be conducted and

applied to national forests under the administration of the USFS and other federal agencies, and throughout North America.

Specific objectives for this amendment to the cooperative research are:

- To continue collecting fuel consumption data and environmental variables from a series of prescribed fires in National Forests of the SE United States to improve fuel consumption models for southern and north central forest regions of the United States.
 - To continue a study of fuel amount and composition following dormant and growing season prescribed fires for flatwoods pine ecosystems in the southern United States.
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Application Number: A60137

Faculty Member: Ernesto Alvarado

Role: Principal Investigator

Title: **Fuel & Fire Hazard Assessment at the USFS Savannah River**

Agency: USDA Forest Service

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

Amount: \$14,992

Supplement and Extension

The purpose of this amendment to the Challenge Cost Share Agreement is to work cooperatively to continue development of a fuel and fire hazard assessment for the USFS Savannah River Site using the Fuel Characteristic Classification System, and to complete the development and analysis of a matrix of FCCS fuelbeds and fire potential predictions that represent the range of prescribed fire conditions. Under this new funding agreement, the SRS, the USFS PWFSL, and the University of Washington teams propose to expand the capacity of FCCS to evaluate the effectiveness of fuel treatments conducted in the spring of 2010. The results of this study will allow us to: (1) improve the spatial resolution and accuracy of fire hazard assessments at SRS in order to evaluate different fuel treatment options, (2) expand the capacity of FCCS to be applied to landscape-level fire hazard assessment, (3) refine the FCCS fuelbeds that have been developed during the initial phase of this agreement to reflect the changes on fuelbeds caused by treatments of hazardous fuels.

Application Number: A59981

Faculty Member: Stanley Asah

Role: Principal Investigator

Title: **Role of motivations on involvement and participation in stewardship organizations: Case of Greater Seattle**

Agency: USDA Forest Service

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

Amount: \$17,852

New

Project goal is to understand and enhance the structure and function of stewardship organizations within the Seattle-Tacoma area as part of the Green Cities Research Alliance for the purposes of achieving social-ecological sustainability within the Seattle-Tacoma area. A secondary goal is to facilitate transferability of insights that may foster stewardship towards achieving social-ecological sustainability goals across the nation. Using a database of over 700 stewardship and sustainable design organizations within the Seattle-Tacoma area, this study will 1) explore the empirical basis for understanding the influence of various dimensions of motivations on involvement and participation in stewardship and sustainable design organizations; 2) contribute to understanding the structure and function of, including variation among, various stewardship and sustainable design organizations; and 3) serve as an empirical basis for the transferability of insights fostering the stewardship of social-ecological sustainability goals across the nation.

Application Number: A36621

Faculty Member: Jonathan Bakker

Role: Principal Investigator

Title: **Controls on conifer regeneration patterns (1909-2011) and implications for future stand development (2012-2061) in southwestern forests**

Agency: Northern Arizona University

Period: 7/1/2008 - 6/30/2011

Amount: \$134,547

New

Project will examine the effects of past and present land management practices on the long-term sustainability of southwestern forests. Large forested areas in the American Southwest are being treated to reduce fire hazard (no action, thinning at different intensities and patterns, prescribed burning), yet we do not know how these current management activities will affect future stand development. Research will examine the factors affecting past and present conifer regeneration, and forecast how stands will respond to contemporary management practices and to climate change. Specifically, project will consider the relative importance of four general factors (abiotic environment, land-use history, forest overstory, and herbaceous understory). Contemporary data will be collected from stands throughout Arizona and New Mexico that are subject to a range of management actions (e.g., no treatment, thinning, prescribed burning) to validate the conceptual model, and the historical dataset spanning ~ 100 years will be used to test this model and assess the ability to forecast stand development. Stand development will be modeled over the next 50 years and concomitant changes in variables such as tree growth, regeneration patterns, and forage production.

Application Number: A57460

Faculty Member: David Briggs

Role: Principal Investigator

Title: **Stand Management Cooperative**

Agency: Oregon Department of Forestry

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

Amount: \$27,545

Supplement and Extension

2010 Membership Dues to Stand Management Coop from Oregon Department of Forestry, State of Oregon.

Application Number: A60177

Faculty Member: John Calhoun

Role: Principal Investigator

Title: **Building a Web-Based Interface to the Restoration Silviculture Initiative**

Agency: USDA Forest Service

Period: 9/15/2009 - 12/31/2012

Amount: \$83,213

Non-Competing Supplement

Decision-making may properly be regarded as a problem solving activity which is terminated when a satisfactory solution is found. Therefore, decision making is a reasoning or emotional process which can be rational or irrational, can be based on explicit assumptions or tacit assumptions. The rational-iterative approach is one such decision-making process that is particularly suitable for management of forest ecosystems. Repeated iterations of feedback between analysts and decision-makers lead to the development of an understanding of the tradeoffs among objectives for the decision-makers.

Many small, non-industrial land owners now face the important decision of continuing to invest in forestry in the face decreasing revenue potential, or to divest. This is particularly true where riparian regulations are in effect; this project will continue to develop management models and coordinate their online deployment. Of particular emphasis is content directed at riparian management decision-making.

Application Number: A60650

Faculty Member: Douglas Deur
Role: Principal Investigator
Title: **A study of traditional activities in the Exit Glacier area of Kenai Fjords National Park**
Agency: USDI National Park Service
Period: 8/1/2010 - 11/23/2013
Amount: \$15,627
New

Project goal is to research and write a report "Traditional Activities in the Exit Glacier Area of Kenai Fjords National Park," using detailed oral histories already compiled among individuals from the Seward area, along with secondary sources. The central portion of the park contains the Harding Icefield, one of the largest ice fields in the U.S., from which no fewer than 38 active glaciers exit into valleys and tidewater locations surrounding the park. Of these glaciers, Exit Glacier is the most publicly accessible, with road access from the town of Seward. The life histories and other information presented in the report will provide insights into the history of Seward of value to National Park Service interpreters; it will also describe Seward residents' traditional activities, as defined by Title XI of the Alaska National Interest Lands Conservation Act, in and around Seward with special emphasis on the Exit Glacier area.

Application Number: A45614
Faculty Member: Ivan Eastin
Role: Principal Investigator
Title: **Rose Braden Staff Assignment**
Agency: Evergreen Building Products Association
Period: 10/1/2008 - 12/31/2010
Amount: \$165,892
Supplement and Extension

Admin support for Rosemarie Braden for the period, 10/1/2008 - 12/31/2010

Application Number: A60927
Faculty Member: Ivan Eastin
Role: Principal Investigator
Title: **Branding Tribal Timber**
Agency: Intertribal Timber Council
Period: 1/1/2010 - 12/31/2010
Amount: \$64,584
New

Faculty Member: Larry Mason
Role: Co-Investigator

Project goal is to develop a tribal forest products branding/marketing strategy in the face of current depressed markets for forest products. Historically, tribal forest products have been sold as commodities with little effort to differentiate them from similar products manufactured by others. However, many tribal forestry programs produce logs with unique qualities, such as large diameters and tight grain. Tribal resource management is based on a unique integration of cultural, environmental, and economic values that contribute many public benefits and ecosystem services, considerations generally not recognized or rewarded in the marketplace where tribal forest products are sold. Specific objectives include 1) Identify the tribes interested in participating in a tribal branding program and develop an inventory of available products, processing capabilities, species, and locations; 2) For tribal forest products, determine market interest, identify distinguishing branding and marketing opportunities, describe the features that could add value, and quantify potential market premiums; 3) For tribal forest products, identify requirements for branding(e.g., product standards and quality assurance controls, reporting), opportunities for regional branding, and alternatives for defraying costs (e.g., use of trademarks, labeling fees); 4) Identify and evaluate alternatives and opportunities for marketing tribal forest products (e.g., individual tribal programs, regional multi-tribal consortia, internet-based matching of buyers and suppliers, fee-based brokerage and sales services), public awareness campaigns to increase market presence and shares, and niche markets; 5) Identify and evaluate alternatives for certification of forest and finished products(chain of custody, sustainability for

domestic and foreign markets); and 6) Identify other opportunities to increase income from tribal forest products and management.

Application Number: A59613
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **CSF-PF/WA State Parks on-Call Projects**
Agency: WA State Parks and Recreation Commission
Period: 7/15/2010 - 6/30/2011
Amount: \$40,000
New

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

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

- Undertaking forest health surveys to assess the condition of COMMISSION natural resources;
 - Creating appropriate records of field surveys, analyzing data and providing management recommendations for the COMMISSION, with consideration of stakeholders for specific areas in and around the state park system;
 - Marking timber, creating timber contracts and overseeing forestry operations implemented across COMMISSION natural resources;
 - Monitoring the response of forest attributes to restoration actions;
 - COMMISSION will provide available agency natural resources information, timely reviews of CSF-PF products, and CSF-PF will be responsible for assuring completion of projects.
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Application Number: A60338
Faculty Member: Jerry Franklin
Role: Principal Investigator
Title: **Ecosystem Management 6**
Agency: USDA Forest Service
Period: 10/1/2010 - 3/31/2011
Amount: \$224,970
Non-Competing Supplement

This funding request is proposed for the continued support and operations of the Wind River Canopy Crane Research Facility (WRCCRF), located in SW Washington, and is based on the Memorandum of Understanding between PNW Station and UW regarding operations at the canopy crane.

The WRCCRF is a cooperative scientific endeavor among the University of Washington, USDA PNW Research Station, and the Gifford Pinchot NF. The mission of this program is to provide a facility, canopy access, data information and education for those wishing to better understand the forest canopy within the context of forest science and management in its broadest sense. The centerpiece of the research facility is a 250 ft. freestanding construction tower crane. The crane is located in a 500-yr old-growth patch within the T. T. Munger, Research Natural Area, and is used as an access tool for scientists and educators to accomplish research and gain knowledge of forest ecosystems. The WRCCRF was established in 1994 as the only tower crane operating in North America within the context of canopy research, and is currently a focal point of environmental research for many Universities and government agencies.

Major research projects supported by the crane operations include productivity and carbon cycling in forest ecosystems, relations between habitat and biological diversity, and ecology of forest diseases and insects.

Application Number: A55799

Faculty Member: Thomas Hinckley

Faculty Member: Jim Lutz

Role: Principal Investigator

Role: Co-Investigator

Title: Combing Landsat and LiDAR remote sensing to refine fire management objectives related to forest structural heterogeneity in Yosemite National Park, CA

Agency: USDI National Park Service

Period: 5/1/2010 - 9/30/2011

Amount: \$68,150

New

Project goal is to develop landscape-scale spatial information on vegetation structural heterogeneity (e.g., size, shape, and vertical and horizontal patch structural heterogeneity) to provide essential insight for developing restoration and maintenance target conditions in particular vegetation types. As fires burn heterogeneously across a landscape of mixed vegetation types, variability in vegetation and fire behavior create a mosaic of burn severity patches. These patches vary in size and shape and the amount of post-fire change in the vegetation structure. Patch heterogeneity influences post-fire plant establishment, wildlife and plant species abundance, community composition, structural heterogeneity, and wildlife use patterns as well as fire behavior in future repeated burns. However, unnaturally large individual patches or limited patch connectivity can seriously hinder forest ecosystem function and potentially lead to vegetation type conversions. For example, many wildlife species, such as the California spotted owl or northern flying squirrel, perceive large 'non-habitat' (e.g., canopy gaps) patches as barriers to dispersal or foraging activity. These uncharacteristically large patches can be created by changes in fire regime attributes resulting in higher accumulation of fuels for that particular vegetation type.

Aside from fire management applications, this type of spatial information would be invaluable to resource managers in answering multi-disciplinary questions. For example, how does gap size, shape, and position in the landscape influence plant and animal species diversity, animal movement patterns, plant species establishment, or probability of vegetation type conversion? Specific objectives are to answer the following questions: 1) In the landscape context, can we spatially define a significant change in vegetation structure at different ecologically relevant levels (e.g., plant and animal) using structural and burn severity data? For example, what are the scale limitations of this data due to the collection resolution? Once we define this limitation of scale, any researcher can use the data for any particular species that would be appropriate for that scale. With LiDAR, there is a potential to have a resolution of <10 m² in the final GIS map we produce with this proposed work. 2) Within a particular vegetation type, how does patch or gap vegetation structure differ with time since the fire burned and burn severity? Specifically, how does a 2-year-old moderate severity burn compare to a 5-year-old high severity burn, or a 10-year-old burn? 3) How does fire severity influence patch spatial characteristics (e.g., size, shape, tree spacing, location of forest gaps)? 4) Can we integrate LiDAR, orthophoto quadrats, and Landsat TM data to develop a Yosemite-wide GIS map depicting vertical and horizontal vegetation structure?

Application Number: A57978

Faculty Member: Thomas Hinckley

Faculty Member: Jim Lutz

Role: Principal Investigator

Role: Co-Investigator

Title: Annually resolved impacts of fire management on carbon stocks in Yosemite and Sequoia and Kings Canyon National Parks

Agency: USDI National Park Service

Period: 8/5/2010 - 1/29/2013

Amount: \$11,190

New

Project goal is to quantify effects of fire management over the past 30 years at Yosemite and Sequoia and Kings Canyon National Parks to determine the impacts of restoring fire to park landscapes on the stability and management of carbon stocks. 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. Project will quantify the effects over a 30 year timescale by leveraging detailed fire history, vegetation, and fuels datasets to quantify biomass in areas where fire has been suppressed vs. areas where fire has been restored.

Project 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 static and dynamic approaches need to be included because 1) much of the information developed from the static approach underpins the dynamic approach; 2) conducting the more complex dynamic approach will allow evaluation of 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, potential users of these methodologies can better decide which approach is best for their situation.

Application Number: A58971
Faculty Member: Thomas Hinckley
Role: Principal Investigator
Title: **2010 McIntire Stennis**
Agency: USDA
Period: 10/1/2009 - 9/30/2010
Amount: \$486,601
New

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

Application Number: A56475
Faculty Member: Soo-Hyung Kim
Role: Principal Investigator
Title: **Modeling forest ecosystem responses to climate change in Korea**
Agency: National Center for Agricultural Meteorology
Period: 3/16/2010 - 2/28/2013
Amount: \$100,000
New

Project goal is to study the impacts of projected regional climate change on forest ecosystems in Korea. The overall objective is to develop a structured modeling framework for assessing how climate change is likely to affect forest ecosystems in Korea through both abiotic and biotic pathways that include pest and pathogen dynamics. Project will use pine forests (e.g., Korean pine [*Pinus koraiensis*], Japanese red pine [*Pinus densiflora*], and black pine [*Pinus thunbergii*]) that are particularly sensitive to pest and pathogen pressures (e.g., pine wilt nematode [*Bursaphelenchus xylophilus*], pine needle gall midge [*Thecodiplosis japonensis*]) as a model system to build this framework, with the expectation that the

framework can be used subsequently for other key tree species in Korea. Climate envelope models will be developed for select native and introduced maple species to demonstrate and visualize the impacts of climate change on range shift and distribution of these trees in East Asia including Korea.

Application Number: A61021
Faculty Member: L. Monika Moskal
Role: Principal Investigator
Title: **Urban Natural Resources Stewardship: Geospatial Data Assessment and Management**
Agency: USDA
Period: 8/14/2010 - 8/20/2011
Amount: \$8,000
Supplement and Extension

The purpose of this JVA is to launch a partnership for identifying, assessing, and organizing social and biophysical data that can be used to help support the urban natural resources research initiative being developed in Seattle. The project will include basic analysis work including geospatial and statistical analysis and joint work on research questions of interest and research reports and publications

Application Number: A60542
Faculty Member: Sarah Reichard
Role: Principal Investigator
Title: **Center for Plant Conservation ex situ review**
Agency: Center for Plant Conservation
Period: 6/1/2010 - 12/31/2010
Amount: \$625
New

Project goal is compiling information on ex situ collections of sensitive plant species held in the UW Botanic Gardens' Miller Seed Vault. Focus will be on collections of high priority species from populations on U.S. Forest Service lands, as well as ex situ material of these species that originated from lands of other ownership. The information will be used to plan for priority ex situ work to ensure recovery and restoration potential for sensitive species and their habitats.

Application Number: A58472
Faculty Member: Luke Rogers
Role: Principal Investigator
Title: **DOH Parcel Database Development Phase II**
Agency: WA Department of Health
Period: 7/1/2010 - 6/30/2011
Amount: \$120,000
Supplement and Extension

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. It assists in helping identify potential sources of contamination near drinking water sources.

The already completed Phase I piece of this project collected available geographic information systems parcel data and attributes for Washington's thirty-nine counties, State and Federal land management agencies, integrated the data into a single geospatial database, and created a project website to document the data collection and integration process to help streamline future data collection efforts. Phase II of the project developed processes and infrastructure to periodically update the integrated parcel database, collect updated GIS data from local, state and federal data providers, integrate the data into the normalized statewide database to test procedures, research archival and temporal storage options for historical data and convene at least monthly meetings of the Parcels Working Group to present progress. The current proposal is for Phase III, which focuses on refining processes and infrastructure to increase automation of the updating of the integrated parcel database, automate

metadata documentation procedures, collect updated GIS data from data providers, and integrate the data into a 2010 normalized statewide parcel database.

Application Number: A59853
Faculty Member: Luke Rogers
Role: Principal Investigator
Title: **GIS-Based LiDAR Ground Plot Selection Protocol**
Agency: USDA Forest Service
Period: 4/1/2010 - 3/31/2013
Amount: \$70,000
Supplement and Extension

Airborne laser scanning (LiDAR) data can be used to map forest inventory and structure across large areas when appropriate ground sample plots are carefully located and measured. This project will develop Geographic Information System (GIS) protocols for stratifying forest lands using LiDAR derived canopy structure metrics.

The primary purpose of the proposed collaboration is to develop a GIS-based protocol for ground plot selection in areas with high-density LIDAR coverage. The study area is approximately 250,000 acres of USDI Bureau of Land Management (BLM) and Coquille tribal forests in the south Oregon coastal forests embedded in a 1.6 million acre area over which LIDAR data were collected in 2005 and 2009. The BLM plans to measure approximately 1,200 ground plots (1/8th -acre, circular) within the BLM and Coquille ownership in 2010. However, the BLM lacks a statistically sound protocol for selecting field plot positions across the range of forest conditions present on these lands.

The PNW and RTI scientists will develop a LIDAR-optimized sampling protocol built on earlier work by Hawbaker et al. (2009).

With the proliferation of LIDAR data collection in heavily forested areas, new methods for selecting field ground plots need to be developed. Prior methods of photographic interpretation were cumbersome and labor intensive. The primary products will be: a GIS protocol for stratifying forests with LIDAR coverage using LIDAR metrics; and, a GIS protocol for then selecting plot locations in each stratum.

Application Number: A60176
Faculty Member: Eric Turnblom
Role: Principal Investigator
Title: **Data Gathering for Updated Logging Residue Ratios**
Agency: USDA Forest Service
Period: 8/1/2010 - 12/31/2010
Amount: \$121,734
Non-Competing Supplement

Biomass from forestry residues has been identified as a significant potential source of renewable energy. An inventory of biomass resources available for energy production in Washington was conducted by scientists at Washington State University (J.D. Kerstetter and J.K. Lyons. 2001. "Logging and Agricultural Residue Supply Curves for the Pacific Northwest"). Study results identified wood residuals from forestry operations and products manufacture as the largest source of in-state-produced biomass that could be used for energy conversions. The magnitude of the forest resource was found to be equal to the volume of other resources (e.g. agricultural residues, municipal waste) combined.

Biomass supply curves illustrate the cost of delivering a specific quantity of biomass to a specific location. In general, the marginal cost increases as the quantity needed increases. The basic task is to determine where available material is located and how much it costs to collect and transport to a specific location. The amount of available woody biomass in a region is a product of the type and frequency of forest operations in that region. This quantity may be reduced by environmental constraints, market competition, and willingness of the resource owners to supply the material. The purpose of this report is to update the data - according to established methods - upon which more accurate supply curves may be developed.

Proposals

Application Number: A59678
Faculty Member: Jonathan Bakker
Role: Principal Investigator
Title: **Fire histories of Turn Point and Kellett Bluff, San Juan Islands, Washington**
Agency: USDI Bureau of Land Management
Period: 10/1/2010 - 9/30/2012
Amount: \$8,000
New

The purpose of this project is to determine the frequency, variability, extent, and seasonality of historic fire activity at two sites in the San Juan Islands that are administered by the Bureau of Land Management. The sites are Turn Point (Stuart Island) and Kellett Bluff (Henry Island). This information will be incorporated into a forthcoming set of management guidelines for the San Juan management area.

Application Number: A60759
Faculty Member: Sharon Doty
Role: Principal Investigator
Title: **Phytoremediation with endophytes**
Agency: Edenspace Systems Corporation
Period: 4/1/2011 - 10/30/2011
Amount: \$49,968
New

This project explores endophyte-assisted phytoremediation of organic pollutants. We are focusing on the microbes living within poplar and willow, two plant genera with proven phytoremediation capabilities. These internal microbes, termed endophytes, have excellent plant growth-promoting properties. In addition, they have the potential for improving the remediation capability of the host plant. Since endophytes colonize the vascular tissues and intercellular spaces of the plant without causing disease, they can partner with the plant to degrade the pollutants that pass through the plant.

We are currently working with a number of microbial strains that degrade TCE and PAHs. By inoculating poplar with these strains and selecting for effective colonization or conjugative transfer of catabolic genes to the existing endophytic microbial population, we hope to cultivate the optimum partnership for enhanced phytoremediation.

Application Number: A60576
Faculty Member: Ivan Eastin
Role: Principal Investigator
Title: **Understanding the factors that influence the adoption and diffusion of energy efficient technologies in the US, China, and Japan**
Agency: National Science Foundation
Period: 1/1/2011 - 12/31/2012
Amount: \$399,835
New

Faculty Member: Indroneil Ganguly
Role: Co-Investigator

Residential and commercial buildings represent 40.5% of energy use in the US, 32.3% in Japan and 28.9% in China. Increasing concern about dependence on foreign oil and its implications for national security and global warming, have spurred efforts in the US, Japan and China to adopt energy efficient construction technologies and products in an effort to reduce energy use in residential and commercial structures. Research shows that the adoption of more sustainable and innovative building technologies and materials can reduce energy use as well as greenhouse gas emissions significantly. However, the adoption and diffusion of energy efficient technologies and materials is often hindered by a variety of factors, including, (i) homebuilder characteristics (such as perceptions of risk), (ii) the fragmented structure of the construction industry, (iii) the level and nature of State intervention and (iv) the

characteristics of the technology/material under consideration (such as switching costs). The proposed research will examine the factors that influence residential builders' decision to adopt energy efficient technologies and materials in the US, Japan and China. Building technologies and materials with varying level of innovativeness will be considered in the research. In addition, the cross-national, cross-product comparative design of this project enables a comparison of the role of State intervention (US – Low; Japan – Moderate; China – High) and the degree of innovativeness of technologies and materials on the firms' decision to adopt new products. Given the fragmented nature of the residential construction industry in all three countries, the research will employ network analysis and spatial contagion modeling to help analyze and understand the adoption and diffusion process. Data for this research will be collected in the US, Japan and China using a structured questionnaire administered to homebuilders in all three countries.

This research comes at an important point in the evolution of the US environmental and trade policies. The US government is not only emphasizing the importance of increased energy efficiency on national security but it is looking to double US exports by 2015. The proposed research will help US policy makers and exporters better understand the factors that influence the adoption of new energy efficient technologies and materials. The project will also help exporters assess the competitiveness of their products and develop strategic marketing plans to introduce these products into Japan and China.

Application Number: A60927
Faculty Member: Ivan Eastin
Role: Principal Investigator
Title: **Branding Tribal Timber**
Agency: Intertribal Timber Council
Period: 1/1/2010 - 12/31/2010
Amount: \$64,584
New

Faculty Member: Larry Mason
Role: Co-Investigator

Project goal is to develop a tribal forest products branding/marketing strategy in the face of current depressed markets for forest products. Historically, tribal forest products have been sold as commodities with little effort to differentiate them from similar products manufactured by others. However, many tribal forestry programs produce logs with unique qualities, such as large diameters and tight grain. Tribal resource management is based on a unique integration of cultural, environmental, and economic values that contribute many public benefits and ecosystem services, considerations generally not recognized or rewarded in the marketplace where tribal forest products are sold. Specific objectives include 1) Identify the tribes interested in participating in a tribal branding program and develop an inventory of available products, processing capabilities, species, and locations; 2) For tribal forest products, determine market interest, identify distinguishing branding and marketing opportunities, describe the features that could add value, and quantify potential market premiums; 3) For tribal forest products, identify requirements for branding(e.g., product standards and quality assurance controls, reporting), opportunities for regional branding, and alternatives for defraying costs (e.g., use of trademarks, labeling fees); 4) Identify and evaluate alternatives and opportunities for marketing tribal forest products (e.g., individual tribal programs, regional multi-tribal consortia, internet-based matching of buyers and suppliers, fee-based brokerage and sales services), public awareness campaigns to increase market presence and shares, and niche markets; 5) Identify and evaluate alternatives for certification of forest and finished products(chain of custody, sustainability for domestic and foreign markets); and 6) Identify other opportunities to increase income from tribal forest products and management.

Application Number: A61197
Faculty Member: Ivan Eastin
Role: Principal Investigator
Title: **Factors influencing the Spatio-temporal diffusion of innovative 'Green' technologies**
Agency: National Science Foundation
Period: 1/1/2011 - 12/31/2012
Amount: \$501,061
New

Faculty Member: Indroneil Ganguly
Role: Co-Investigator

In recent years, an enhanced understanding of anthropogenic global warming has led to an increased emphasis on 'green' living by political leaders, scientific communities and social organizations. Accordingly, the consumer and business-to-business markets have experienced an influx of innovative products and technologies, supported by a variety of awareness campaigns, incentives and certification programs by government and non-governmental agencies, promoting a 'greener' lifestyle. The proposed project will provide a comprehensive understanding of the roles of innovation characteristics and geo-socio-economic factors in the spatial and temporal diffusion of technologies that aim to reduce the environmental impact of human activities (popularly known as 'green technologies' or 'clean technologies'). An interdisciplinary team of researchers from the University of Washington (UW) in Seattle and National Association of Home Builders (NAHB) Research Center in Maryland will investigate the spatio-temporal adoption and diffusion patterns of a series of 'green' technologies/products within a fragmented industry framework.

The project team, consisting of researchers from the College of the Environment, Foster School of Business, the Geography Department and the Center for Studies in Demography and Ecology at the UW and the NAHB Research Center will develop a theoretically plausible, practically implementable and empirically established spatio-temporal modeling framework for 'green' technologies within the US homebuilding industry. The project will also develop a web-based interface using a geographic information system (GIS) that will be made available to researchers, industry leaders, policy makers and other interested parties. The empirical estimation of the models will be based on a dataset amassed from primary and secondary sources, including: (i) a dataset consisting of 15 cross-sectional yearly surveys of the building material usage practices of over 30,000 US homebuilders collected by the NAHB Research Center since 1995 (the respondents in this dataset are geo-referenced using FIPS code), (ii) secondary data on geo-socio-economic variables from yearly census data appended to the 15 year material usage practice dataset, and (iii) a telephone survey of 400 homebuilders exploring perceived innovation characteristics and barriers to the adoption of the 'green' technologies under consideration.

The proposed research will investigate the diffusion of innovative 'green' products and technologies, incorporating the role of geo-socio-economic factors, using a temporal and spatial contagion modeling framework. By doing so, the proposed research will further the understanding of innovation adoption based on innovation characteristics and perceived barriers to the adoption of innovations within a fragmented project-based industry setting. Alongside the regular venues of research dissemination (e.g., conference presentations, academic publications and industry white papers), the research findings will be disseminated using an interactive web-based geographic information system technology with enhanced visualization of the modeling outcomes.

Application Number: A60921

Faculty Member: Robert Edmonds

Role: Principal Investigator

Title: **Efficacy of Biocontrol Agents Applied to Bare-Root Conifer Seedlings Grown Under Minimal Buffer Zone Rates of Soil Fumigation**

Agency: USDA

Period: 9/16/2010 - 9/15/2012

Amount: \$31,000

New

Bare-root conifer seedling culture consists of growing seedlings (sown or transplanted) in soil, and is the predominant method for supplying America's need for healthy tree regeneration stock. Each year well over 300 million seedlings are grown for regeneration purposes in the southeastern and western United States. Soil fumigation with Methyl Bromide and other chemical agents has been the operational means to assure that soils are free of weeds and disease and that disease free seedlings are planted. The recent EPA RED (2009) decisions on re-registration of soil fumigants is restricting their use. Thus it is imperative to design and test new disease control strategies that can consistently deliver cost-effective and environmentally acceptable integrated pest management (IPM) alternatives for disease control. Specifically, we will test the efficacy of fungal and bacterial biocontrol agents coupled with the use of less soil fumigants to mitigate a root pathogen complex. The study will be conducted in two Douglas-fir seedling nurseries in Oregon (Canby and Aurora).

Application Number: A59993
Faculty Member: Gregory Ettl
Role: Principal Investigator
Title: **The Western Mountain Initiative: Vulnerability and Adaptation to Climate Change in Western mountain Ecosystems**
Agency: USDI US Geological Survey
Period: 9/15/2010 - 9/15/2012
Amount: \$160,000
Supplement and Extension

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

Application Number: A57812
Faculty Member: Richard Gustafson Faculty Member: Renata Bura
Role: Principal Investigator Role: Co-Investigator
Title: **Washington State Biofuels Industry Development**
Agency: US Department of Energy
Period: 10/1/2010 - 12/31/2011
Amount: \$1,000,000
New

The object of this project is to develop a world class laboratory for research on the production of fuels and high value chemicals from cellulosic biomass feedstocks. Specific areas of research that this allocation will support are fractionation of biomass components and conversion of biomass into high value chemicals. Research is on-going at the University of Washington to develop processes for conversion of cellulosic biomass into fuels and chemicals. Our research is focusing on bioconversion processes. We are currently building a bioconversion pretreatment laboratory. To complement this facility we will construct a laboratory focused on biomass fractionation and conversion to high value chemicals. Construction of the laboratory will involve renovation of existing laboratory space and purchasing the equipment necessary for our current and proposed research projects.

Application Number: A61059
Faculty Member: Robert Harrison
Role: Principal Investigator
Title: **Effects of Organic Matter Retention & Management on Long-Term Productivity of Pacific Northwest Coastal Douglas-Fir Plantations**
Agency: National Council for Air and Stream Improvement
Period: 1/1/2011 - 12/31/2011
Amount: \$24,000
Non-Competing Supplement

The goal of this project is to gain a better understanding of the long-term consequences of various levels of organic removals, nutrient allocation, and soil compaction, as well as the appropriate ameliorative or

growth enhancement treatments that can be used to sustain productivity through multiple rotations on the Pacific Northwest's most productive soils. Although N fertilization is commonly used in Pacific Northwest Douglas-fir stands for enhancing, it is not known to what extent organic matter will be enhanced by N fertilization through successive applications, or how it compensates for the nitrogen removed from the system through harvest. This study will begin to fill this critical data gap in the Pacific Northwest Region.

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

Application Number: A61021
Faculty Member: L. Monika Moskal
Role: Principal Investigator
Title: **Urban Natural Resources Stewardship: Geospatial Data Assessment and Management**
Agency: USDA
Period: 8/14/2010 - 8/20/2011
Amount: \$8,000
Supplement and Extension

The purpose of this JVA is to launch a partnership for identifying, assessing, and organizing social and biophysical data that can be used to help support the urban natural resources research initiative being developed in Seattle. The project will include basic analysis work including geospatial and statistical analysis and joint work on research questions of interest and research reports and publications

Application Number: A61366
Faculty Member: John Perez-Garcia
Role: Principal Investigator
Title: **Washington Forest Biomass Supply Assessment**
Agency: WA Department of Natural Resources
Period: 11/15/2010 - 11/14/2011
Amount: \$499,920
New

The School of Forest Resource in collaboration with TSS Consultants will provide estimates of the volume of forest biomass that is available for energy production on a long-term sustainable basis, accounting explicitly for a range of environmental, operational, and economic assumptions, within a series of logical supply tributary areas and statewide, on multiple landownership categories. This project will also result in development of a biomass calculator tool that allows for customized biomass availability estimates based on user-defined inputs.

Application Number: A60910
Faculty Member: Sandy Wyllie-Echeverria
Role: Principal Investigator
Title: **Zostera japonica Workshop**
Agency: WA Department of Natural Resources
Period: 9/15/2010 - 1/31/2011
Amount: \$8,097
New

The introduction of *Zostera japonica* to the west coast of North America is believed to have occurred early in the 1900's. Until recently these plants were found in estuaries and lagoons from Southern British Columbia to Southern Oregon. Now coast wide distribution includes sites in Northern California, and the size of extant populations has increased in several locations. Studies describe the physiology, autecology and ecosystem impact of *Z. japonica* at particular locations; however, there is limited understanding about the alteration or enhancement of ecosystem services should the distribution of this species continue to expand.

The Washington State Noxious Weed Board recently received a request to list *Z. japonica* as noxious weed on the State Noxious Weed List. If *Z. japonica* is listed on the State Noxious Weed List, Counties could choose to designate it for control and/or eradication. DNR wants sound scientific input, in addition to commercial interests, to be considered by the State Noxious Weed Board in the decision to list or not. Therefore, DNR is co-sponsoring (with Washington Sea Grant*) this two-day *Z. japonica* workshop at the Friday Harbor Laboratories, University of Washington, to assemble regional seagrass experts for the purpose of discussing the state of science on *Z. japonica* and ultimately, to make a recommendation for management. DNR staff will participate in this workshop and carry the recommendation forward to the State Noxious Weed Board.