



UNIVERSITY *of* WASHINGTON

School of Forest Resources

RESEARCH NEWSLETTER ISSUE ONE, VOLUME 6

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NEWS –

Human subjects: Those of you who use human subjects will be interested to learn that the IRB (Institutional Review Board) is being updated in the near future. There hasn't been a revision since 1994; the changes will, hopefully, move the process into the 21st Century. You will be disappointed to learn that the form will be longer, but pleased that it will make more sense and result in a far greater number of approvals at the first IRB review, fewer deferrals, shorter and more-to-the-point review letters and significant reductions in turn-around time. Content revisions will be implemented in Spring, 2010, with the new electronic submission in summer/fall 2010.

F & A Rates (aka indirect costs). In anticipation of the University moving to a new resource allocation model (ABB, or Activity-Based Budgeting), a number of offices and committees across campus have been looking at how the UW spends research recovery funds. The preliminary data looks pretty grim, leading many to think that the University simply cannot afford to continue operating the way it has in the past. In anticipation, the Office of Research and the Office of Sponsored Programs are implementing the existing rules concerning indirect cost rates that have been frequently ignored in the past. In one recent example, OSP rejected the

reduced indirect rate on a proposal renewal because the renewal came a number of months after the previous project had ended and they required that it be treated as a new project, subject to current policies. In another case, the dean's office called to question the appropriateness of using the off campus rate. Increased scrutiny of how we do our research business has become the new reality, and any deviation for the negotiated rates must be requested by the Dean of the College of Environment and approved by the director of OSP.

SAGE upgrade. Also being updated is the System to Administer Grants Electronically (SAGE), but that will happen sooner. Watch for a whole new look after March 17, as well as improved navigation and functionality.

OPPORTUNITIES –

USDA AFRI Carbon Cycle Science (Letter of Intent due April 9, 2010; proposal due date June 4, 2010) The carbon cycle plays a fundamental role in the forces driving global climate change. This program, offered in partnership with the Research Opportunities in Space and Earth Sciences (ROSES) 2010 program of the National Aeronautics and Space Administration (NASA) and the U.S. Forest Service, contributes toward the goals of the U.S. Global Change Research Program (USGCRP) and the U.S. Ocean Action Plan by providing critical scientific information about the movement of carbon in the environment and potential near- and long-term changes in the carbon cycle, including the role of and implications for societal actions. It follows from two previous joint USDA-NASA solicitations in 2004 and 2007, addressing questions of carbon stocks and fluxes as well as how carbon cycling might change and be managed in response to a changing climate, and the risks and benefits to society of management options.
<http://www.csrees.usda.gov/fo/carboncyclescienceafri.cfm?pg=2>

NSF Innovations in Biological Imaging and Visualization (IBIV) (pre-proposal due April 12; deadline to submit application to participate in the Ideas Lab, which will be held May 24-28, 2010) The IBIV activity supports the development of novel approaches to the analysis of biological research images through the innovative "Ideas Lab" project development and review process. The analysis and visual representation of complex biological images present daunting challenges across all scales of investigation, from multispectral analysis of foliage or algal bloom patterns in satellite images, to automated specimen classification, and tomographic reconstructions in structural biology. Analysis of biological image data is complicated by a host of factors, including: complicated signal to noise profiles; variable feature size, density, scale, and perspective in images; experiment-specific metadata considerations; and reliance on subjective classification criteria. Advances in biological image analyses have the potential to facilitate the automation of analytic processes, improve synthetic approaches to the analysis of large or heterogeneous data collections, and permit higher-order dimensional analyses of complex research models. The goal of this activity is to identify opportunities for investment to advance the state-of-the-art in biological image analysis, data visualization, archiving, and dissemination. Participants selected through an open application process will engage in an intensive five-day residential workshop to generate project ideas through an innovative, real-time

review process. Members of the biological research community, computational theorists and engineers, mathematicians, imaging specialists from other fields, educators involved in training the next generation of researchers, and a range of other specialists (artists, illustrators, etc.) are all strongly encouraged to participate.

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503473&org=NSF&sel_org=NSF&from=fund

NSF Dimensions of Biodiversity (pre-proposal required by May 5, 2010; full proposal by June 8, 2010) The Dimensions of Biodiversity initiative seeks to characterize biodiversity on Earth by using integrative, innovative approaches to fill rapidly the most substantial gaps in our understanding of the diversity of life on Earth. This campaign will take a broad view of biodiversity, and in its initial phase will focus on the integration of genetic, taxonomic, and functional dimensions of biodiversity. Successful proposals should integrate these three dimensions to understand interactions and feedbacks among them. While this focus complements several core NSF programs, it differs by requiring that multiple dimensions of biodiversity be addressed simultaneously, in innovative or novel ways, to understand the roles of biodiversity in critical ecological and evolutionary processes.

http://www.nsf.gov/pubs/2010/nsf10548/nsf10548.htm?WT.mc_id=USNSF_179

NSF Hydrologic Sciences (due June 1, 2010) Hydrologic Sciences focuses on the flow of water and transport processes within streams, soils, and aquifers. Particular attention is given to spatial and temporal heterogeneity of fluxes and storages of water, particles, and chemicals coupling across interfaces with the landscape, microbial communities, and coastal environments, to upscaling and downscaling given these heterogeneities and interfaces and how these processes are altered by climate and land use changes. Studies may address aqueous geochemistry as well as physical, chemical, and biological processes within water bodies. These studies commonly involve expertise from many basic sciences and mathematics, and proposals often require joint review with related programs.

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=13684&org=NSF&sel_org=NSF&from=fund

NSF Population and Community Ecology Program (Due July 9, 2010) This program supports fundamental studies in the broadly defined areas of population and community ecology. Topics include the population dynamics of individual species, demography, and fundamental ecological interactions affecting populations, communities, and their environments. Themes include, but are not limited to: population regulation; food-web structure and trophic dynamics; competition, predation, mutualism and parasitism; mechanisms of coexistence and the maintenance of species diversity; community assembly; paleoecology; landscape ecology; conservation and restoration biology; behavioral ecology; and macroecology. The Program particularly encourages studies that can be applied to a wide range of habitats and taxa across multiple spatial and temporal scales. http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503414&org=NSF&sel_org=NSF&from=fund

NSF Environmental Chemical Sciences (submission window 7/1/2010 – 7/31/2010) The Environmental Chemical Sciences (ECS) Program supports basic research in chemistry that promotes the understanding of natural and anthropogenic chemical processes in our environment.

Projects supported by this program enable fundamentally new avenues of basic research and transformative technologies. The program is particularly interested in studying molecular phenomena on surfaces and interfaces in order to understand the inherently complex and heterogeneous environment. Projects utilize advanced experimental, modeling and computational approaches, as well as developing new approaches. Topics include studies of environmental surfaces and interfaces under laboratory conditions, the fundamental properties of water and water solutions important in environmental processes, dissolution, composition, origin and behavior of molecular scale systems under a variety of naturally occurring environmental conditions, chemical reactivity of synthetic nanoparticles and their molecular level interactions with the environment, and application of theoretical models and computational approaches to discover and predict environmental phenomena at the molecular scale. The ECS program supports research in basic chemical aspects of our environment. Programs in the Biological Sciences, Engineering and Geosciences Directorates as well as other federal agencies address other aspects such as field studies. [NSF Program Description 09-6882](#)

PROPOSALS FUNDED

Application Number: A54650

Faculty Member: David Briggs

Role: Principal Investigator

Title: **Stand Management Coop**

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

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

Amount: \$7,500.00

Supplement and Extension

Stand Management Coop Membership Dues for 2010

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.

Application Number: A40903

Faculty Member: Renata Bura

Role: Principal Investigator

Title: A biomass flexible bioconversion of lignocellulose to ethanol: A robust pretreatment method for processing mixed feedstocks

Agency: Consortium for Plant Biotechnology Research

Period: 1/1/2009 - 12/31/2011

Amount: \$77,104.00

New

Project will research utilization of forest residues and switchgrass for fuel ethanol production. Project goal is to optimize the pretreatment process for forest residues, to produce maximum amount of sugars in hydrolysable and fermentable form, and concurrently be able to simplify the overall biomass to ethanol process. After decades of human intervention in suppressing forest fires, vast quantities of forest residues have overcrowded forests in the Western U.S. and created a severe fuel-loading problem. The resulting forest fires are often catastrophic. Previous biomass to ethanol conversion schemes have been tested on a uniform, single biomass source such as corn fiber, corn stover, willow, or poplar. The critical challenge of this project is to find the compromised pretreatment condition for the mixture of forestry residues comprised of bark, white wood, and needles originating from different wood species.

Application Number: A56137

Faculty Member: Joshua Lawler

Role: Principal Investigator

Title: Assessment of species representivity in Canada's protected areas

Agency: Canadian Council on Ecological Areas

Period: 2/15/2010 - 3/31/2011

Amount: \$14,383.00

New

Project will assess how wildlife species are currently representing in Canada's protected areas network and how climate change will likely affect representation in the future. Project will identify where changes in vertebrate fauna will be the greatest and suggest areas for improvement in protected areas planning over the short, medium, and long term.

Climate change is recognized as an import threat to biodiversity. Project will build upon the work of Lawler et al. (2009) and will consist of customized analyses at geographic extents that are of interest to Canadians. Expected outcomes are datasets and/or tables summarizing changes in species distributions and species representivity within protected areas networks for several geographic extents, including Canada, Bird Conservation Plans Regions, and the Northern Appalachian/Acadian Ecoregion.

Application Number: A55123

Faculty Member: Sarah Reichard

Role: Principal Investigator

Title: Shrub Steppe/Sage-Grouse Habitat Restoration

Agency: USDI Bureau of Land Management

Period: 2/1/2010 - 1/31/2012

Amount: \$85,000.00

New

The objective of this project is to contribute field and lab information on restoration techniques and research that leads to more successful restoration projects and an increased availability of restoration materials crucial to the restoration of shrub-steppe habitat that support threatened/endangered (T/E) species on public lands. Under this project, we will investigate and evaluate selected sites for restoration and conservation priorities, collect field data from existing restoration sites, and research and summarize state-of-the-art restoration techniques that can be applied to current restoration problems. We will also investigate selected species through lab and greenhouse research to develop protocols for development of these species for restoration materials including seed production.

Proposals Submitted

Application Number: A55956

Faculty Member: Ernesto Alvarado

Role: Principal Investigator

Faculty Member: James Agee

Role: Co-Investigator

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

Agency: USDA Forest Service-PNW

Period: 5/11/2009 - 3/31/2014

Amount: \$25,000.00

Non-Competing Supplement

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: A56195

Faculty Member: Ernesto Alvarado

Role: Principal Investigator

Faculty Member: Thomas Hinckley

Role: Co-Investigator

Title: **ARRA: Educating Future Forestry Leaders and Scientists from Underrepresented Communities**

Agency: USDA Forest Service-PNW

Period: 4/1/2010 - 6/30/2012

Amount: \$100,000.00

New

This Joint Venture Agreement (JVA) with the USFS Pacific Northwest Research Station will be supported from the American Reinvestment and Recovery Act (ARRA) funds. The goal of this JVA is to create or retain jobs in King County, WA, by employing University of Washington graduate students from underrepresented communities in the Pacific Northwest. Specific objectives for this joint venture agreement is to bring more underrepresented students into natural resources fields in general and natural resource science in particular.

Under this JVA, the School of Forest Resources will support a USFS Pacific Northwest (PNW) Research Station project to create leadership and learning opportunities for students in middle school to graduate school from underrepresented communities within the area of influence of the USFS PNW Research Station. Youth mentors will lead activities for underprivileged children and their families, introducing them to National Forests. University students will benefit from summer jobs in science-related fields. Their work assisting with field studies in local forests and rivers will contribute valuable baseline information about the health of these resources. Activities and internship opportunities targeted at minority communities will expose these students to jobs in science-related fields, where they are currently under represented, and encourage them to obtain further education in these areas.

Application Number: A56857

Faculty Member: Gordon Bradley

Role: Principal Investigator

Title: **Reasonable Person Model: A Path Toward More Effective Participation**

Agency: University of Washington Royalty Research Fund

Period: 6/15/2010 - 6/15/2011

Amount: \$32,678.00

Competing Revision

The management of forest lands throughout the western United States has always been the subject of considerable debate. As more demands are placed on forest lands, and as we gain greater insight into the wide range of benefits they provide, more people would like a say in the planning and management of both wild land and urban forest landscapes. Recent issues focus on all aspects of forest ecosystem services including physical, biological, economic and social. The focus of this research is to explore more meaningful ways of engaging people in the development of effective natural resource management policies and programs. The Reasonable Person Model offers a perspective for achieving that goal. Presumably public involvement efforts should result in greater information exchange between managers and people who will be affected by natural resource programs, as well as to increase the likelihood of successfully implementing important natural resource programs. Alternative strategies for communicating information about emerging natural resource programs will be tested. The conservation program of interest is in rural Chelan County and involves the development of a native gray squirrel habitat conservation

strategy. Alternative methods of communication will be tested for their effectiveness in creating an understanding of the programs purpose and intent, and people's interest in modifying land use practices on their private property to achieve natural resource program objectives.

Application Number: A56352

Faculty Member: David Briggs

Role: Principal Investigator

Title: **Life Cycle Assessment of Forest Carbon Balance of Silvicultural Regimes**

Agency: National Council for Air and Stream Improvement

Period: 3/16/2010 - 12/15/2010

Amount: \$15,004.00

New

This project extends previous research which developed life-cycle analyses (LCA) of silvicultural regimes of intensively managed Douglas-fir and loblolly pine plantations that were based on growth and yield projections using FVS, a model developed by the USFS. This study will use growth and yield models more commonly used by forest industry, specifically LOBDSS for loblolly pine and CONIFERS/ORGANON developed for Douglas-fir. In addition to analysis of regimes used previously, new regimes defined in consultation with industry will also be analyzed. The project will also develop a method for incremental analysis focusing on change within a regime with stand age and change between regimes. Areas requiring further fundamental process LCA will be identified.

Application Number: A56635

Faculty Member: David Briggs

Role: Principal Investigator

Title: **Stand Management Coop**

Agency: International Forestry Consultants, Inc.

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

Amount: \$6,092.00

Supplement and Extension

2010 Membership dues payment to Stand Management Coop from International Forestry Consultants, Inc.

Application Number: A56482

Faculty Member: Sally Brown

Role: Principal Investigator

Faculty Member: Darlene Zabowski

Role: Co-Investigator

Title: **Dual-purpose use of reclaimed water for watershed enhancement in the Puget Sound Basin**

Agency: US Environmental Protection Agency

Period: 7/1/2010 - 12/30/2012

Amount: \$322,899.00

New

Municipal effluent from wastewater treatment plants is the largest point source discharger into Puget Sound. Ecological and agricultural use of reclaimed water would reduce direct discharge into Puget Sound and replenish flows in compromised watersheds. Current State requirements for groundwater recharge using reclaimed water are in excess of Class A requirements for irrigation. It is likely that indirect recharge by using irrigation areas as surface spreading basins will effectively treat water to meet State groundwater requirements. This study will test the potential for soils in impacted watersheds to serve as a tertiary treatment system. Fate of nutrients and contaminants will be monitored in greenhouse and field studies. Two types of reclaimed water will be added to representative soils series. Impact on soils and water quality will be measured. This approach offers the potential for maximizing benefits associated with reclaimed water while simultaneously protecting water quality in streams.

Application Number: A56787

Faculty Member: Sharon Doty

Role: Principal Investigator

Title: **Development of effective phytoremediation technologies for the Puget Sound Area**

Agency: US Environmental Protection Agency

Period: 6/1/2010 - 5/31/2013

Amount: \$570,024.00

New

We propose to develop remediation strategies for contaminated sediments, soils, and water using our expertise with phytoremediation of TCE, PAHs, and other organic pollutants. We will screen poplar and willow species, ones obtained from the local contaminated sites as well as from other phytoremediation field sites across the country, for the highest tolerance and removal of the chemicals. We will inoculate the best-performing plant lines with endophytes (microbes that live within plants) that degrade the chemicals, and then compare growth and health of the inoculated vs uninoculated plants in the contaminated material obtained from the sites. We will measure removal of pollutants of concern from the soil/water and analyze for degradation products by using HPLC or GC-ECD. By the end of the two year lab study, we will be able to identify the best willow/poplar endophyte “partnership” for removal and detoxification of pollutants of concern, and will begin field studies by planting the best performing poplar and willow lines in the contaminated sites. In addition, we will test enhanced poplar lines as a back-up plan in case the endophyte-assisted phytoremediation is insufficient. With these aims we hope to develop a cost effective remediation strategy for restoration of contaminated sites in the Sound.

Application Number: A55809

Faculty Member: Ivan Eastin

Role: Principal Investigator

Faculty Member: Indroneil Ganguly

Role: Co-Investigator

Title: **Factors influencing the Spatio-temporal diffusion of innovative 'Green' technologies**

Agency: National Science Foundation

Period: 10/1/2010 - 9/30/2012

Amount: \$496,125.00

New

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: A56856

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: 3/15/2010 - 12/31/2010
Amount: \$24,000.00
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 addendum is to extend the MOA and supplement this project.

Application Number: A56558
Faculty Member: Thomas Hinckley
Role: Principal Investigator
Faculty Member: Jim Lutz
Role: Co-Investigator
Title: **Western Forest Initiative: YFDP and WFDP**
Agency: Smithsonian Institution
Period: 3/1/2010 - 12/31/2012
Amount: \$174,320.00
New

We plan to establish two 25-ha forest dynamics plots, one in California and one in Washington. One plot is the Yosemite Forest Dynamics Plot (YFDP), currently 10.2 ha in size, which we intend to expand to 25 ha, and in which all woody stems = 1 cm diameter at breast height will be identified, mapped, tagged, and periodically re-censused. The second plot is the Wind River Canopy Crane Forest Dynamics Plot (WFDP), currently 12 ha in size, which we intend to expand to 25 ha, and in which all woody stems = 1 cm diameter will be identified, mapped, tagged, and periodically re-censused.

Application Number: A56344
Faculty Member: Soo-Hyung Kim
Role: Principal Investigator
Title: **Development of a Process-based Plant Growth Model for Garlic**
Agency: Pending - OSP to be notified
Period: 3/1/2010 - 12/31/2012
Amount: \$25,000.00
New

Process-based crop simulation models have become an important tool for researchers who study crop responses to environmental changes as well as growers who need make economically and environmentally sound crop management decisions. Mechanistic crop models that are based on solid

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

Application Number: A56475

Faculty Member: Soo-Hyung Kim

Role: Principal Investigator

Faculty Member: Gregory Ettl

Role: Key Personnel

Title: **Modeling forest ecosystem responses to climate change in Korea**

Agency: National Center for Agricultural Meteorology (NCAM)

Period: 3/16/2010 - 2/28/2013

Amount: \$100,000.00

New

The ongoing global climate change is affecting most terrestrial ecosystems including forest ecosystems. Recent advances in our ability to predict changes in climate at relevant scales offer the opportunity to investigate complex dynamics involving interactions between biotic and abiotic components. While numerous studies have addressed the possible impacts of climate change on forest ecosystems in many parts of the world including United States and Europe, few studies addressed this issue in the East Asia including Korea. Here, we propose 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. We 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 our framework can be used subsequently for other key tree species in Korea. We will also develop climate envelope models 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 the East Asia including Korea.

Application Number: A56137

Faculty Member: Joshua Lawler

Role: Principal Investigator

Title: **Assessment of species representivity in Canada's protected areas**

Agency: Canadian Council on Ecological Areas

Period: 2/15/2010 - 3/31/2011

Amount: \$14,383.00

New

Project will assess how wildlife species are currently representing in Canada's protected areas network and how climate change will likely affect representation in the future. Project will identify where changes in vertebrate fauna will be the greatest and suggest areas for improvement in protected areas planning over the short, medium, and long term.

Climate change is recognized as an import threat to biodiversity. Project will build upon the work of Lawler et al. (2009) and will consist of customized analyses at geographic extents that are of interest to Canadians. Expected outcomes are datasets and/or tables summarizing changes in species distributions and species representivity within protected areas networks for several geographic extents, including Canada, Bird Conservation Plans Regions, and the Northern Appalachian/Acadian Ecoregion.

Application Number: A56239

Faculty Member: Joshua Lawler

Role: Principal Investigator

Title: **Habitat climate-change sensitivity database**

Agency: National Wildlife Federation (NWF)

Period: 2/15/2010 - 3/31/2011

Amount: \$20,000.00

New

This project will develop and on-line database that both ranks the ecological systems of the Pacific Northwest with respect to their relative sensitivity to climate change and documents the ways in which they are sensitive. The database will include information and rankings for roughly 50 different ecological systems, chosen in conjunction with Northwest Wildlife Federation and Oregon, Idaho, and Washington fish and wildlife agencies. For each system, the database will contain information on the relative sensitivity to changes in fire regimes, hydrology, insect outbreaks, and invasive species, as well as the relative sensitivity of the dominant species in the system. The information for each of the systems will be collected with a combination of workshops, literature searches, input from individual experts, and data from a species-sensitive database that is currently under development.

Application Number: A56321

Faculty Member: Larry Mason

Role: Principal Investigator

Faculty Members: Ernesto Alvarado and David Peterson

Role: Co-Investigators

Title: **A Nation-Wide Program to Improve Integration and Application of Wildland Fire Science and Traditional Ecological Knowledge in Tribal Communities**

Agency: USDI Bureau of Land Management

Period: 6/30/2010 - 6/30/2012

Amount: \$426,773.00

New

This proposal seeks to establish new and enduring partnerships between tribal communities, academic institutions, and agencies for wildland fire science delivery and application. The University of Washington (UW) and the Intertribal Timber Council (ITC) will team the Bureau of Indian Affairs, JFSP regional consortia, tribal colleges, US Forest Service Research Laboratories, senior fire scientists, and others to produce, disseminate, receive, collate, and publish syntheses of fire science and traditional ecological knowledge (TEK) pertinent to resource management of fire-prone ecosystems. TEK refers to knowledge of fire and ecosystems, accumulated by generations of native practitioners, that is kept by tribal elders and practitioners who have inherited understanding of the reasons and responsibilities associated with its use. Tribal elders, councils, and resource managers will be consulted to develop workshop agendas, reservation locations, and focus on fire management topics of local importance. Partnerships with BIA wildfire mentoring programs, JFSP regional consortia, and US Forest Service fire science laboratories will be sought to aid fire science and technology transfer to tribal communities. Cooperators from the educational community will be sought to provide situational expertise, with special preference given to Indian Colleges. By establishing formal ties between larger universities and tribal colleges, Native American students will gain increased exposure to the broader fire science community and will benefit from mentoring programs. Workshops tailored for regional circumstances will provide forums for knowledge transfer and development of interpersonal relationships among tribes, agencies, and fire scientists. Methods to disseminate information will involve contemporary web media, newsletters, alerts, and networks for interpersonal communication. As example, web technologies, such as streaming video, can be used to facilitate communication and distribute information. Symposia proceedings, science lectures, and technology training workshops, as well as “on-location” tribal practices and interviews can be recorded and made broadly available. Project investigators will solicit and compile tribal perspectives on contemporary and emerging issues, such as: (a) the need to integrate fire science with other disciplines including TEK; (b) guidelines for biomass utilization, mechanical treatments, and prescribed burning while maintaining ecosystem functions; (c) maintaining long-term viability of infrastructure for processing, manufacturing, and biomass utilization; (d) identification, communication, and integration of fire use in support of important cultural values such as traditional foods and basket materials; (e) Potential stewardship contracting to reduce hazard on federal wildlands; (f) Implications of climate change for fire management strategies; (g) Integrate case studies, traditional knowledge, and tribal perspectives into fire and ecosystem training programs.

Application Number: A56727

Faculty Member: Larry Mason

Role: Principal Investigator

Faculty Member: Ernesto Alvarado

Role: Co-Investigator

Title: A Nationwide Program to Improve Integration and Application of Wildland Fire Science and Traditional Ecological Knowledge in Tribal Communities

Agency: USDI Bureau of Land Management

Period: 1/16/2010 - 6/30/2010

Amount: \$50,956.00

Supplement and Extension

This project will promote information exchange between tribes, agencies, research organizations, and institutions of higher learning to explore the feasibility, interest, and utility of developing a nation-wide program to improve information and technology transfer between Indian Tribes and the fire science community. Phone/email contacts and visits to regions (canvassing and meeting with candidates among tribes, agencies, academic institutions and researchers) would identify the level of interest in attending and becoming partners for convening regional workshops. Regional workshops would be designed to exchange information with opportunities for field application of modern fire science and traditional ecological knowledge. Tribal elders, councils, and resource managers will be consulted to develop workshop agendas and focus on topics of local importance. Regional cooperators from the educational community will be sought to provide situational expertise, with special preference given to Indian Colleges. By establishing formal ties between larger universities and tribal colleges, Native American students would have increased exposure to the broader fire science community and could benefit from mentoring programs. Workshops tailored for regional circumstances would provide forums for knowledge transfer and development of interpersonal relationships among tribes, agencies, and academia. Methods to disseminate information would involve contemporary web media, newsletters, alerts, and networks for interpersonal communication. The commitment and expertise of Tribes to national and regional forest health should be recognized as a unique forest stewardship human resource worthy of investment.

Application Number: A56716

Faculty Member: L. Monika Moskal

Role: Principal Investigator

Faculty Members: Daniel Vogt and Darlene Zabowski

Role: Co-Investigators

Title: **Assessing forest soil quality with hyperspectral remote sensing**

Agency: University of Washington Royalty Research Fund

Period: 6/16/2010 - 6/15/2011

Amount: \$39,239.00

New

Since the early 1980's, the spectral information available from remote sensors has increased providing scientists with hyperspectral sensors such as the satellite sensor Hyperion. The shapes of soil spectra are known to respond to mineral composition, organic matter, water, iron form and amount, salinity, and particle size distribution. These attributes of soil determine their capacity to perform production and environmental functions, however, limited amount of research has been done in this area. The proposed research will use terrestrial and satellite hyperspectral remote sensing to assess forest soil quality in two pilot sites located in western and eastern Washington. Techniques will be investigated to utilize the terrestrial spectral signatures to drive a satellite image-based soil quality assessment. Remote sensing-based soil characterization has the potential to replace or augment standard soil characterization techniques where rapid, non-destructive, reliable and inexpensive analysis is required for large regional extents. This pilot project will provide the necessary 'proof-of-concept' evidence to pursue large scale soil productivity mapping research.

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: \$40,000.00

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:

What species are being used in these emerging markets?

What are the potential niche markets for Alaska forest products in these emerging markets?

What niche marketing strategy could be used by Alaskan mills in these markets?

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.

Application Number: A56149

Faculty Member: Clare Ryan

Role: Principal Investigator

Faculty Members: L. Monika Moskal and Kathy Wolf

Role: Co-Investigators

Faculty Member: Christian Torgersen

Role: Key Personnel

Title: **Implementing the Puget Sound Action Agenda Through Stewardship: A Watershed Based Assessment of Ecological and Social Footprint**

Agency: US Environmental Protection Agency

Period: 9/1/2010 - 12/31/2013

Amount: \$548,839.00

New

This research will answer the question: How do stewardship activities contribute to Puget Sound ecosystem recovery and sustainability? The Puget Sound estuary and surrounding urbanized watersheds are expected to attract an additional three million human residents in the next 20 years. Despite the breathtaking appearance of this estuarine system, many of the processes supporting diverse species and ecosystem services have been disrupted or severely degraded. The recently developed Puget Sound

Action Agenda calls for the use of stewardship activities to aid recovery and restoration efforts. However, little is known regarding the benefits of stewardship for assisting ecological restoration or increasing social responsibility. Stewardship activities are an important mechanism for delivering public services across a wide range of issue areas, but we lack understanding about the effects of stewardship activities on ecosystem recovery, the tangible outputs they produce, and the extent to which those outputs are congruent with policy goals. This knowledge gap is problematic given that local, state, and federal agencies are making substantial and increasing investments in stewardship activities. This research will contribute to the development and advancement of methods by which ecological and social factors are integrated into stewardship policies and programs. The research goal is understand the interrelationships between ecological and social consequences of stewardship activities. With the Puget Sound ecosystem as an example, the research will employ a geographically-based “stewardship footprint” approach and use quantitative and qualitative methods to test specific hypotheses. The research objective is to develop an approach and model that quantifies the extent to which stewardship activities achieve broader ecological and social goals.

Application Number: A56077
Faculty Member: Sandor Toth
Role: Principal Investigator
Title: **ECOSEL Experimental Auctions in New Zealand**
Agency: Pending - OSP to be notified
Period: 3/1/2010 - 12/31/2010
Amount: \$29,435.00
New

We will test a new auction mechanism for forest ecosystem services, called ECOSEL, in New Zealand . The test site is a managed Monterey pine plantation in the catchment of the Tauranga-Taupo River located in the Lake Taupo area near Turangi. Multi-objective optimization will be used to generate alternative management plans for the catchment that would lead to efficient provisions of water quality and other ecosystem services. A mock auction will be organized to evaluate people's willingness-to-pay for these alternative management plans and the associate ecosystem services.

Application Number: A56296
Faculty Member: Aaron Wirsing
Role: Principal Investigator
Title: **Assessing the feasibility of lynx (*Lynx canadensis*) population augmentation in the Kettle Range of Washington**
Agency: WA Department of Fish and Wildlife
Period: 9/1/2010 - 8/31/2012
Amount: \$104,871.00
New

Numbers of Canada lynx in Washington State have dwindled over the past several decades, leading to this imperiled carnivore’s listing as a state threatened species in 1993. Much of this decline owes to loss of

suitable forest habitat resulting from stand replacing fires, insect outbreaks, and timber harvest. In certain areas, however, trapping has markedly depressed lynx abundance without otherwise altering the environment. With lynx harvest no longer permitted, these areas could represent suitable locations for translocations aimed at population augmentation, a tool that will likely be necessary to facilitate lynx persistence in Washington. Lynx are snowshoe hare (*Lepus americanus*) specialists. Thus, before any translocations can occur, densities and habitat associations of hares in these formerly trapped areas must be assessed so that we can establish whether they can support a restored lynx population and, if so, the number of individuals that should be translocated. Accordingly, I propose to conduct a study of snowshoe hare abundance and habitat relationships in one such area, the Kettle Range of northeastern Washington, as a precursor to possible lynx population augmentation. This study will use fecal pellet plots combined with mark-recapture population sampling to quantify hare density and habitat use, and will ultimately generate a predictive model of hare occupancy and abundance that will guide future decisions about lynx population augmentation.

Application Number: A55925

Faculty Member: Kathy Wolf

Role: Principal Investigator

Title: **Investigating Organizational Innovations and Social Networks in Civic Eng**

Agency: National Science Foundation

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

Amount: \$112,721.00

New

This research explores the intersection of informal social networks, community psychology, and civic engagement within a social-ecological system to advance knowledge regarding organizational innovation. The central concept of this investigation is that civic engagement has a demonstrable impact and influence on the efficacy of environmental organizations and their programs. Indeed, lack of involvement of key stakeholders and community participation in environmental projects has been linked, in some cases, to project failure. A variety of civic engagement strategies and tools are available to institutions, and this study will explore and classify which strategies are successful given institutional arrangements and conditions, and how social and environmental outcomes vary by civic engagement strategy. The social-ecological system, which underpins this project, is the urban forest and associated urban ecosystems. The project team will conduct an interdisciplinary research project examining relationships between diverse organizational strategies and innovations in civic engagement, and associated outcomes. Comparisons of environmental stewardship programs between the cities of New York and Seattle will be the research context.

Application Number: A56681

Faculty Member: Kathy Wolf

Role: Principal Investigator

Title: **ARRA: Environmental Stewardship Assessment in the Puget Sound Region**

Agency: USDA Forest Service

Period: 10/1/2010 - 9/30/2013

Amount: \$63,236.00

New

Based on a pilot study, about 600 organizations, NGOs, and groups conduct environmental stewardship projects in King and Pierce counties. The work ranges from neighborhood parks clean ups, to street tree plantings, to ecological restoration of natural areas. Thousands of people participate every year. This citizen-based activity is a considerable resource for addressing the environmental issues of our urban areas. Yet we know little about the patterns, scope, and outcomes of environmental stewardship. This project will provide a preliminary, more detailed assessment of stewardship activity and locations, focusing on the metro Seattle area. We will conduct a geospatial mapping analysis of programs and participant densities, followed by an organizational network analysis. The project findings will provide a “footprint” of stewardship activity and its correlation to environmental mitigation need (such as priorities identified in the Puget Sound Action Agenda). Results will enable organizations, agencies, and project sponsors to build more effective programs, and engage greater numbers of stewardship participants.

Application Number: A55835

Faculty Member: Sandy Wyllie-Echeverria

Role: Principal Investigator

Title: **Water quality monitoring for the National Park Service on San Juan Island**

Agency: USDI National Park Service

Period: 2/1/2010 - 12/31/2010

Amount: \$8,318.00

New

This proposal would establish a contract between UW and the National Park Service so that PI Dr. Sandy Wyllie-Echeverria and staff would monitor the seawater quality in Garrison Bay adjacent to English Camp National Historic Park and American Camp National Historic Park on San Juan Island. This contract would fall under the aegis of an existing cooperative agreement between UW and NPS. This project would involve seawater quality testing in Garrison Bay with the following tasks to be conducted by UW personnel at UW-Friday Harbor Laboratories:

1. Maintain Hydrolab data sonde
 2. Monitor seasonal changes in English Camp's water column environment.
 3. Monitor potential changes to the water column properties in Garrison Bay during the summer boating season.
 4. Monitor seasonal changes in water quality properties in the larger American Camp lagoons.
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Application Number: A56255

Faculty Member: Sandy Wyllie-Echeverria

Role: Principal Investigator

Title: **The role of disease in San Jaun Archipelago eelgrass (*Zostera marina*) decline: An untested but potentially serious problem**

Agency: University of California, Davis

Period: 4/10/2010 - 3/31/2011

Amount: \$21,437.00

New

In 2003 and 2004, relatively rapid decline of *Z. marina* meadows was observed at several sites in the San Juan Archipelago, a prominent feature of the Salish Sea sub-region of the Pacific Northwest. Cause for these declines is still the subject of investigation, however, even though the pathogen known to bring about a disease epidemic exists in the San Juan Archipelago, the possibility that acute loss was the result of a disease event has not been thoroughly tested.

Microorganisms of the genus *Labyrinthula* are the most notable disease agents. Once infected a leaf can spread the disease to other leaves, lethally infecting a large area. We have designed a project to investigate the potential impact of a disease outbreak in the San Juan Archipelago. To do this we will intensively sample two geographically adjacent sites with varying *Z. marina* genetic diversity and population stability and four additional sites sampled less intensively, providing much-needed information on the diversity and distribution of *Labyrinthula*. We will transfer results and a program designed to determine sites at risk from a disease outbreak to federal, state and county agencies responsible for natural resource management.

Application Number: A56263

Faculty Member: Sandy Wyllie-Echeverria

Role: Co-Investigator

Title: **Marine Benthic Habitat Mapping of the San Juan Island National Historic Park**

Agency: USDI National Park Service

Period: 3/25/2010 - 5/31/2011

Amount: \$51,940.00

New

In response to the U.S. National Parks Service's (NPS) interest to map submerged lands within National Park boundaries and to understand the aquatic processes that play a role in the formation, distribution and disturbance of coastal and submarine resources in and around park boundaries, research scientists at the Friday Harbor Laboratories (FHL), University of Washington (UW), propose to construct a series of thematic maps that can be used by San Juan Island National Historical Park (SJINHP) personnel to evaluate and manage nearshore and offshore resources.

Application Number: A56447

Faculty Member: Sandy Wyllie-Echeverria

Role: Principal Investigator

Title: **Ecosystem response to sediment and heavy metal dispersal in the Puget Sound: The Impact of Industrialization, Urbanization, and Climate Variability**

Agency: US Environmental Protection Agency

Period: 6/1/2010 - 6/30/2012

Amount: \$426,562.00

New

Investigators from the College of the Environment and College of Education, University of Washington will collaborate with colleagues from NOAA and USGS. COE and the Canadian Geological Survey to

describe the response of the Puget Sound Ecosystem to sediment and heavy metal dispersal. This team will determine the origin of river born sediment and explore the role of an intermediate agent – Hydrogen Sulfide – in ecosystem change. Toxic concentration of Hydrogen Sulfide and various heavy metals, observed at some sites, are primarily driven by urbanization, deforestation and watershed modification rather than as a direct response to climate change factors such as temperature increase and sea level rise. However in order protect ecosystem health it will be important to have quantitative models that describe the fluxes and composition of sediment and metals into Puget Sound and the role of potentially dangerous levels of Hydrogen Sulfide as a regulating force on community structure in intertidal and subtidal environments. Experimental methods will involve a blend of standard geochemical, sedimentological and ecological practices combined with the newly emerging techniques of geochemical tracing and in situ monitoring. Because we predict that the potential indirect threats of warming temperatures are being observed but are not the subject of ongoing investigation, we predict that regional resource management programs will not have the necessary knowledge or skill set to prevent ecosystem collapse.

After year one of field-work and laboratory analysis Education and Outreach programs will be jointly developed by faculty and research scientists in the College of the Environment and College of Education. The objective of these programs will be to transfer information to federal, state and local resource managers, the general public and create a curriculum for primary and secondary aged school children. Preparing the next generation with the education necessary to execute more wise decisions as citizens will be a primary focus of our Outreach effort.

Application Number: A56844
Faculty Member: Sandy Wyllie-Echeverria
Role: Principal Investigator
Title: **IPA Supplement for Wyllie-Echeverria at US EPA**
Agency: US Environmental Protection Agency
Period: 10/4/2009 - 10/3/2011
Amount: \$8,893.00
Non-Competing Supplement

This is a supplement to an existing IPA with the US Environmental Protection Agency. It would extend the existing contract for Dr. Sandy Wyllie-Echeverria, UW Research Scientist-Engineer, to compile and summarize information on ecosystem services for Pacific NW estuarine wetlands.

The WED/PCEB ecosystem services team is conducting research on the ecosystem services (ES) of Pacific Northwest (PNW) estuarine wetlands and their sensitivities to anthropogenic stressors. The purpose of this task is to support that effort by initiating a review of published and grey literature on the capacity of selected estuarine habitats to produce core ES. The focal habitats are unconsolidated tide flats, seagrass beds, low and high salt marshes, and tidal channels. The core ES's are (by priority) surface-water nitrogen reduction, support for shellfish (bivalves, crabs, burrowing shrimp), support for birds and other vertebrate wildlife, and carbon sequestration.
