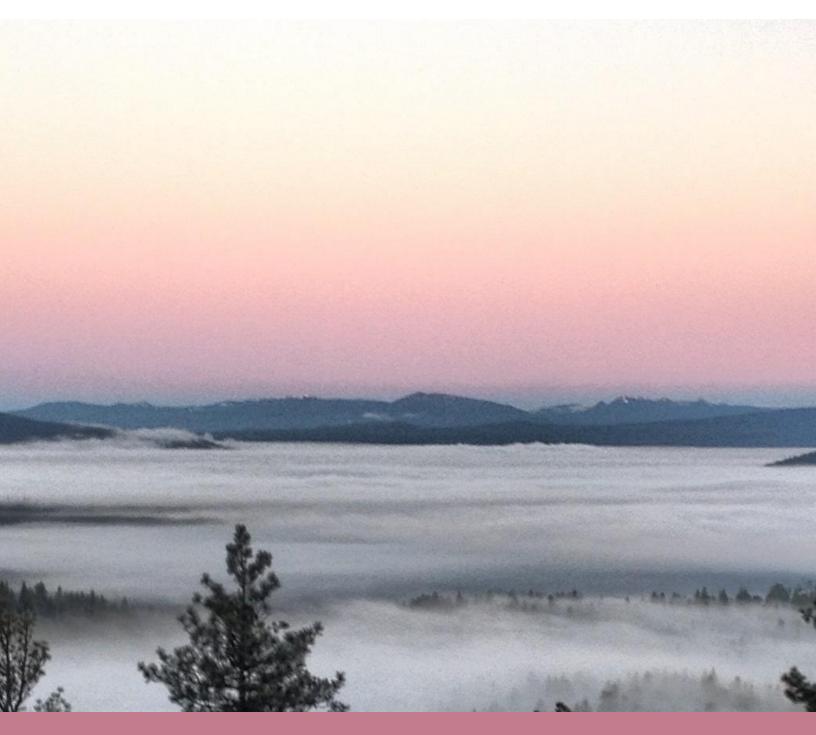


USDA Forest Service Pacific Northwest Region Ecology Program



Accomplishments for Fiscal Year 2012 (October 2011-September 2012)

Annual Report

USDA Forest Service Pacific Northwest Region Ecology Program

USDA Forest Service Pacific Northwest Region 333 SW First Avenue Portland, Oregon 97204-3440

Contact:

Tom DeMeo, Regional Ecologist e-mail: tdemeo@fs.fed.us

Table of Contents:

Table of Contents	1
Ecology Program Purpose	
About the Program	3
Western Washington Area Ecology Program	
Eastern Washington Area Ecology Program	
Northeastern Oregon Area Ecology Program	
Central Oregon Area Ecology Program	
Southwest Oregon Area Ecology Program	
Northwest Oregon Ecology Program	
Pacific Northwest Regional Office	
Acronyms Defined	

Ecology Program Purpose:

The Pacific Northwest Region Ecology Program serves to apply science on the National Forests. Ecologists are stationed on the Forests they serve, ensuring direct contact with managers and fostering technology transfer through training, workshops, troubleshooting, and support to the planning process. While the traditional strength of the program is in vegetation ecology, in recent years capacity to support fire and wildlife ecology needs has grown substantially. Ecologists also support the vegetation component of riparian and wetland ecology. Continually adapting to changing needs is a hallmark of the program.

As agency resources decline, and as pressing issues continue to emerge, such as the new Planning Rule, landscape-scale fire management, collaborative monitoring, and climate change, this role of on-the-ground ecology skills continues to serve a critical role. Ecologists provide a landscape perspective critical to the NEPA process. Moreover, the program is run with a strong service ethic to meet the needs of silviculturists, wildlife biologists, and others on the ground, as well as our state, university, and Federal partners. Ecologists work in a team spirit with other disciplines, realizing efforts are much more effective when the interaction, peer review, and resources of groups are applied to the vexing problems that face us.

Ecology Program Objectives:

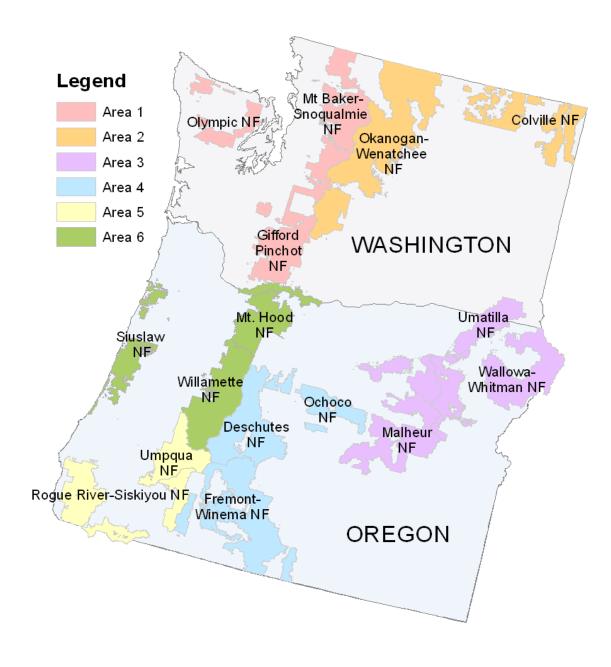
The Ecology Program's objective is to provide expertise in current ecological science to land and resource management on the National Forests in Region 6. Ecology Program ecologists work cooperatively with other federal agencies such as the Bureau of Land Management as well as public and private land managers to accomplish the following:

- Provide science expertise. Ecologists bring the statistical and analytic skills of those with graduate degrees to address practical monitoring and assessment problems on the ground. They serve on the Forests and are accountable to their Forest Supervisors.
- Monitoring implementation. Ecologists can provide adept monitoring to meet the practical constraints of the situation.
- Technology transfer through workshops, publications, and consultation. This is particularly effective because it is generated directly on the Forests.
- Troubleshooting. Ecologists do not have the publishing pressure of the research environment, and thus can take time to address and solve day-to-day issues emerging on the Forests.
- Support to NEPA process. The consensus from Forest leadership suggests ecologists are best used for assessment, science input, and limited participation on interdisciplinary NEPA teams. Emerging work in ecosystem services also falls in this category. This process often leads to very effective technology transfer.

Managing, analyzing and providing data. In a downsizing era, ecologists provide much of the Forests' capacity for modeling, mapping, and data management.

About the Program:

The ecology program is organized into six Areas in the Region: Western Washington, Eastern Washington, Northeast Oregon, Central Oregon, Southwest Oregon, and Northwest Oregon. Each Area has a core team of ecologists who work closely with other disciplines, both within the agency and with our partners.



The Regional Ecology Program staff meets at least annually to discuss programs of work, funding, standards and guidelines, future planning, and topics of current interest. The Ecology Program provides products and expertise to support state-of-the-art science-based, multiple-use natural resource management in the Pacific Northwest.

Learn more about what we do at our website http://ecoshare.info/ (or Google "ecoshare"). The ecoshare website provides information on the environment, ecology, and natural resources. We include publications, data sets, code sets, GIS data, and plant photography to a wide audience. Our spirit is interdisciplinary and interagency. All materials presented here are in the public domain. On this site you will find electronic versions of plant association and other publications, maps, datasets, photos, and the contact information for the area ecology teams. The site also includes the Regional and Northwest Oregon area newsletters.

We also now have a page on govloop (http://www.govloop.com/group/usfs-pacific-northwest-regional-ecology-program), for all our cooperators, and internal Yammer groups for the program's ecologists and Forest natural resource staff officers.

Western Washington Area Ecology Program (Area 1)

Mt. Baker-Snoqualmie, Olympic, and Gifford Pinchot National Forests



Area 1 Ecology Program Team: Robin Shoal, Ecologist Jessica Hudec, Fuels Specialist

Overview of Program for FY2012

In 2012, Western Washington Ecologists were involved in various interdisciplinary projects and Environmental Assesments (EA's); climate change consultation and action planning; huckleberry enhancement project planning and monitoring; updates to the White Salmon Wild and Scenic River Management Plan; wilderness Inventoried Needs Assessments (INA) for the wilderness areas on the Gifford Pinchot National Forest; Terrestrial Condition Assessment (TCA) pilot team (Mt. Hood National Forest); prescribed burning for elk habitat; Strategic Placement of Fuel Treatments Management Plans and mapping; leading workshops for Forest Activity Tracking System (FACTS), National Environmental Policy Act (NEPA) for fuels planners, and Wildland Fire Decision Support System (WFDSS); collaborative group meetings and field trips regarding hazardous fuels reduction, fire ecology, Fire Regime Condition Class (FRCC), small diameter thinning, early seral communities, and insects and disease; Joint Fire Sciences Program Field trip; research regarding mixed severity fire regimes and lichen-driven fire behavior; Interior West Fire Ecology Conference; published an article in Forest Ecology and Management; wetlands inventory and condition assessment; beargrass savanna prairie restoration; and management of the Olympic National Forest's Native Plant Materials program.

Accomplishments by Strategic Budget Objective:

Strategic Budget Objective 1.1.1 Reduce Risk from Wildfire

- Large-fire decision support for Cascade Creek Fire, Gifford Pinchot National Forest.
- Landscape fuel treatment strategy, Mt. Hood and Gifford Pinchot National Forests.
- Terrestrial Condition Assessment, Mt. Hood National Forest.

- Integrated resource project planning, Barlow Ranger District, Mt. Hood National Forest.
- Collaborative fuels reduction project on National Forest and adjoining state and private lands following an ice storm, Mt. Adams Ranger District, Gifford Pinchot National Forest.
- Coyote Thin surveys for hazardous fuel reduction opportunities in and adjacent to the Wildland-Urban Interface (WUI), Mt. Adams Ranger District, Gifford Pinchot National Forest.

Strategic Budget Objective 2.2.1 Rangeland Management

Fuels consultation for the Mt. Adams grazing allotment, Gifford Pinchot National Forest.

Strategic Budget Objective 1.4.1 Invasive Species (Insects and Diseases)

- Collaborative group field trips to observe the spread of Western spruce budworm and mountain pine beetle mortality areas around Mt. Adams.
- Reported integrated accomplishments and planned hazardous fuels reduction projects through hazard tree removal associated with insect and disease mortality, Mt. Adams Ranger District, Gifford Pinchot National Forest
- Wilderness INA's, Gifford Pinchot National Forest.

Strategic Budget Objective 1.4.1 Invasive Species (Plants and Animals)

Planned prescribed burn to enhance and restore elk habitat (Rocky Mountain Elk Foundation funded).

Pre-treatment condition photo point monitoring at the Pacific Crest Trail Nursery Field on Mt. Adams RD, Gifford Pinchot National Forest.

Strategic Budget Objective 1.5.1 Watershed and Aquatic Restoration

-

Wetlands inventory and condition assessment: The purpose of this project is to map, type, and assess the condition of freshwater wetlands on the Olympic National Forest. This is an integrated project involving the Ecology, Wildlife, Botany, Invasives, and Aquatics programs. Survey sites are selected based on their potential to provide high quality habitat for threatened, endangered, and sensitive (TES) species; their proximity to historic, recent, and planned management activities; rarity or sensitivity of wetland type (for instance, sphagnum bogs); and/or their location within an established RNA or Botanical Area. In 2011, fifteen wetlands totaling 104 acres were surveyed. In 2012, we surveyed eight additional sites. Data collected include hydrologic regime and condition (hydrologic function); wetland type (validation of National Wetland Inventory codes); vegetation (structure, composition, and condition); evidence of direct or indirect human or management impact; and aquatic invertebrate, fish, and wildlife observations, including assessment of habitat suitability for TES and other species.



A wetland survey site on the north end of the Pacific Ranger District, Olympic National Forest.

Based on data collected, field observations, review of historic and current aerial photography, and management history, the project team develops recommendations for potential restoration activities for each site. Recommendations include, but are not limited to, "conserve" for wetlands in very good condition; wildlife habitat enhancement where structural habitat components are lacking; treatment/removal of invasive non-native plants with subsequent re-vegetation using appropriate native plant species; culvert maintenance; and removal of non-native animal species (bullfrogs).

The wildlife assessment includes swabbing amphibians to test for presence of the chytrid fungus (*Batrachochytrium dendrobatidis*), or Bd. This involves capturing as many individual animals as possible at each wetland site, and gently swabbing their ventral surfaces with cotton-tipped swabs. The procedure is quick and non-invasive. Each swab is placed into a small vial containing 70% ethanol solution, and the samples are sent to a lab to be assayed.

Table 1. Results of chytrid testing				
Species swabbed	2011	Animals infected	2012	Animals infected
Rana cascadae	12	0	13	0
Rana aurora	14	3	5	0
Pseudacris regilla	2	1	0	
Bufo boreas	15	7-12*	1	0
Taricha granulosa	4	0	0	
* This range is a result of pooling samples within sites.				

A total of sixty-six individual amphibians of five different species have been tested: Cascades frogs (*Rana cascadae*), northern red-legged frogs (*Rana aurora*), Pacific chorus frogs (*Pseudacris regilla*), western toads (*Bufo boreas*), and rough-skinned newts (*Taricha granulosa*). Table 1 displays the results of the chytrid testing.

- Terrestrial Condition Assessment, Mt. Hood National Forest.
- White Salmon Wild and Scenic River Management Plan, Gifford Pinchot National Forest.

Strategic Budget Objective 1.5.2 Restore Plant/Animal Species Diversity

The beargrass savanna/prairie restoration project is an integrated project involving the Ecology, Wildlife, Fire, and Silviculture programs, and the Olympia PNW Lab. External partners include the Skokomish Tribe, the Skokomish Watershed Action Team (SWAT), and the South Puget Sound Ecological Fire Program, a program of the Center for Natural Lands Management that works collaboratively with many land management agencies in the Puget Sound region to design and implement ecological burn plans to restore and maintain native prairie, oak woodland, and wooded savanna ecosystems.



Beargrass recovery in a portion of the prairie restoration unit. Charred stumps are evidence of the 2002 conifer removal and 2003 prescribed burn.

The 32-acre Skokomish Prairie Restoration Unit is located within a much larger area that had historically been maintained as native prairie and beargrass savanna by Native American burning. When managed tribal burning was halted in the 1800s, the prairie was invaded by conifer forest and converted to timber production. This area lies within the Lower South Fork Skokomish River watershed, a Northwest Forest Plan Key Watershed that was formerly heavily roaded and logged, and is now the focus of numerous collaborative restoration efforts. The current project renews restoration efforts begun a decade ago.

In 2012 we completed the NEPA analysis and decision documentation, developed a burn plan, completed pre-burn data collection on established vegetation plots, and collected beargrass seed, which will be used to grow plugs for planting after prescribed burning. An unusually hot and dry summer, which ended abruptly with heavy rains in early October, prevented implementation of the first prescribed burn. We expect to implement one or more prescribed burns in 2013.

Sawtooth Huckleberry Restoration monitoring and implementation, Mt. Adams Ranger District, Gifford Pinchot National Forest.



Sawtooth Huckleberry Enhancement prescribed burn implementation, Gifford Pinchot National Forest



Huckleberry Recovery following 2011 prescribed burn in the Sawtooth Berry Fields, Mount St. Helens RD, Gifford Pinchot National Forest

- Polepatch Huckleberry Restoration planning, Cowlitz Valley Ranger District, Gifford Pinchot National Forest.
- The Ecologist manages the Olympic National Forest's Native Plant Materials program. This program develops and provides native plant materials for restoration projects or ground-disturbing management activities across the Forest, including road repair and maintenance, aquatic organism passage projects, timber management, road decommissioning, elk forage enhancement, wetland restoration, invasive plant treatments, and pollinator habitat restoration. This work involves developing site-specific re-vegetation plans, forest-wide native plant strategies, site monitoring, foundation seed collection, and contract management.

In 2012 the program provided over 3 tons of local source-identified native grass seed, 12 tons of certified weed-free straw from those production fields, 20,000 plugs of emergent plant species for wetland restoration projects, and several hundred containerized shrubs for elk forage enhancement projects.

Strategic Budget Objective 5.1.1 Resource Information

Agency representation in forest collaborative groups.

Publications:

Hudec, Jessica L., and David L. Peterson. 2012. Fuel variability following wildfire in forests with mixed severity fire regimes, Cascade Range, USA. Forest Ecology and Management, 277: pp 11-24.

Presentations and trainings:

- Presented Fuel variability following wildfire in mixed severity fire regimes, Cascade Range, USA at the Interior West Fire Ecology conference in Snowbird, Utah.
- Provided trainings in FACTS, WFDSS, and NEPA for fuels managers.
- Worked on climate change scorecard and action plan.
- Presented at the JFSP field trip on current research needs in mixed severity fire regimes.

Summary of 2012 Leadership Direction

The Olympic National Forest is known as a restoration forest. The annual Ecology program of work is directed by restoration priorities identified by the Forest Leadership Team. Leadership direction for the Gifford Pinchot National Forest was to establish a sound ecology program of work. The Ecologists should provide broad ecology input to forest interdisciplinary teams and bring cohesiveness to project planning. In addition, the Ecologists should continue to develop skills in fire and fuels management and provide that expertise to other forests in Western Washington as well as Northwest Oregon. The Ecologist Position on the Mt. Baker Snoqualmie National Forest was vacant most of FY12, but leadership hopes to fill the position in FY13. Data recovery and storage from retired ecologists is underway.

FY2013 Goals

<u>Olympic National Forest</u>: In 2013 we plan to continue wetland surveys and amphibian chytrid testing. We will implement prescribed burning on the prairie restoration unit, followed by postburn monitoring of vegetation plots and planting of beargrass plugs. The Ecologist will continue

to manage the Native Plant Materials program. We will initiate NEPA analysis on an aspen restoration project in the Skokomish watershed, the only known aspen population on National Forest Lands on the Olympic Peninsula. In coordination with the Wildlife program, we will initiate monitoring of American marten and continue enhancement of native host plant species for Taylor's checkerspot butterfly. The Ecologist will continue to monitor the Forest's small remnant populations of golden chinquapin and Oregon white oak.

Gifford Pinchot National Forest: We will update the FRCC assessment and include a separate seral stage analysis that will be presented to collaborative groups. The results of the analysis will determine the appropriate use of vegetation condition class for determining ecological priorities within a watershed, including potential early seral management by watershed and vegetation type. The Ecologist will create a rule-set for the seral stage analysis that can be extended to the MBS and Olympic National Forests (FY14).

We will continue to contribute to NEPA work, specifically Coyote Thin, Polepatch Huckleberry Enhancement, Swift Thin, and Cascade Creek Salvage. In addition to project-specific fuels and fire ecology input, the Ecologist will contribute to project description, site ecology, cumulative effects, and current literature validation.

The Ecologist will complete Final #1 of Strategic Placement of Fuels Treatments Plan for the Mt. Hood and Gifford Pinchot National Forests, and determine a process for future updates and refinement. The product will be presented at the Association for Fire Ecology conference in Portland (December 2012).

We will develop ideas and draft a plan for Late-Successional Reserve (LSR) management applicable across Western Washington (FY13-FY14).

Smaller project goals for the Gifford Pinchot National Forest include:

- Continue working on the Terrestrial Condition Assessment and Ecological Condition Framework for the Mt. Hood.
- Conduct an assessment of fire behavior analysis tools to determine preferred models and their appropriate uses (NEPA, landscape analyses, burn plans, etc.).
- Work with forest climate change coordinator to identify major areas/habitats of concern and practical adaptation possibilities (FY13-FY14).
- Fuels and fire effects monitoring for wildfire, prescribed fire, and projects with fuels objectives.
- Provide trainings to forest as needed including fuels NEPA analysis, Plant Associations, WFDSS, FACTS, lightning mapping, and fuels and fire behavior analysis tools.
- Assist Fire Planner with Fire Management Plan and WFDSS updates.

data recovery and management.	Mt. Baker Snoqualmie National Forest:	Advertise and fill forest Ecologist position.	Continue
	data recovery and management.	Ç 1	

Eastern Washington Area Ecology Program (Area 2)

Colville and Okanogan-Wenatchee National Forests



Area 2 Ecology Program Team:

Rod Clausnitzer, Plant Ecologist/Botanist Andrea Lyons, Wildlife Ecologist Richy Harrod, Fire Ecologist Pete Ohlson, Fire Ecologist

Overview of Program for FY2012

During FY12 the Area 2 Ecology Team focused efforts across functional boundaries initiating, continuing, or completing projects in fire ecology, vegetation ecology, and wildlife ecology. The collaborative work emphasized Area needs for monitoring and evaluation of resource management issues related to fire effects, plant community dynamics, restoration ecology, ecosystem responses to management treatments, and wildlife community process and function. Colville and Okanogan-Wenatchee National Forest resource staff validated and supported these emphases projects during the FY12 annual meeting.

Accomplishments by Strategic Budget Objective

Strategic Budget Objective 1.1.1 Reduce Risk from Wildfire

Fire effects monitoring includes ecosystem responses to both prescribed fire and unplanned wildfires. Plant community dynamics following both thinning and planned fuels treatments across a variety of sites and vegetation types were studied. Fire/fuels projects included:

Forest Monitoring Project: Fire ecologists collected data from permanent plots in project areas on the Okanogan-Wenatchee National Forest as part of a continuing Forest Monitoring Project. Data collected includes understory and overstory tree attributes, surface fuel loadings, and fire effects attributes. They installed 39 pre-treatment plots in 13 Units to gather the fuels and vegetation data. These units will be treated in the future to accomplish both forest restoration and fuels reduction objectives and will be monitored post-treatment. Additionally, some plots were monitored this field season that represented a cohort of thinning of plots initially installed in 2009. These thinned areas were treated for fuel reduction (burns) during the spring 2012 prescribed fire season. FY12 field season

monitoring occurred in 3 post-treatment plots in a unit that underwent a landscape underburn in the spring of 2012.

Preliminary results of sample plots in this prescribed burn show effects of prescribed fire on the fuelbed and forest stand:

Surface Fuels – Average total load reduced from 18.2 to 5.5 tons/acre (70%)

Duff/Litter Depth – Average depth reduced by 71%

Average Bole Char – 5.2 feet

Average Live Crown Scorch – 16.5%

Overstory Mortality (>5" dbh) – 0%

Sapling Mortality (>4.5' tall-5" dbh) -0%

Seedling Mortality (<4.5' tall) – 66%

Change in Live Crown Base height – Average increased from 14 to 20 feet (41%)





Pre-burn in 2011

Post-burn in 2012

- Forest Restoration Strategy: Fire ecology supported the Forest Restoration Strategy implementation with several aerial photo interpretation workshops for district personnel working on analysis of high priority watersheds. This included describing the protocol for delineation of individual stands and definition of the attributes of those stands as well as conducting "ground truth" surveys to verify the accuracy of the photo interpretation.
- Landscape Fire Analyses: During field season 2012 ecologists collected 63 sample tree cross-sections representing 30 different stands that underwent stand replacing fire within the 2006 Tripod Fire. They will use the data to determine stand history including establishment dates and past fire history. This will supplement further analyses of landscape fires in high elevation lodgepole pine/subalpine fir forests on the OKW NF.
- Technology Transfer: Fire ecology assisted Methow Valley RD with Fire Effects Monitoring (FEMO) on prescribed burn units and worked with FEMO trainees to complete taskbook requirements.

Strategic Budget Objective 1.1.1 Reduce Risk from Wildfire, and Strategic Budget Objective 1.5.2 Restore Plant/Animal Species Diversity

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Snag Dynamics: Fire ecology analyzed 4 collections of snag data taken over a decade and prepared a report on snag longevity in the 2002 Deer Point Fire area. Final data collection was completed at the end of FY11. This high-intensity fire burned on the north shore of Lake Chelan in 2002 and permanent plots were established and sampled in 2003. Plots were stratified into 3 different elevation groups to ensure measurements that include a variety of species and growth characteristics. The intent of this effort is to report decay rates and snag longevity for different conifer species by diameter and height classes following stand replacing fire events. A total of 2,132 snags were initially tagged in 2003 and subsequent resampling was completed in 2005, 2008 and 2011 Examination has shown that ponderosa pine has the highest rate of snag loss over the decade with only 27.3% of the original snags still remaining.



At this midelevation Deer Point site, most of the Douglas-fir and ponderosa pine snags have broken or have fallen completely during the past decade.

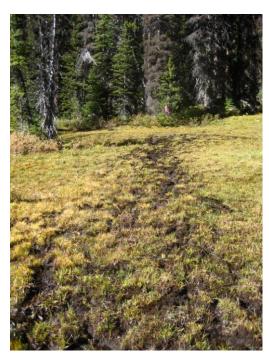
<u>Strategic Budget Objective 1.5.2 Restore Plant/Animal Species Diversity, and Strategic Budget Objective 2.2.1 Rangeland Management</u>

During the 2012 field season, ecologists were involved in vegetation monitoring and assessment projects related to ecological condition of diverse communities. Range Condition and Trend clusters were monitored on the Tonasket Ranger District to provide current ecological information for future analyses of two allotment management plans (AMPs). Ecology personnel also collaborated in the assessment of livestock use on fen vegetation and *Carex gynocrates* in

Upper Falls Creek on the Methow Valley Ranger District. Ecology personnel were also used to assist in planting seedlings on burned whitebark pine sites in early fall 2012 on the Tripod Fire.

Condition and Trend Range Monitoring: The Area 2 Ecology Program monitored historic allotment key areas during the 2012 season. Sampling followed the Nested Frequency, Cover/Frequency, and Parker 3-Step methodologies. Data collection was compatible with the R6 Range Protocols and NRIS-Terra database. Allotments were selected based on communication with forest and district personnel; the allotments monitored were identified as priorities for allotment management plan development.

A total of six permanent clusters were located, re-established, and monitored. Targeted Forest locations were searched for an additional four historic clusters on the Tonasket District but none were located due to poor re-location directions or vegetation disturbances over the past 40 years. All the site data, photos, narratives, and vegetation cover/frequency and nested frequency data will be entered into NRIS range applications. A Parker 3-Step analysis will be completed for all six clusters to assess forage rating and ecological condition.



<Site 2 Transect prior to exclosure Aug 2009



Site 2> Transect now inside exclosure Aug 2012

Priority range condition and trend clusters in 2012.

District	Cluster Name	Status
Tonasket	Bannon 41a	Located/Monitored
Tonasket	Bannon 41	Located/Monitored
Tonasket	Bannon 42	Located/Monitored
Tonasket	Aeneas 44	Located/Monitored
Tonasket	Toats Coulee 48	Located/Monitored
Tonasket	Toats Coulee 50	Located/Monitored

District	Cluster Name	Status
Tonasket	Aeneas 37	Not located
Tonasket	Tunk 39	Not located
Tonasket	Toats Coulee 47	Not located
Tonasket	Toats Coulee 53	Not located

Upper Falls Creek *Carex gynocrates* Monitoring: The Ecology Program helped to complete the 4th year monitoring of the Upper Falls Creek fen (photos above) and the rare sedge, *Carex gynocrates*. Since the fenced enclosures were built by Area 2 Ecology in 2009, monitoring has occurred during the fall to assess the impacts of annual and recurrent livestock grazing on the fen community as well as the rare sedge component. Permanent transects were established both within and outside fenced exclosures of the meadow complex and monitored over the past four seasons. Data representing plant species occurrence and abundance as well as soil disturbance attributes have been gathered. Preliminary analyses and reports have been completed. These sites will continue to be monitored periodically in future years. Funding for the monitoring has been shared with the district; their support has been from the Interagency Special Status Sensitive Species Program (ISSSSP).

Whitebark Pine (*Pinus albicaulis*) Reforestation: Whitebark pine ecosystems are imperiled nation-wide and have been identified for priority management actions by the R6 Whitebark Pine Strategy. The Tripod Fire (2006) burned many of the high elevation whitebark pine sites in the northern portion of the OKW NF and the remaining whitebark pine stands there are vulnerable to mountain pine beetle attacks and western whitepine blister rust infestation. Climate change and its impacts remain a concern. Action plans have identified appropriate seed collection sites and prescribed whitebark pine planting in these environments to ensure whitebark pine persistence and ecosystem resilience and function. The Ecology Program helped the many Forest Programs and volunteers to plant over 100 acres of whitebark pine habitat on Rock Mountain, Three Buttes Peak, and Thunder Mountain on the Okanogan-Wenatchee National Forest. Additionally, the ecology program established sixteen monitoring plots to evaluate reforestation success in these harsh environments.



Planted whitebark pine seedling

Natural whitebark pine seedling cluster

Strategic Budget Objective 1.5.2 Restore Plant/Animal Species Diversity

The wildlife ecologist participated in several projects designed to further our collective knowledge of wildlife community process and habitat. Collaboration with other forests, federal and state agencies, universities, and conservation groups was the hallmark of the work accomplished in FY12 and helps support landscape restoration projects in northeastern Washington.



White-headed woodpecker feeding nestlings.

White-Headed Woodpecker Monitoring: During 2012, we continued our participation in the regional effort to monitor white-headed woodpecker habitat and population trend. Monitoring sites were completed on the Wenatchee River, Methow Valley, and Tonasket Ranger Districts (RDs). Successful monitoring of the white-headed woodpecker is a program priority because this woodpecker will be both a focal and management indicator species in our revised Forest Plan.

The OKW NF began collaborative work with Victoria Saab (Rocky Mt. Research Station) and Kim Mellen-McLean (R6 RO) on development and evaluation of a survey protocol that will allow us to compare data from several protocols and also achieve additional monitoring objectives. The focus of additional monitoring includes assessment of Restoration Strategy Treatment effects (white-headed woodpecker presence/absence both pre- and post-treatment). Examples of differing protocols include Wenatchee River and Naches RDs' use of data collected from monitored radio-tagged birds, while other districts implemented a modified PNW Regional Protocol or observational transect.

Entiat and Cle Elum RDs implemented the modified protocol and visited a total of 37 pretreatment sites for a total of 609 surveyed acres. The Methow Valley RD used a different walk-through observation method to survey suitable white-headed woodpecker habitat on approximately 1,500 acres. No white-headed woodpeckers were located during either of these efforts. The Tonasket RD used the modified protocol to survey approximately 1,500 acres of suitable habitat. Two occupied nests were discovered that represent at least two white-headed woodpecker breeding pairs. Wenatchee River and Naches RDs monitored and observed radio-tagged birds and recorded over 50 days of observations. Major Partner: University of Idaho.

Wildlife Habitat Connectivity: The wildlife ecologist from the Area Ecology Program provided continued participation in the Washington Wildlife Habitat Connectivity Working Group as further collaborative efforts continue across all lands within Washington State. The group includes a wide variety of state, federal and non-governmental partners. http://www.waconnected.org.

Major Partners for this project were Washington Department of Fish and Wildlife (Co-Lead), Washington Department of Transportation (Co-Lead), USDA Forest Service, USDI Fish and Wildlife Service, Conservation Northwest, The Nature Conservancy, Western Transportation Institute, and University of Washington.

Effects of Restoration Treatments on Prey Species of the Northern Spotted Owl. Major Partners: Wenatchee Forestry Sciences Lab:

In 2012 we began pre-treatment monitoring on the Cle Elum Ranger District in collaboration with the Pacific Northwest Research Station. The study objectives are to identify and describe the effects of thinning and prescribed fire on prey species associated with the northern spotted owl. This monitoring task was identified during the initial efforts to implement the OWNF Forest Restoration Strategy and has been discussed, reviewed, and supported by the Forest Leadership Team.

Strategic Budget Objective 5.1.1 Resource Information

Workshops and Classes Taught or Organized

The fire ecologist provided field presentation and instruction to University of Washington and University of Montana graduate students on fire ecology, fire history, and historic stand reconstruction. He assisted with defining field methods and data collection procedures to identify and accurately map the distribution of historic stand components on area that is a collaborative project involving the USFS and Washington State Dept. of Fish and Wildlife, Methow Wildlife Area. The goal of this project is to have the students develop a thinning and fire management prescription that would restore this ponderosa pine dominated stand back to its historic condition.



Students mapping historical stand remnants for data, to inform restoration process

- The Area Ecology Program provides continuing support to planning efforts for Forest Plan Revision, GIS map products, and riparian vegetation assessments.
- Colville and Okanogan-Wenatchee National Forests' Land Management Plan Revision: Area Ecology functions in a support role for forest plan revision IDT and continued providing area information regarding fire, vegetation, and wildlife issues during FY12.
- PAG Map: Revision of NE Washington Plant Association Group (PAG) map was a priority task identified by COL and OKW NFs PAG Map users and was continued during FY12. The product will be completed in early FY13. Further, users will be asked to evaluate this version's application to landscape project planning and assessment during the remainder of FY13.

Summary of 2012 Leadership Direction

Area 2 Ecology personnel participated in a variety of efforts designed to inform management decisions and improve ecosystem condition and trend. From landscape-level ecosystem assessments to individual site studies, restoration of ecosystem structure and function is our collective goal. Leadership direction for us is to inform this process, including understanding and improving ecosystem resiliency, health, biodiversity, and natural processes, all within a framework of a dynamic environment.

FY2013 Goals

While the Area Ecology Program is in transition because of retirement, FY13 will allow us to pursue continuing projects and support crucial Colville and Okanogan-Wenatchee NFs' projects.

Studies associated with fire effects and fuels, vegetation ecology, wildlife community responses to management activities, and ecology database maintenance will continue in FY13 albeit with reduced efforts because of declining budgets. Priorities for FY13 also include developing ecology program direction and delivery into the future, particularly with support to Collaborative Landscape project monitoring, and related support to Forest Planning and NEPA processes.

Northeastern Oregon Area Ecology Program (Area 3)

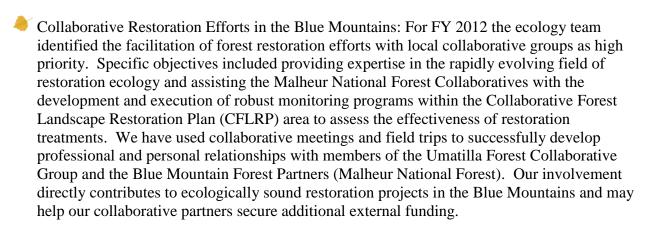
Wallowa-Whitman, Malheur and Umatilla National Forests



Area 3 Ecology Program Team: Sabine Mellmann-Brown, PhD Jennifer Ferriel Gunnar Carnwath, PhD

Overview of Program for FY2012

In 2012, the NE Oregon ecology program worked on four major projects in addition to providing project support to local Forest Service units.



Biological Soil Crust Issues in Hells Canyon National Recreation Area (HCNRA): The comprehensive management plan for Hells Canyon includes objectives, goals and standards for biological soil crust. However, there is little scientific data on the natural range of variability of biological soil crusts for NE Oregon. The Wallowa-Whitman National Forest is preparing two independent NEPA documents for grazing allotment within the HCNRA. Major issues include the determination of acceptable impacts to biological soil crust, soil disturbance by winter and early spring grazing of loamy moist soils in steep terrain, and the occurrence of *Silene spaldingii*, a federally listed plant species that occupies steep north facing slopes. We have participated in IDT meetings and taken a lead role in the interpretation of management plans, design of an integrated inventory method for biological soil crust, soil disturbance, and vegetation composition, and collection of pilot data. We are

currently working on a white paper analyzing available data and summarizing the state of knowledge regarding biological soil crust in the Snake River and Columbia Basins.

Old growth ponderosa pine snag on a white-headed woodpecker inventory transect



White headed woodpecker habitat inventory in the Blue and Ochoco Mountains: The white headed woodpecker is a management indicator species for dry old-growth ponderosa pine forests. The project involved repeated bird surveys and habitat inventory on 12 randomly selected transects in ponderosa pine forest. In 2012, year 2 of the 3 year project, we detected white-headed woodpeckers on a majority of the transects and documented 2 nest sites. This monitoring effort is in cooperation of the Rocky Mountain Research Station and will continue through 2013.

Fire-effects monitoring: Entering the 27th year of fire-effects monitoring, we inventoried the post fire vegetation development of 31 riparian and upland sites in Hells Canyon, the Wallowa Mountains and the Blue Mountains. Long term results of this monitoring effort have been summarized on the Ecology intranet site at http://fsweb.f16.r6.fs.fed.us/natural-resources/ecology/monitoring.shtml.

Leadership Direction

Our annual call for assistance-requests from the forests and districts resulted in 25 individual requests. With cooperation from the staff officers from the Wallowa Whitman, Malheur and Umatilla, we came up with work priorities for 2012 that are reflected in our key issues:

1) Participation in and assistance to the Forest Collaborative Groups on the Malheur and Umatilla National Forests; 2) Assistance in rangeland monitoring and analysis, with emphasis on riparian areas; 3) Regional monitoring tasks; 4) Continuation of long term monitoring projects.

We also served as advisors in multiple subject areas for the Blue Mountain forest plan revision, a priority for all three forests.

Accomplishments by Strategic Budget Objective

Strategic Budget Objective 1.1.1 Reduce Risk from Wildfire

Fire-effects monitoring: Inventoried the post-fire vegetation development of 31 riparian and upland sites in Hells Canyon, the Wallowa Mountains, and the Blue Mountains.

Strategic Budget Objective 1.4.1 Invasive Species (Insects and Disease)

- Whitebark pine health monitoring on 4 newly established permanent transects: Analysis of forest health with emphasis on white pine blister rust, mountain bark beetle and balsam woolly adelgid.
- Regional whitebark pine database: reviewed database design and proposed additions and updates. Entered data from 123 whitebark pine monitoring transects.

Strategic Budget Objective 1.5.1 Watershed and Aquatic Restoration

- Collaborative restoration efforts: Attended collaborative meetings and field trips on the Umatilla and Malheur National Forests to 1) develop professional and personal relationships with members of the Umatilla Forest Collaborative Group and the Blue Mountain Forest Partners and 2) provide expertise in restoration ecology.
- Malheur Collaborative Forest Landscape Restoration Plan (CFLRP) Monitoring: Assisting with the development and execution of robust monitoring programs that assess the effectiveness of collaborative forest restoration treatments.
- Asotin Fire Restoration Project, Umatilla National Forest: Field visits with district personnel and forest botanist to review restoration proposal for prescribed fire. Recommendations and concerns summarized in report to district.

Strategic Budget Objective 1.5.2 Restore Plant/Animal Species Diversity

White-headed woodpecker inventory on 12 randomly selected transects in Ponderosa Pine forests of the Blue and Ochoco Mountains. Completed 4 vegetation transects to characterize habitat. Year 2 of a 3-year project. Inventory is part of regional project and provides wildlife biologists with Forest Plan mandated data on management indicator species.

- Silene spaldingii habitat: Designed and tested integrated inventory protocol to assess soil disturbance by livestock in *Silene spaldingii* habitat on steep north facing slopes in Hells Canyon National Recreation Area (also see 2.2.1).
- Monitoring of *Astragulus tegatarioides*: Designed and tested monitoring protocol for sensitive *Astragulus tegatarioides* with Malheur National Forest botanist within a proposed fuels reduction project.
- Field review and adjustment of proposed treatment of Pinus albicaulis stand at Anthony Lakes to improve health and protect blister rust resistant, cone bearing trees.
- Blue Mountain Area ISSSP projects: Presented poster highlighting Blue Mountain projects at Rare Plants Meeting in Seattle, WA.
- Fungi work: Co-authored article for Northwest Passage Magazine on the 2011 Anthony Lakes Fungi Foray. Wrote 5 fungi fact sheets for the ISSSSP website.

Strategic Budget Objective 2.2.1 Rangeland Management

Biological soil crust and soil health: Co-authored issue paper on biological soil crust and soil health in the Hells Canyon National Recreation Area. Issue paper interprets management objectives, goals, and standards from the Hells Canyon Comprehensive Management Plan and other guiding documents, to assist and guide districts with the preparation of NEPA documents for two allotment management plans (AMP) within the Hells Canyon National Recreation Area.



Lower Imnaha River area in Hells Canyon National Recreation Area

- Integrated biological soil crust inventory: Designed and tested integrated inventory protocol to assess and monitor biological soil crust, soil disturbance by livestock, and vegetation cover for use in Hells Canyon National Recreation Area. Collected detailed biological soil crust data on 18 sites.
- Inventoried vegetation cover and basal area in two grazing exclosures and adjacent controls. Exclosures were established in 2010 to investigate site potential of vegetation currently strongly to completely departed from reference. Half of the experiment area was seeded in 2010 with native species.
- Riparian vegetation assessment: Revisited 11 existing riparian photo monitoring sites and relocated and inventoried 10 historic riparian inventory plots to document riparian vegetation condition for the Murderers Creek AMP on the Malheur National Forest.
- Assisted with condition and trend monitoring in Catherine Creek, Wallowa-Whitman National Forest.
- Assisted Wallowa Mountain, Whitman, Blue Mountain, and Emigrant Creek districts on Wallowa –Whitman and Malheur National Forests with rangeland analysis: 5 field visits and extraction and interpretation of condition and trend data from ecology database and archived records, in preparation for 4 AMPs. Participated in interdisciplinary team meetings regarding NEPA for 2 AMPs.
- Blue Mountain Forest Plan revision: Reviewed and edited draft Forest Plan regarding a landscape scale analysis of rangelands and the use of state and transition models.

Strategic Budget Objective 5.1.1 Resource Information

Workshops and Classes Taught or Organized

- Multi-day upland plant association training for Malheur National Forest employees in Collaborative Forest Landscape Restoration Plan (CFLRP) project areas.
- Moist forest plant association training for Umatilla National Forest employees to assist with stand exams in proposed timber project areas of the Walla Walla district.

Publications and educational materials

- Blue Mountain Forest Plan revision: Edited Research Natural Area section of draft forest plan.
- Research Natural Areas: Revised and expanded summary document on all proposed and established Research Natural Areas in the Blue Mountains. Visited Rainbow Creek RNA to assess the status of western white pine, for which the RNA was established.

Data and databases

- Inventoried whitebark pine habitat on 4 historic ocular macroplots in conjunction with whitebark pine health monitoring.
- Climate-growth relationships publication and presentation:

Carnwath, G.C., D.W. Peterson, and C.R. Nelson. 2012. Effect of crown class and habitat type on climate-growth relationships of ponderosa pine and Douglas-fir. Forest Ecology and Management 285:44-52.

Carnwath, G. C. and C. R. Nelson. Competition modulates climate sensitivity of Douglas-fir. Oral Session. 97th ESA Annual Meeting. Portland, OR. 7 Aug 2012.

Field work was conducted on the Colville National Forest and supported by the NE Washington Area Ecology Program.

Legacy data rescue and database management: Scanned and partly cross-referenced approx. 10,000 slides from photo monitoring and vegetation inventory in the Blue and Ochoco Mountains. Started to scan original plot cards. Maintained and updated ecology database and Parker Three Step database.



Moist forest plant association training on the Umatilla National Forest

Summary on 2012 Leadership Direction and Accomplishments

We experienced a continuing work force reduction during 2012. Gunnar Carnwath joined us in July 2012 as our third full-time ecologist. Jenifer Ferriel took a detail as R6 ISSSSP Coordinator from August through October 2012. In addition, the Wallowa-Whitman National Forest experienced major changes in leadership. This necessitated some restructuring of our plan of work. However, we were able to fulfill all high priority monitoring and inventory obligations. We also addressed many assistance requests from the forests, with work ongoing in several instances. Some inventory projects were deferred to 2013.

Goals for FY2013

The NE Oregon Ecology Team will continue their effort to participate in collaboratives on all three National Forests, building on our efforts from the past season. We will focus on restoration of moist forest types with mixed severity fire regimes, as there appears to be more uncertainty regarding best management practices. We anticipate heavy involvement in the CFLRP monitoring process. Our call for assistance requests will go out in January, to all district and supervisor offices in the Blue Mountains. The Malheur NF has already communicated an ongoing need for assistance with rangeland analysis for allotment management plans. Other goals for 2013 include the continuation of the white-headed woodpecker inventory project, Path modeling of historic range of variability of forested landscapes of NE Washington, a possible revision of our fire- effects methodology to provide additional fuels data, fire-effects monitoring on approximately 50 sites, and systematic collection of biological soil crust data for Hells Canyon National Recreation Area.

Central Oregon Area Ecology Program (Area 4)

Deschutes, Ochoco, and Fremont-Winema National Forests



Area 4 Ecology Program Team:

Gregg Riegel, PhD Mike Simpson Beth Johnson Sara Prueitt Lovtang

Overview of Program for FY2012

In FY2012 Area 4 ecologists worked on projects in wildlife ecology, fire ecology, range management, riparian ecology, and interpretation.

Key projects included white-headed woodpecker inventory and monitoring; ongoing long-term fire ecology studies focused on effects of repeated fire return intervals and various fuel treatment methods including prescribed fire, thinning, and understory mowing; collaborating with Janet Ohmann (PNW – Corvallis), Bob McGaughey (PNW-Seattle), and the Western Wildlands Environmental Threat Assessment Center (WWETAC) on a project that will determine the utility of light detection and ranging (LIDAR) as well as utility of more precisely located forest inventory plots for improving Gradient Nearest Neighbor vegetation and fuels attributes; monitoring and analyzing the spread of medusa head.

Leadership Direction

White-headed woodpecker monitoring was a Regional Wildlife Program request and was supported by the affected Forests. Other projects were requested from a variety sources such as field units, Regional, and National Headquarters, and were approved by Forest staff officers.



Area specialists (Entomology, Pathology, Ecology, and Genetics) met with Fremont-Winema Forest Supervisor, Deputy Forest Supervisor and Natural Resources Staff, April 2, 2012, to discuss our current and program of work and future Forest needs.

Accomplishments by Strategic Budget Objectives

Strategic Budget Objective 1.1.1 Reduce Risk from Wildfire

- We revisited and measured vegetation attributes on 14 1-ha plots as part of a long-term alternative fuels treatments study. This study began in 2001 and covers 3 National Forests. Treatments include prescribed fire, prescribed mowing, thinning followed by prescribed fire, and untreated control. In 2011 we conducted measurements of understory, overstory, and duff at 14 of the 73 study plots.
- Units within the Metolius Research Natural Area have been either left as controls or burned on 5, 10, and 20-year intervals. Season of treatment effects are being examined for the 10-year burn interval. In 2012 we took photos and measured fuels on 2 of the 15 units.
- We worked with Central Oregon Fire Management Service, Oregon Department of Fish and Wildlife, and Forest Service wildlife biologists to analyze the effects of previous fuels treatments on bitterbrush in mule deer winter range within the Fuzzy project area. We came to a consensus that future fuels treatments within the project area should continue as originally planned. Results from our long-term fire ecology studies were used in making these management decisions.
- We are partners with the Collaborative Forest Landscape Restoration Program (CFLRP) assisting in 1) the interpretation of monitoring data collected by the Chewaucan Biophysical Monitoring Team lead by Clair Thomas and 2) exploring the relationship of Learning and Planning under the 2012 Planning Rule under the framework of the CFLR lead by Bormann (PNW Corvallis).
- Participated in the A to Z field trip on the Paisley and Silver Lake Ranger Districts of the Fremont-Winema NF (FRE-WIN) to explore concepts and alternatives for landscape level treatment of lodgepole pine (Pinus contorta) to reduce the potential of bark beetle damage and treat hazardous fuel. This effort was the brainchild of Rick Newton, Deputy Forest Supervisor; attendees included Barb Machado, District Ranger, FRE-WIN Forest and District Staff, Drs. Jerry Franklin (Univ. of Washington) and Norm Johnson (Oregon State Univ.), and Will Hatcher of The Klamath Tribes, August 29-30, 2012.

Strategic Budget Objective 1.4.1 Invasive Species (Plants and Animals)

We remeasured 12 plots on Gray Butte of the Crooked River National Grassland. These plots are part of a long-term monitoring program established in 2002 as a pilot for FIREMON. Gray Butte was treated with prescribed fire in 2003, with treatment goals including juniper reduction and shrub-steppe restoration. Monitoring includes overstory, understory, and ground cover measurements. Cheatgrass (*Bromus tectorum*) is of particular concern and has continued to increase since treatment; cover increased from 5% pre-treatment in 2002 to 23% in 2006 to 31% in 2012.



Area Geneticist, Matt Horning coring a white bark pine to determine age, on monitoring plot on Drake Peak, in the Warner Mountains.

Strategic Budget Objective 1.4.1 Invasive Species (Insects and Diseases)

- We worked with Regional Forest Health Protection staff to establish and measure 12 permanent whitebark pine (*Pinus albicaulis*) monitoring plots on Fremont-Winema National Forest. Work was funded by Forest Health Protection.
- Developed 14 risk models for the 2012 National Insect and Disease Risk Map (NIDRM) for Oregon, Washington, and California. Six of the models represent areas with high risk of 25%+ total Basal Area mortality within 15 years due to infection by Sudden Oak Death (SOD) and White Pine Blister Rust (WPBR). Both agents are exotic invasive species. The other 8 risk models represent areas with high risk of 25%+ total Basal Area mortality within 15 years for native pathogens (Laminated Root Rot, Armillaria Root Rot, and Annosus Root Rot).
- Evaluated 20 Oregon and Washington Host Tree Species surfaces for R6. These surfaces, or GIS-layers, produced by the Forest Health Technical Enterprise Team (FHTET) in Ft Collins will serve as input data for the NIDRM risk models used in the 2012 NIDRM product.

Strategic Budget Objective 1.5.2 Restore Plant/Animal Species Diversity

We continued to work with Kim Mellen-McLean, Regional Wildlife Ecologist and Vicki Saab, Rocky Mountain Research Station Research Wildlife Biologist, on a region-wide white-headed woodpecker habitat inventory. We performed white-headed woodpecker callbacks at 14 randomly selected 2.7 kilometer long transects (140 points, 2 visits), and

Jenifer Ferriel, Area 3 Ecologist, and Marilyn Elston, Biological Technician, at the 2012 white-headed woodpecker callback training held in Sisters, OR.



measured vegetation attributes on 4 (40 points) of these transects. White-headed woodpeckers were detected on 6 transects in 2012 and 3 nest sites were documented.

- Revisited the Townsend bat data analysis for the China Hat area of the Deschutes National Forest and Bureau of Land Management, and wrote a final report on the analysis. Analysis on the Townsend bat population surveys done between 1986 and 2010 indicate both increasing and decreasing populations. The overall Townsend bat population for the China Hat area did not seem to be changing significantly (p-value=0.39). By individual cave, no statistically significant trend was detected in 9 out of 14 caves (64%), 4 out of 14 caves (29%) had decreasing trends, and 1 out of 14 caves (7%) had an increasing trend. The data suggests that Townsend bats are moving between caves, perhaps due to disturbance in or near the caves, but there is no evidence of a significant drop in the population due to disease such as white-nosed syndrome. A final report was submitted to the Bend/Fort Rock Ranger District of the Deschutes National Forest.
- Assisted ODFW researchers and managers with mule deer habitat and landscape characteristics for the ecology of mule deer in South Central Oregon Telemetry Study. Ecology Program data has aided analysis and interpretation of vegetation treatments on winter range/transition range along the interface of the Deschutes and Fremont-Winema NF's.

Strategic Budget Objective 2.2.1 Rangeland Management

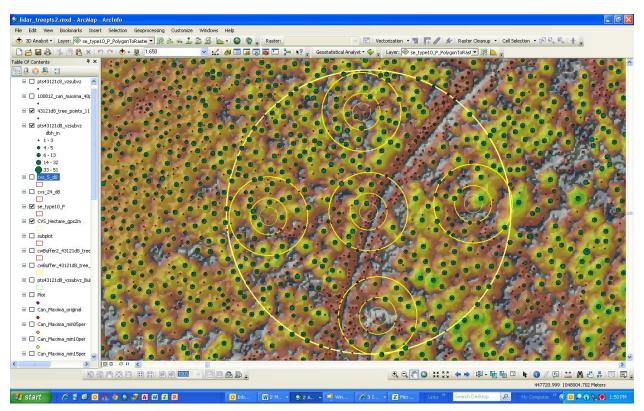
- Washington Office assignments: 1) Field Liaison and Rangeland Technical Committee Member for the Forest Inventory and Analysis (FIA) Oregon Rangeland Pilot, 2) National Riparian Technical Guide Team, and 3) USFS cadre member for the multi-agency, Implementing Indicators of Rangeland Health (IIRH) Program.
- Field site review of end of season livestock grazing effects in the Beaver/Sherwood Meadows and Alkali Meadows, Rogue River-Siskiyou NF Field Trip, October 20, 2012.
- Becky Kerns, of the PNW Research Station, Joint Fire Science Program (JFSP) proposal site review "Effects Prescribed Burn Regime and Grazing on Eastern Oregon ponderosa pine Vegetation and Fuels: The Season and Interval of Burn Study," Malheur NF, November 1-3, 2012.
- Review Jack Creek Oregon Spotted Frog (*Rana pretiosa*) Site Management Plan and Grazing Monitoring Plan for the Antelope Allotment Management Plan, Fremont-Winema NF.
- Initiated a pre-NEPA assessment of Camas Prairie Meadow, at the request of the Mt Hood National Forest, September, 2012. This field assessment will continue in FY2013.

Strategic Budget Objective 5.1.1 Resource Information

Data and databases

- Collaborating with Jim Muckenhoupt of Region 6 Data Resource Management to optimize individual tree point identification (location) using the Canopy Maxima function in the software called FUSION, which is used to interpret Light Detection And Ranging (LiDAR) data. The tree points derived from the LiDAR Canopy Surface model are then used to estimate tree diameter (DBH), Basal Area/Acre (BAft²/A), Stand Density Index (SDI), and Trees/Acre by size class.
- Used Viable Ecosystems state-and-transition models to complete landscape analyses for existing vegetation within the Red Knight project area on the Chemult Ranger District, Fremont-Winema National Forest, within the Drink and Rocket projects on the Bend/Ft. Rock Ranger District, Deschutes National Forest, within the McKay project area on the Ochoco National Forest, and within Seekseequa project area on the Warm Springs Reservation.
- Collaborating with Janet Ohmann (PNW Corvallis), Bob McGaughey (PNW-Seattle), and the Western Wildlands Environmental Threat Assessment Center (WWETAC) on a project that will determine the utility of LIDAR as well as utility of more precisely located forest inventory plots (FIA/CVS) for improving GNN vegetation and fuels attributes. The goal of this mapping project is to generate fine-grain (stand-level), spatially explicit information on fuels and vegetation attributes across approximately 500,000 hectares (1.2 million acres) of

interior dry forests in the Eastern Cascades Eco-Region of Oregon. We will quantify the accuracy of GNN maps developed with Landsat only, LIDAR only, and with both Landsat and LIDAR. The following 3 paragraphs excerpted from the project pre-proposal summarize the project and its deliverables. The project was funded by WWETAC in July 2011. See the attached WWETAC Pre-Proposal document for the complete project proposal.



Screen capture of individual-tree point-algorithms, overlayed on forest inventory plots, the canopy surface model, and the canopy height model derived from airborne LiDAR.

Created Tree/Acre by size class, Basal Area/Acre, and Stand Density Index in GIS layers from the LiDAR data for the portions of the Deschutes, Fremont-Winema, and Ochoco National Forests and Crooked River National Grasslands where new LIDAR data was delivered in 2012.

Land Type Association Review and Terrestrial Condition Framework Roll Out; Area Forest Assessment.

We propose to map fuels and vegetation over the Central Oregon LIDAR acquisition area (about 1.2 million acres) of interior dry forests of the eastern Cascades of Oregon using GNN. The GNN method uses multivariate direct gradient analysis to quantify relations among FIA plot data, satellite imagery, and mapped environmental variables. Individual pixels in resulting GNN maps are associated with plots that have the most similar spectral and environmental characteristics. A suite of detailed plot variables is imputed to each pixel,

allowing simultaneous and consistent predicting of a wide range of vegetation attributes. Because the plot-level variables are attached to the GIS database, a wide array of summary variables and classifications can be portrayed to meet different objectives. This study will incorporate rasters describing the forest canopy (overall height, variability in height, and cover) derived from LIDAR point clouds, which will be developed by Bob McGaughey. We will quantify the improvement in map accuracy achieved through the addition of LIDAR data and more precise inventory plot locations.

Deliverables will include GNN maps with the standard suite forest attributes as produced for the Interagency Mapping and Assessment Project (IMAP) (http://www.fsl.orst.edu/ lemma/imap), as well as fuels-specific variables needed for fire modeling programs such as FARSITE and FlamMap. GNN maps will be evaluated in several ways as described by Ohmann and Gregory (2002) and Ohmann et al. (2007. To explicitly evaluate what spatial extents the GNN maps are best suited for, important variables as determined in conversations with land managers will be evaluated using a suite of assessment procedures outlined by Riemann et al. (2010). GNN map products and accuracy assessments will be made available for download from our website (http://www.fsl.orst.edu/lemma). We anticipate deliverables to be made available within 15 months of beginning of project.

Anticipated impact of products: We anticipate that including LIDAR and precise FIA plot locations will greatly improve the accuracy and utility of GNN maps for local forest management for a variety of business needs. Improved GNN maps will provide resource managers within the study area unparalleled regional data, synthesizing fuels and vegetation information in one consistent data format to inform both tactical and regional fuels management. The strength of previous GNN products for regional assessments has been tempered by their limited applicability to stand-level decision making. If successful, the improved GNN map products will be a significant step towards providing natural resource managers with tactic-level information across large landscape and regions. This study would serve as a proof-of-concept for using LIDAR to downscale nearest-neighbor maps for local management, and our methods could be applied anywhere LIDAR data are available.

Mike Simpson has initiated and acquired seed money to begin a new region-wide project for 2013 which will build on existing work by Jimmy Kagan and John Christy from the Oregon Institute of Natural Resources. The project will build a spatial database from the General Land Office survey notes on the original Land Survey of both Oregon and Washington. The database will consist of both point features (section and quarter-section corner reference trees, tree diameters, tree species) and line features (section observations of tree and understory species). The database will be useful for semi-quantitative estimates of size/structure, species composition and density of forest vegetation in the 1850-1900 timeframe. It will also serve as a historic vegetation species distribution reference for climate change assessments.

Workshops and Conferences Attended

- Ecologist started working on a graduate-level certificate in "Water Conflict Management and Transformation" through Oregon State University, which trains professionals in mediation techniques for conflicts over water use.
- WWETAC Intermountain Invasive Risk Assessment Model Workshop, May 1-2, 2012.

Workshops, Presentations and Classes Taught or Organized

- Organized and moderated the Arid Lands session and presented talk on Fuels Management in Riparian Areas of the Interior West (Dwire, K. and G. Riegel). Central Oregon Fire Science Symposium: Using current research to inform resource objectives April 17-18, Central Oregon Community College, Wille Hall, Bend.
- Organized and led the Fire, Weeds to Restoration: Managing Succession with Ecologically Based Invasive Plant Management (EBIPM) Workshop, May 15, 2012, Redmond, OR. This workshop brought together speakers from the Ecology Program, Crooked River National Grassland, Ochoco National Forest, and Agricultural Resource Service, Burns, to present on EBIPM methods of dealing with invasive species.



Roger Sheley (far right), research ecologist with the Agricultural Research Service in Burns, OR, talks to participants in a May 15, 2012 Ecologically Based Invasive Plant Management workshop.

Invited Lecture, RX-310 Introduction to Fire Effects: Flora and Weed Modules. Region 6 Fire Training Center, January 30, 2012.

- Invited Lecture, Effects of Fire on Wildlife, Central Oregon Community College, Fire Ecology Course, May 3, 2012.
- Invited Presentation: Alternative Fuel Treatment Study Results and Interpretation. Forest Leadership Team, Modoc NF, Alturas, CA, July 19, 2012.
- Invited Presentation: Vegetation: A Practitioner's Perspective, at the Creating Stand Level Silvicultural and Monitoring Templates that Integrate Ecological Objectives for the Eastern Cascades, (PNW Research Station and US Fish and Wildlife Service Dry Forest Working Group) Hood River, OR, September 5-7, 2012.



Gregg Riegel, Area 4 Ecologist, and Steve Gibson,
Forest Range Program Lead for the Ochoco
National Forest and Crooked River National
Grassland, compare roots of two perennial grasses
for students on a Central Oregon Community
College field trip.

- Invited Field Trip Presentation, Field Monitoring of Fire Effects in Crooked River National Grassland, Central Oregon Community College, Fire Ecology Course, April 21, 2012.
- Co-lead white-headed woodpecker callback training in Sisters, OR, April 26, 2012, and white-headed woodpecker vegetation assessment training, Bend, OR, June 28, 2012.
- Ecologists were part of an interdisciplinary team which completed an Interpretive Plan for the proposed Cascade Lakes National Scenic Byway Welcome Station. We assisted in creating and editing interpretive signs on a variety of subjects including climate change, wildlife ecology, and vegetation ecology for both the Byway and for the Welcome Station. Work was funded by National Scenic Byways Program.

- Invited Lecture, The Restoration Conundrum of Central Oregon Ponderosa Pine Forests: balancing hazardous fuel risks of bitterbrush and mule deer browse needs. Humboldt State University, Wildland Restoration Class (RRS 430), September 17, 2012
- Invited Presentation: Bitterbrush Ecology: Lessons Learned from Fuel Treatment Studies in Central Oregon and the Modoc NF. Goosenest Ranger District, Klamath National Forest, Macdoel, CA, September 18, 2012.
- Gregg Riegel taught Fire Ecology and Effects (Forestry 209), a 3-unit lecture and lab second year class. He is a part-time faculty member, of the Forestry Resources Technology Program, Natural and Industrial Resources Dept., Central Oregon Community College, Bend, OR.

Publications and Educational Materials

- Lovtang, Sara. C., & Riegel, Gregg. M. 2012. Predicting the Occurrence of Downy Brome (*Bromus tectorum*) in Central Oregon. Invasive Plant Science and Management, 5(1), 83-91.
- Weixelman, D.A., and G.M. Riegel. 2012. Measurement of Spatial Autocorrelation of Vegetation in Mountain Meadows of the Sierra Nevada, California and Western Nevada. Madroño 59(3):143-149.
- Meyer, K.E., K.A. Dwire, P.A. Champ, S.E. Ryan, G.M. Riegel, and T.A. Burton. 2012. Burning Questions for Managers: Fuels Management Practices in Riparian Areas. Fire Management Today. 72(2)16-23.
- Area 4 Ecologist worked with Area 6 Ecologist to write, edit and format the document "Nonforested plant communities of the northern Oregon Cascades" which describes alpine and subalpine meadow communities of the northern Oregon Cascades using archived Ecology Program plot data. To be published.
- Gregg Riegel is a courtesy graduate faculty member with Oregon State University,
 Department of Rangeland Ecology and Management. He is currently serving as a committee
 member for:
 - Merschel. A. Stand Structure of Old-Growth Dry-Mixed Conifer Forests in the Deschutes and Ochoco National Forests. M.S. Student, Department of Forest Ecosystems and Society, Oregon State Univ. Expected completion date, December 2012.
 - Craigg, C.L. Soil Compaction Processes: Relationships and Indices for Forest Health in Oregon. Ph.D. Student, Department of Forest Engineering, Resources and Management, Oregon State Univ. Expected completion date, June 2014.
 - Seager, S.T. In drying climate scenarios, can forest overstory removal increase soil moisture and allow the persistence of drought-sensitive tree species in dryland ecosystems? Ph.D. Student, Department of Forest Ecosystems and Society, Oregon State Univ. Expected completion date, June 2014.

Platt, E. From Chiloquin to Washington: Fire in Eastern Oregon and Communities. Ph.D. Student, Department of Forest Engineering, Resources and Management, Oregon State Univ. Expected completion date, December 2014.

Goals for FY2012

Goals for FY2013 include continuing white-headed woodpecker habitat inventory, long-term fire and fuel treatment effects studies and monitoring, riparian grazing assessments for NEPA on Ochoco and Fremont-Winema NF, providing assistance for Area Forests and Regional Range Programs, Collaborative Forest Landscape Restoration Programs (CFLRP), interpretive programs on ecology, wildlife, and climate change work with Forests.

Southwest Oregon Area Ecology Program (Area 5)

Rogue River-Siskiyou and Umpqua National Forests



Area 5 Ecology Program Team: Tom Sensenig PhD Patricia Hochhalter Amy Nathanson

Overview of Program for FY2012

The Southwest Oregon Ecology Program is extraordinarily diverse in both its geographic extent and the variety and complexity of ecological issues. A large part of FY2012 was focused on the ten-year anniversary of the Biscuit Fire. There were many requests by the media for tours of the area, along with interviews by local television and radio stations. Furthermore, it was time to resample our ecology monitoring plots.

In addition to its contribution to Forest Service programs, one focus of the Southwest Oregon Ecology group is our involvement and service to social and public outreach, events and projects. During FY2012 the Ecology Program presented 19 scholarly public lectures and trainings, and planned and conducted five field days for local school children. The Ecology Program also provided data, input, and support for numerous high priority forest projects including the Northern Spotted Owl plan analyses, reviews, and revisions.

The ecology team contributed to the synthesis sub-team for the Climate Change Scorecard and the development and implementation of the Southwest Oregon Climate Change Plan.

Leadership Direction

The Area 5 Ecology Program includes an internal agency program and external public outreach emphasis. The ecology staff supports the ecological needs of ongoing forest programs including fish and wildlife habitat, soil and water, forest management, and climate change. The ecology staff also serves on the Silviculture Certification committee for individuals pursuing Forest Service Silvicultural certification.

Accomplishments by Strategic Budget Objective:

Strategic Budget Objective 1.1.1 Reduce Risk from Wildfire

The SW Oregon Ecology Program is engaged with the Siuslaw National Forest (lead Forest) in the Regional FRCC (Fire Regime Condition Class) and VDDT (Vegetation Development Dynamic Tool) development, for use in prioritizing and planning forest restoration efforts by watershed.

Fire ecology – Following the 2002 fires in southwest Oregon, mainly the Biscuit fire and the fires on the Tiller Ranger District, the Ecology Program established a post-wildfire monitoring program to track and assess post-fire ecological processes including revegetation, tree mortality, regeneration, and down wood. 102 pre-established ecology plots were within the Biscuit and Tiller fire perimeters. Of those, 88 were burned and re-sampled in 2003, 2005, and again in 2012, the ten-year anniversary of the fires. 62 plots were resampled in 2012, with approximately 17 remaining. We are hoping to finish those that we can get to over the winter and into the spring of 2013.



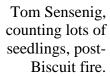
Darlingtonia californica post-Biscuit fire, 2012



Life, post-Biscuit fire,



Amv Nathanson & Patricia Hochhalter, post-Biscuit fire.





A literature search for published articles related to the Biscuit Fire was done, and has been entered into a database for easier access when information is needed.

In addition, there are approximately 140 post-Biscuit Fire monitoring plots that were installed after the Biscuit Fire in 2002 by the Fire Program on the Wild Rivers Ranger District. With assistance through a fuels service contract with Oregon Department of Forestry, the SW Oregon Ecology Program has begun the 10 year re-sample/measuring of these plots. Re-measurements were initiated in 2012 and will extend through 2013.



Biscuit fire monitoring plot – post burn, 2002.

Biscuit fire monitoring plot – post burn, 2012



Strategic Budget Objective 1.5.1 Watershed and Aquatic Restoration

Interdisciplinary team participation/consultation:

- Consultation/participation on the SW Oregon Forest Restoration Collaborative Team (Medford BLM and FS).
- Continued participant and contributor to the Briggs Valley (Wild Rivers Ranger District) forest restoration project.
- Consultants for the monitoring team for the Ashland Forest Resiliency Landscape Restoration Project.

Strategic Budget Objective 1.5.2 Restore Plant/Animal Species Diversity

- Continued with the analyses of dry forest ecosystems involving the identification of dry forest plant associations and plant association groups for use with the implementation of the Survey and Manage Species Agreement for the southwest Oregon Bureau of Land Management, Medford District, and the Forest Service.
- The ecology program participated in and contributed to the Klamath Province Dry Forests northern spotted owl interdisciplinary team and the inter-agency team "Recovery Action 10 Methodology".
- Provided peer review for the US Fish and Wildlife's Northern Spotted Owl recovery plan rule.

- Assisted the Central Oregon Ecology Program (working with the Regional Office) with the white-headed woodpecker callback surveys during the months of April and May.
- In cooperation with the Bureau of Land Management and Oregon State University, assisted with Brad St. Claire's (PNW Research Station) study on potential Douglas-fir seed source environmental sensitivity to climate change, requiring spring monitoring of precise dates of bud burst, bud set, and leader elongation on several hundred study trees.
- Participated and contributed to the Port Orford cedar Technical Team, a science-based team tasked with the management of Port Orford cedar, in the reduction of *Phytophthora lateralis*, which is an introduced root disease responsible for the demise of large populations of Port Orford cedar throughout southwestern Oregon.

Strategic Budget Objective 2.2.1 Rangeland Management

The ecology program works closely with range staff on an ongoing basis monitoring grazing utilization, effects on rare plants, and review for cattle allotment plans.

Strategic Budget Objective 5.1.1 Data and Resource Information

- Conducted field inventories necessary for the development and improvement for the accuracy of the Plant Association Group (PAG) map. Field inventories are conducted on an ongoing basis.
- Assisted Bernard Bormann, from the Pacific NW Research Station, with the Biscuit Fire Interpretive Report. This report was initiated following the fire in 2003. It is an attempt to analyze ecological succession and provide interpretations of observations of a burned study area.



Vulcan Lake – within the 2002 Biscuit fire perimeter

Legacy data rescue and management: Facilitated a service contract with retired ecologist Dr. Thomas Atzet to interpret and convert to a usable format SW Oregon historical ecological

- data continuous precipitation and temperature data collected on the Siskiyou Mountains Ranger District (was the Applegate and Ashland Ranger Districts) in the early 1960's.
- Provided support to several PhD students and universities, for ecological data analyses related to our permanent ecological inventory and monitoring plots.
- Oregon Public Broadcasting (television) Tenth Anniversary of the Biscuit Fire, viewed April 2012.
- Forest Management Oregon State University Master Land Steward Certification Program
- Managing Forests for Multiple Objectives High School Natural Resource Adventure Tour, North Medford High School
- Fire in Oregon Forests Oregon Forest Resource Council, Keno, Oregon
- Forest Ecology of Southwest Oregon Oregon Education Association, Medford, Oregon
- Geophysics and Forest Ecology Society of American Foresters National Convention
- Forestry and Silviculture (three times) Hanby Middle School, Gold Hill, Oregon
- Forestry Instruments, field trip Hanby Middle School, Gold Hill, Oregon
- Forestry and Silviculture, Oak woodlands and dry Douglas-fir forest field trip Hanby Middle School, Gold Hill, Oregon



Tom Sensenig with Hanby Middle School

Tom Sensenig with North Medford High School



- Forests and Forest Fires Ashland Kiwanis, Ashland, Oregon
- Climate, Fire, and the Future of Forest Restoration Oregon State University Extension, Rogue Tree School
- Forest Ecology and Fire in the Siskiyou's Oregon Education Association, Ashland, Oregon

- Vegetation Ecology Oregon State University Extension Land Steward field-based training
- History of Fire and Ecology in Southwest Oregon Illinois Valley Rotary Club, Cave Junction, Oregon
- Fire and Wildlife Habitat in Southwest Oregon Illinois Valley Rotary Club, Cave Junction, Oregon
- Are Forests and Climate Related? Ashland Kiwanis, Ashland, Oregon
- Forest Ecology of the Siskiyou Mountains Oregon Caves National Monument, USDI National Park Service, Cave Junction, Oregon
- Forest Ecology of the Siskiyou's Geo-Corp Student Program, Geological Society of America
- Forests and Water Transportation Forest to Tap Jackson County Soil and Water District, OSU Extension High School Natural Resource Adventure Tour, North Medford High School, in partnership with: Jackson County Soil and Water Conservation District; Oregon State University Extension; Medford Water Commission; Oregon Department of Forestry; Southern Oregon Timber Association; and Bureau of Land Management.

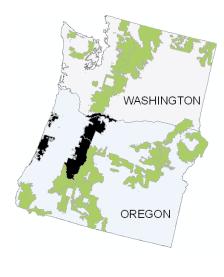
Goals for FY2012

In 2013, the Southwest Oregon Ecology Program's goal is to continue to grow and build upon the previous year's accomplishments and participate in both regional and forest level ongoing efforts and projects, including the Terrestrial Condition Framework analysis, FRCC mapping, Land-type Association (LTA) review for both the Umpqua and Rogue River-Siskiyou National Forests, PAG map review and revision for southwest Oregon, as well as continued participation with the Rogue River-Siskiyou and Umpqua National Forests requests for data, monitoring, participation on interdisciplinary teams, and involvement and service to social and public outreach, events, and projects. In February, ecologist Amy Nathanson, now based in Medford, will be relocating to Roseburg to acquire local training to better prepare for the support of the ecological needs of the Umpqua National Forest. In addition to training, she will be involved in a variety of projects, including the Umpqua National Forest FRCC mapping, through coordination with the NW Oregon Ecology Program, located on our neighboring forest, the Siuslaw National Forest.

We will also be involved with the Elk Creek project on the Tiller Ranger District and assist with some PAG map updates (field related) in the Quartz Creek Watershed on the Cottage Grove Ranger District, both on the Umpqua National Forest.

Northwest Oregon Ecology Program (Area 6)

Mount Hood, Siuslaw, and Willamette National Forests, Columbia River Gorge National Scenic Area, in cooperation with Salem and Eugene BLM Districts and the Central Cascades Adaptive Management Project



Area 6 Ecology Program Team:

Cindy McCain Jane Kertis Jeanne Rice Doug Glavich

We formed an official Forest Service/BLM chartered ecology group in 2003. Team members include: Cindy McCain, Jeanne Rice, Jane Kertis, Doug Glavich – NW Oregon FS Ecologists; Jenny Lippert (Willamette NF Botanist), Cheryl Friesen (Willamette NF Science Liaison), Doug Glavich (Siuslaw NF Botanist/Ecologist), Robin Dobson (Columbia River Gorge National Scenic Area ecologist), Hugh Snook (Salem BLM Ecologist), Chris Langdon (Eugene BLM Wildlife Biologist).

Overview of Program for FY2012

- Climate Change education, planning, status (scorecard), vulnerability and adaptation.
- Fire Ecology post-fire development, fire regimes, understanding fire ecology and fire behavior interactions, assessing current conditions.
- Special Habitats (e.g. meadows, oak/pine) definition, mapping, vulnerability
- Coarse Woody Debris spatial and temporal variability, wildlife habitat
- Vegetation successional pathways, large scale planning and analysis
- Monitoring planning, methods, analysis
- Landscape analysis and tools large scale, long time period assessments and tools
- Technology Transfer workshops, participation on teams, formal and informal interactions

Leadership Direction

Our team has a steering committee (staff from all units, Regional Ecologist) that oversees our program of work. Listed are areas of focus, and high priority topics of interest:

- Provide and support long-term, large-scale planning and analyses
- Provide Forest and project level support ID Team participation, technology transfer
- Climate change planning, analysis, technology transfer
- Monitoring vegetation and disturbance process changes through space and time
- Technology Transfer workshops, person to person, literature, etc.
- Work collaboratively with Districts, Forests, Region, BLM units and partners
- Finish ongoing projects



Natural Resource Crew Grass Seeding—local field crew seeding Deshampsia cespitosa at Pixieland Restoration site after dike removal, Siuslaw National Forest.

Accomplishments by Strategic Budget Objective

Strategic Budget Objective 1.1.1 Reduce Risk from Wildfire

Fire Regime Condition Class (FRCC) Analysis-collaborated with ecologists, planners, fire and wildlife to produce updated NW Oregon analysis (includes potential vegetation and current seral distribution) and draft for Umpqua NF and SW Oregon.

- Prescribed Fire in Wilderness core team member of joint Willamette/Deschutes team to implement strategic placement of prescribed burns to reduce risks to firefighters and multiple values. Analysis of treatment attributes and fire effects.
- Post-fire trends in high elevation and mixed elevation Forests-submitted journal article describing coarse wood dynamics 10 years after high elevation fire (expected publication FY13). 14 years post fire trajectories of the Warner Creek Fire Draft PNW Research Paper submitted with publication expected in 2013.
- Bull Run participated in team producing report requested by Regional Forester on potential wildfire effects and management options for Bull Run watershed.

Strategic Budget Objective 1.4.1 Invasive Species (Insects and Diseases)

Invasive species management – participated in implementing a small study to test effective native planting strategies for managing invasive species on the Pixieland marsh restoration site on the Salmon River Estuary (Cascade Head Scenic Research Area, Siuslaw NF).



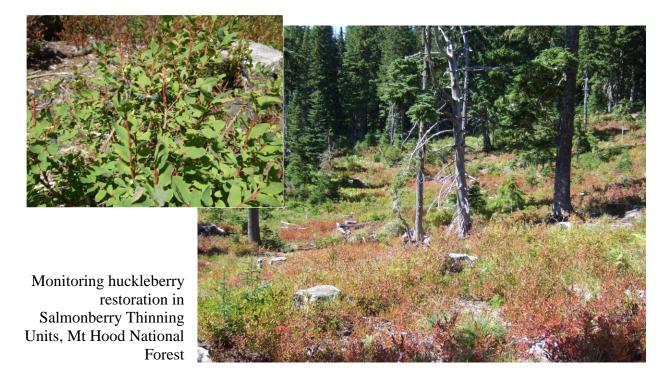
Pixieland Dike Planted—Sitka spruce planted post dike removal at Pixieland Restoration site. Siuslaw National Forest.

- Invasive species management-participated in invasive plant management planning for the Tamara Quays restoration site on the Salmon River Estuary (Cascade Head Scenic Research Area, Siuslaw NF).
- Invasive species management -participated in planning, implantation and monitoring efforts at Siuslaw NF's Sand Lake Research Natural Area, Salmon River Estuary (Cascade Head Scenic Research Area), Marys Peak Scenic Botanic Area
- Oversaw meadow restoration in Benton County funded through Rural Schools (PAYCO).

Strategic Budget Objective 1.5.1 Watershed and Aquatic Restoration

- Terrestrial condition assessment team member core member of the Mt Hood pilot.

 Developed protocols and rule sets for terrestrial indicators of vegetation condition. Presented to WO and regional leadership. Documented process.
- Climate change scorecard function as lead climate change coordinator on Siuslaw and Mt. Hood NFs, and on Willamette NF team. Completed September Performance Scorecard reports (Mt. Hood and Siuslaw NFs). Facilitated planning and program of work toward answering yes to all 10 elements by 2015. Develop climate change resource and sustainable Ops links and posted on intranet. Launched a Forest "Sustainable You" challenge to engage employees on making personal changes. Finalized the Employee Engagement & communication strategy for the Mt Hood. Gave a zero waste presentation to Mt Hood FLT. Completed the Forest Climate Action Plan (Mt Hood, Siuslaw, and Willamette NFs) looking at actions to incorporate climate considerations into the program of work and compliance with Performance Scorecard by 2015.
- FSVeg Spatial Migration completed Mt Hood NF migration and creating a wall-to-wall vegetation layer. Used eCognition polygons developed for the Mt Hood and latest GNN coverages for current vegetation.
- Contributed to EAs/EIS ID Team member on the Mt Hood NF team to the Mt Hood Meadows proposed Twilight parking project providing climate change and huckleberry input. Consulted with Willamette NF Sweet Home District on ecosystems services approach to the all lands Cool Soda project by modeling several vegetation scenarios and interpreting results, providing basic fire regime and successional pathway information.



Strategic Budget Objective 1.5.2 Restore Plant/Animal Species Diversity

- Meadow maintenance implemented maintenance prescription and developed vegetation planning for the Tamara Quays meadow (Cascade Head Scenic Research Area, Siuslaw NF), created for wildlife habitat.
- Elk forage collaborated on elk forage management tool development for species with high elk forage value (new west-side model).
- Contributed to EAs/EIS provided landscape coarse wood assessment to Central Coast RD, Siuslaw NF Beaver-Millwright planning unit.
- Estuary restoration participated on the planting plan development for the Crowley Creek restoration site on the Salmon River Estuary (Cascade Head Scenic Research Area, Siuslaw NF).
- Native sand dune communities collaborated in restoration of open sand dune community management of the Sand Lake Research Natural Area on Hebo RD, Siuslaw NF.
- Dunes restoration began dialogue with partners on dunes restoration strategies. Received PAYCO project funding to pilot treatments to reduce invasive species, preserve tree islands, restore globally significant plant communities and create open sand.
- Special habitats made recommendations on special habitat mapping and attributes for NW Oregon members, based on field evaluation of existing mapping techniques. Revised mapping protocol (incorporating LIDAR) planned for FY13.

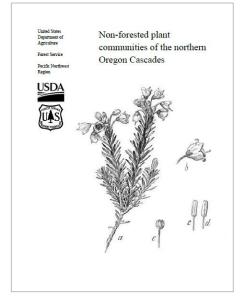


Jim's Creek monitoring, on Willamette National Forest

Strategic Budget Objective 5.1.1 Resource Information

Analyzed data for, and co-wrote, the guide <u>Non-forested plant communities of the northern Oregon Cascades</u>, to be published in FY13.

Cover of Non-forested plant
Communities of the northern
Oregon Cascades,
to be published in 2013



- Annual NW Oregon Information Sharing Workshop co-sponsored 1 day event with CCAMP technology and science transfer with Forest employees, partners, tribes, state, and other agencies on spotted owl prey.
- Annual Northwest Oregon Ecology Group Newsletter Forest dynamics after the Warner Fire, Gopher disturbance and plant community dynamics in montane meadows, climate change on the Mt. Hood National Forest etc. available on ecoshare website.
- Presentations and field trips presentation on Biophysical environments, fire regimes and vegetation development on the Sweet Home district, poster presentation on tree recruitment after a fire in a mountain hemlock forest (Ecological Society of America meeting), Vegetation modeling and mapping (NRCS) FLT presentations on climate scorecard and "Getting to Zero Waste" (Mt Hood NF), helped host field tour of Jim's Creek savanna restoration project with National Silviculturist (Willamette NF),
- Active Monitoring Projects upland vegetation and coarse wood dynamics after the Charlton fire and Warner fire (Willamette NF); Tamara Quays (Siuslaw NF), Jim's Creek savanna (Willamette NF) Pioneer Butte (Siuslaw NF) pre-meadow restoration bird monitoring, huckleberry restoration (Mt. Hood NF).

Summary on 2012 Leadership Direction and Accomplishments

- Provide and support long-term, large-scale planning and analyses: Terrestrial Condition Assessment, FRCC, Special Habitats, Coarse Woody Debris analysis, vegetation modeling and scenario development, Potential Natural Vegetation (PNV) mapping, large scale analysis for Prescribed Fire in Wilderness
- Provide Forest and project level support ID Team participation, technology transfer: ID team participation and or technology transfer on all 3 Forests and District (4) teams. Technology transfer—several workshops (e.g. Oregon Ecology Info Share workshop), presentations
- Climate change planning, technology transfer: Climate change coordinator for Mt. Hood and Siuslaw NFs. Facilitated information exchange (e.g. newsletters), developed program of work to complete scorecard requirements
- Monitoring: Active monitoring projects (see above), integrating with fire, botany, silviculture in monitoring efforts.
- Collaboration: Worked collaboratively with BLM, University of Oregon, Oregon State University, Portland State University Regional Office, CCAMP, various Districts, provides and shares information with the Confederated Tribes of Warm Springs.

Goals for FY2013

- Continue Climate Change role
- Special Habitats mapping for NW Oregon: continued collaboration with BLM units to classify and map using LIDAR, satellite imagery
- Continue consulting and performing monitoring projects.
- Communicate relevant science and management projects via Information Sharing workshop and Newsletter
- Initiate Dunes Restoration Strategy and pilot implementation projects
- Participate on ID teams on high priority forest projects (e.g. prescribed fire, seral management within LSRs, coarse wood analyses, meadow restoration, landscape analyses)
- Smooth transition of two new ecology positions (vice Rice and McCain)

Pacific Northwest Regional Office

33 SW First Avenue, Portland, Oregon



Pacific Northwest Regional Office Staff: Thomas DeMeo, PhD Nikola Smith

Overview of Program for FY2012

In Fiscal Year 2012 the program contributed to several emerging issues in the Region, among them the Collaborative Landscape projects, the Terrestrial Condition Assessment process, and new methods of landscape assessment.

Collaborative Forest Landscape Restoration Projects (CFLRP) have been established in the Region over the past two years. These projects receive extra funding in exchange for integrated proposals to change landscapes through significant treatments, with an emphasis on moving landscapes towards more sustainable conditions and reducing the risks of uncharacteristic fire to communities. One important component of the effort that continued to emerge in FY12 was the need for monitoring. The ecology program is working with the CFLRP monitoring teams, PNW Research, the Fire Science Consortium, and Sustainable Northwest on monitoring, and is the advocate of a process featuring an emphasis on carefully selected and screened monitoring questions owned by full collaborative membership.

The Terrestrial Condition Assessment (TCA) process emerged in FY12 at the National level as a counterpart to the aquatic Watershed Condition Framework (WCF) developed in 2010. The Mt. Hood National Forest/Columbia River Gorge National Scenic Area was selected as a National Pilot to test the indicators used in the assessment. A Regional Office group, led by soil scientist Karen Bennett, worked closely with Forest counterparts to form an integrated team, working through the process. The Ecosystem Management Decision Support (EMDS) tool was employed to evaluate the interactions of 13 terrestrial indicators, including three new indicators developed by the team. Ecologists contributed significantly to this process throughout.

Mapping, LiDAR (Light Detection and Ranging), and their role in both landscape management and project will continue as pressing issues, particularly as Forests face plan revisions.

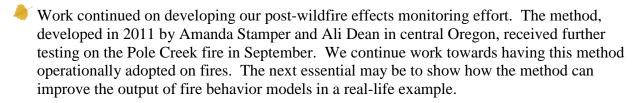
Ecologists Mike Simpson of the Central Oregon Ecology team, Cindy McCain of the Northwest Oregon Ecology team, and others contributed significantly to testing these approaches (see their respective sections in this report). Moreover, the involvement of ecologists on the Forests helps ensure outcomes can be used in a practical context.

Nikola Smith continued her National and Regional leadership in ecosystem services, implementing projects on National Forests, facilitating pilot payment for watershed services projects in Oregon and Washington, serving on the National team developing an ecosystem services evaluation framework, and helping to lead a National conference on ecosystem services held in Portland. In FY2012 Nikola was jointly funded by Ecology, the Climate Change Program and State and Private Forestry.

Finally, ecology continues its service role in technology transfer, monitoring, and support to the planning process in vegetation, fire, range, wildlife, and riparian ecology. For example, ecology contributed significantly to the field monitoring of whiteheaded woodpecker habitat. See the Area reports within this document for details.

Accomplishments by Strategic Budget Objective

Strategic Budget Objective 1.1.1 Reduce Risk from Wildfire



Tom continued to improve his fire experience and qualifications, being certified as a fire effects monitor. In September he was assigned to the Pole Creek fire on Bill Aney's long-term assessment team, serving in the fire effects monitor role. One outcome of this was a poster that was subsequently displayed at the 5th Association of Fire Ecology Conference in Portland in December 2012.

Strategic Budget Objective 1.5.1 Watershed and Aquatic Restoration, 1.5.2 Restore Plant/Animal Species Diversity, and 5.1.1 Resource Information



The Deschutes National Forest has been working since 2009 to apply an ecosystem service framework to forest management. A primary goal of this work is to help the forest collaboratively establish management priorities with partners and stakeholders, highlight the public benefits that result from sustaining or restoring ecological functions and processes, and articulate the rationale for management decision-making. In 2011 Nikola was the lead author of a General Technical Report that described the ecosystem services concept and

potential applications to forest management. In 2012 her efforts focused on implementation and project-level planning.

John Allen, Forest Supervisor, selected the Marsh Project on the Crescent Ranger District as a pilot. The planning area is characterized by significant fuel loads and contains critical habitat for the Oregon Spotted Frog and Northern Spotted Owl, as well as several species of rare plants. Nikola worked with the District Ranger, Interdisciplinary Team and The Nature Conservancy to design and facilitate workshops that identified key values associated with the ecological, economic and social benefits provided by the planning area. Workshop participants included forest staff and partners such as Oregon Department of Fish and Wildlife, U.S. Fish and Wildlife Service, Rocky Mountain Elk Foundation, Deschutes River Conservancy, Oregon State University and local community members. This collaborative process is being used to define the Purpose and Need of the project. Impacts of management activities on a range of ecosystem services are being used to inform project design.

♦ Willamette National Forest: All-Lands Approach to Management of the South Santiam Watershed – Sweet Home Ranger District

The South Santiam watershed on the Willamette National Forest has a checkerboard USFS/private ownership pattern. Nikola is participating in a cooperative restoration effort with district and forest staff, watershed council representatives and private land managers to improve overall watershed conditions across ownerships and encourage local economic development. This collaborative group is working together to (1) determine the inherent capacity of a sub-watershed to produce a variety of ecosystem services, (2) understand changes to that capacity based on historic land uses and existing conditions, and (3) develop a plan to restore these services at a level that is ecologically sustainable, economically viable and socially acceptable. Participants include Cascade Timber Consulting, AFRC, South Santiam Watershed Council, City of Sweet Home, Linn County Parks, ODF, ODFW, USFWS, NOAA-Fisheries, U.S. Army Corps of Engineers, Cascadia Wildlands, Oregon Wild, and others. The team finalized a restoration proposal in December 2012 which includes management needs, project recommendations, and expected ecosystem service outcomes of management activities.

In addition to this effort, the Sweet Home District Ranger is engaging the greater Sweet Home community in landscape-scale planning and economic revitalization. Oregon Solutions, designated by Governor Kitzhaber, is working with the District and local stakeholders to develop a plan for a community forest that connects Sweet Home to the Willamette NF. Projects will focus on public access, job creation, and forest health. Nikola serves on the Oregon Solutions Leadership Committee.

National Ecosystem Services Evaluation Framework Team

Nikola participates in a team led by Washington Office EMC staff to develop resources for managers on how to address ecosystem services in forest planning, as directed by the Planning Rule. This includes a stepwise guide as well as management support tools. Methods and tools developed in Region 6 are included in these resources.

<u>Strategic Budget Objective 1.5.1 Watershed and Aquatic Restoration, 1.5.2 Restore Plant/Animal Species Diversity, 5.1.1 Resource Information</u>

Eugene Water and Electric Board (EWEB): Payment for Watershed Services Program Development

Nikola represents the Regional Office in a working group convened by Eugene Water and Electric Board to support the development of a payment for watershed services program that protects and enhances the City of Eugene, Oregon's municipal drinking water supply. The working group meets monthly and includes representatives from the Willamette National Forest, McKenzie Watershed Council, Cascade Pacific Research and Development, McKenzie River Trust, East Lane Soil and Water Conservation District, Lane Council of Governments, University of Oregon and Oregon State University, among others.

The collaborative is developing a multi-faceted approach including:

- a voluntary payment incentive program to protect privately owned high quality riparian areas that result in public drinking water benefits;
- collaboration with partners like Oregon Watershed Enhancement Board and The Freshwater Trust to restore degraded areas; and
- use of stewardship contracting on the Willamette National Forest to maintain the quality of the McKenzie headwaters and retain restoration funds in the watershed for use on public and private lands.
- Washington State Payment for Watershed Services Pilots

In 2010 the Washington State Legislature passed House Bill 2541 to help forest landowners access more diversified sources of revenue, including from emerging ecosystem services markets. Washington Department of Natural Resources (WDNR) developed proposals to support the development of payment for watershed services market transactions in the state. They received a \$200,000 grant from the EPA to initiate demonstration projects in the Nisqually and Snohomish watersheds. Nikola participates in an advisory group to provide feedback on potential buyers and sellers, metrics and protocols, and components of demonstration transactions in these watersheds.

Ecosystem Services Champions Group

Nikola collaborated with the Pacific Northwest Research Station and the Washington Office to convene employees from across USDA to share lessons learned and develop a strategy for the future of an ecosystem services program for the agency. A forum of representatives from the National Forest System, State and Private Forestry, Research and Development as well as the Natural Resources Conservation Service met in Portland in May to identify opportunities and challenges for integrating ecosystem services approaches into our work and outline next steps for moving forward. Nikola co-authored an executive summary of the meeting including program recommendations. In November 2012 these recommendations were

approved by the Associate Deputy Chiefs, which tasked a sub-group (including Nikola) with their implementation.

Strategic Budget Objective 5.1.1 Resource Information



Terrestrial Condition Assessment (TCA)

To accompany the aquatic-centered Watershed Condition Framework, completed in 2010, a companion Terrestrial Condition Assessment is being developed nationally. In FY12 several pilot National Forests across the country were identified for developing and testing the methods. Through mutual agreement with the Washington Office, the Mt. Hood National Forest (NF) in our region was selected as one of the pilots.

The pilot effort was a model of Forest-Regional Office-research teamwork, and ecology was heavily involved. A team led by soils scientist Karen Bennett and ecologist Tom DeMeo included botanist Mark Skinner and wildlife ecologist Kim Mellen-McLean. For the Mt. Hood, silviculturist Nancy Lankford, ecologist Jeanne Rice, and GIS specialist Jaimie Bradbury completed the core team. Other support came from John Dodd, soils scientist, Chris Ringo, GIS contractor (Oregon State University/ecology program), and others. Keith Reynolds, a research scientist with the Pacific Northwest Station, provided significant assistance by incorporating Ecosystem Management Decision Support (EMDS) techniques as a way to combine the outcomes of the various attribute ratings.

In brief, the TCA consists of a set of 13 attributes (10 national standard attributes and three we added Regionally that have been tentatively accepted nationally), covering the range of terrestrial conditions. (A complete final report on our work is available on request, or electronically at O:/NFS/MtHood/Program/Ecology/TerrestrialConditionAssessment/Final Report/Mount Hood Columbia River Gorge TCA Report FINAL.docx.) The attributes can then be combined into a final terrestrial score, or any combination of attribute scores, by use of the EMDS process.

Results showed more needs for terrestrial restoration occurred on the Mt. Hood east of the Cascade crest. We presented our results to Regional leadership in November 2012 and officially transmitted our report to the Washington Office in December. Results have been well received, although there is now a "wait and see" attitude as we look to the Washington Office for further direction on how to complete the work Region-wide.

During our work on the pilot from June to December, we had to put in significant work on developing attributes so that they were meaningful and practical. Staying in touch with the Washington Office at all times, we took some innovative approaches that should significantly streamline and decrease the workload as the assessment is applied to other National Forests, both within the Region and across the nation.

Annual Meeting November 2011

The annual interdisciplinary meeting was held November 8-10 in Bend at the Riverhouse Hotel and Convention Center. Soils, range, silviculture, fuels, and ecology all participated, meeting as individual disciplines on November 8 and 10 and together in a common day November 9.

The morning of November 9 featured a look at restoration fire ecology, with Steve Arno (retired USFS Rocky Mountain Research Station) and David Pyke (USGS, Corvallis) as guest speakers. In the afternoon, we covered other pressing topics, including an overview of the Terrestrial Condition Assessment, a briefing on the NEPA process, and an update on climate change assessment in the Region.

Plans for the 2012 integrated meeting included an expansion to include all the disciplines, including the aquatic ones, presentations on restoration case studies, and a keynote address by the Regional Forester. This was canceled after new direction came out on meeting size. Instead we held a joint ecology/silviculture meeting in Hood River, which was very useful but lacked the impact of the larger meeting. We will attempt a more integrated meeting in 2013.

Data Rescue

In FY12 we launched a major renewed effort in identifying and capturing legacy data. The emphasis is on cataloguing datasets and converting them to a digital format. The main effort was converting Fred Hall's photo-monitoring slides, as well as paper data, to a digital format through scanning. To this end two contractors, Thomas Vittetau and Sarah Rambeau, have been hired on a part-time basis to scan Fred's vast legacy. 40 boxes of data were moved from his house to the Regional Office for processing (with great thanks to Fred's wife Ginger for organizing and labeling the boxes). At this writing the scanning is nearly complete; datasets of slide images will soon be posted on ecoshare.

Thomas and Sarah are assisted by De LaSalle High School interns, who join us two days per week, with oversight by myself and Nikola Smith. The data rescue team also is a service to other disciplines, and we scan materials on request. In FY12 we served the silviculture and fish biology units, and are currently working on a soil science project.

In FY13 we will focus on the Henderson/Lesher datasets, as well as paper data for the Gifford Pinchot National Forest.

Summary of FY12 Leadership Direction and Accomplishments

Ecology contributed significant leadership to the Collaborative Forests Landscape (CFLRP) projects. Regional ecologist Tom DeMeo serves with assistant director Tracy Beck and Regional fuels management lead Bill Aney in facilitating the projects for the Region, and with liaison to the National Office. In the area of monitoring, a monitoring process was developed with the

Lakeview and Tapash collaboratives, with early steps taken to offer it to the other collaboratives in FY13.

The Fire Science Consortium (FSC) was implemented in FY13. DeMeo serves on the FSC management team and was instrumental in fire-related field trips organized for the Columbia River Gorge (September) and the Pole Creek fire (November). Involvement will continue and expand in FY13.

Nikola Smith continued her National and Regional leadership in ecosystem services, implementing projects on National Forests, facilitating pilot payment for watershed services projects in Oregon and Washington, serving on the National team developing an ecosystem services evaluation framework, and helping to lead a National conference on ecosystem services held in Portland.

An integrated silviculture, fuels, ecology, soils, and range meeting was held in Bend in November 2011. This featured a common day with emphasis on landscape fire and climate change, and was widely regarded as a resounding success. Significant work in FY12 went into developing an even more fully integrated meeting, with Regional Forester participation, but was scuttled when National direction moved to limit meeting size. A smaller (but still effective) meeting of silviculturists and ecologists took place instead.

Projected Goals for FY13

In FY13 the program will continue to support monitoring efforts that are effective and collaborative. A monitoring process developed for the Collaborative Landscape Projects will continue to be implemented in a cooperative, mutual learning process. Ecologists will continue to put in significant field time in monitoring, notably with whiteheaded woodpecker habitat monitoring and range monitoring but with many other efforts as well.

We will assist in implementing the new Planning Rule, with plans for a workshop on preparing data layers for Plan revision. Sara Lovtang's position on the Central Oregon Ecology Area has been stabilized and tasked in part with contributing significantly to the Deschutes/Ochoco Forest Plan revisions.

Data management will continue to be a focus, including "rescue" of legacy data. Scanning of Fred Hall's photo-monitoring legacy is nearly complete and will be posted on line soon, with other datasets to follow.

Nikola Smith will continue her work and leadership in ecosystem services, and will lead an effort to train the ecology cadre in ecosystem services so the methods can be more fully implemented on the Forests. Nikola's work with Jane Kertis, Karen Bennett, and others on the Cool Soda project on the Willamette NF could serve as a template for this implementation.

Mapping and LiDAR will receive renewed attention. We will continue to seek the most effective ways of implementing these by working with other disciplines, research, and the Forests. A

Regional team, with Forest involvement and guidance, has been initiated to determine the most cost-effective and integrated ways to implement mapping, inventory, monitoring, and LiDAR, both in the short- and long-term.

Acronyms Defined:

There are many acronyms in ecology and the Forest Service. We have tried to define the acronyms the first time they are used within an Area's report. Here are some of the more commonly used acronyms:

AMP: allotment management plan

BA: basal area of a tree

CFLRP: Collaborative Forest Landscape Restoration Plan, also CFLR.

CVS: Current Vegetation Survey, which was the precursor to the Forest Inventory Analysis. In 2007 the CVS plots and monitoring schedules were altered to become FIA plots (see FIA below).

DBH: diameter at breast height, which is the measure of a tree trunk's diameter at 4.5 ft (1.37m, although more contemporary foresters in the US may use 1.4m).

ecoshare: The R6 Ecology Program website that provides information on the environment, ecology and natural resources (http://ecoshare.info)

EIS: Environmental Impact Statement. Document required by National Environmental Policy Act (NEPA) for certain actions "significantly affecting the quality of the human environment."

EMDS: Ecosystem Management Decision Support.

FACTS: Forest Activity Tracking System.

FEMO: Fire Effects Monitoring

FHTET: Forest Health Technical Enterprise Team

FIA: Forest Inventory Analysis, which is a program of the U.S. Forest Service that provides data from long-term annually surveyed plots in order to assess the composition, structure, and density of America's forests.

FRCC: Fire Regime Condition Class. An interagency standardized assessment method to evaluate the current conditions of lands in relation to their historic or "natural" reference condition, and used to describe the degree to which vegetation condition and structure, fire frequency and severity depart from natural or historical ecological reference conditions.

FUSION: software used to analyze Light Detection And Ranging (LiDAR) data.

GIS: Geographic Information System, which uses geographic coordinates and links it to information, so that roads, elevation, boundaries and climate can be projected digitally in different layers.

GNN: Gradient Nearest Neighbor. A form of imputation that integrates plot and spatial (GIS) data, including satellite imagery, to map detailed forest composition attributes and structure.

GPNF: Gifford Pinchot National Forest

HCNRA: Hells Canyon National Recreation Area

IDT: Interdisciplinary Team, usually formed to work on an environmental impact statement.

INA: Inventoried Needs Assessments. Wilderness programs do an INA to ensure that data they are collecting is the information needed to best steward wilderness areas, rather than collecting field data that might never be used for decision making.

ISSSSP: Interagency Special Status Sensitive Species Program

LiDAR: Light Detection And Ranging. A laser signal is sent to the ground from an aircraft. The time it takes for the laser to travel to the ground and back to the aircraft is used to determine the distance to a feature on the ground. An image of the ground is recorded to great accuracy.

LSR: Late-Successional Reserve. A designated area where the management objective is to protect and enhance conditions of late successional and old-growth forest ecosystems.

MBS: Mt Baker-Snoqualmie National Forest

NEPA: National Environmental Policy Act, which requires all federal agencies to prepare environmental assessments (EAs) and environmental impact statements (EISs) that contain assessments of the environmental effects of a proposed federal agency action.

NIDRM: National Insect and Disease Risk Map

ONF: Olympic National Forest

OKW NF: Okanogan-Wenatchee National Forest

PAG: Plant Association Group

PNW: Pacific Northwest, sometimes referring to the PNW Research Station in Corvallis, Oregon.

R6: Forest Service Region six, which includes Oregon and Washington

RD: Ranger District

RO: Regional Office

SDI: Stand Density Index

TCA: Terrestrial Condition Assessment. Consists of a set of attributes of terrestrial conditions, which are then combined into a final terrestrial score, or any combination of attribute scores, by use of the EMDS process.

TES: Threatened, endangered, and sensitive species

TPA: Trees per acre

VDDT: Vegetation Development Dynamic Tool. Software used to model vegetation dynamics.

WUI: Wildland-Urban Interface

WFDSS: Wildland Fire Decision Support System

WWETAC: Western Wildlands Environmental Threat Assessment Center, which is a unit of the USDA Forest Service Pacific Northwest Research Station, created to predict, detect, and assess existing and potential environmental threats to western wildlands.