USDA Forest Service
Pacific Northwest Region
Ecology Program

Accomplishments for Fiscal Year 2011
(October 2010-September 2011)

Annual Report

USDA Forest Service
Pacific Northwest Region
Ecology Program

USDA Forest Service
Pacific Northwest Region
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Cover photo credit: The Snake River in Hells Canyon Natural Research Area, taken by Sabina Mellman Brown

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Ecology Program Purpose:

Applied science for better forest and range management.

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. 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.

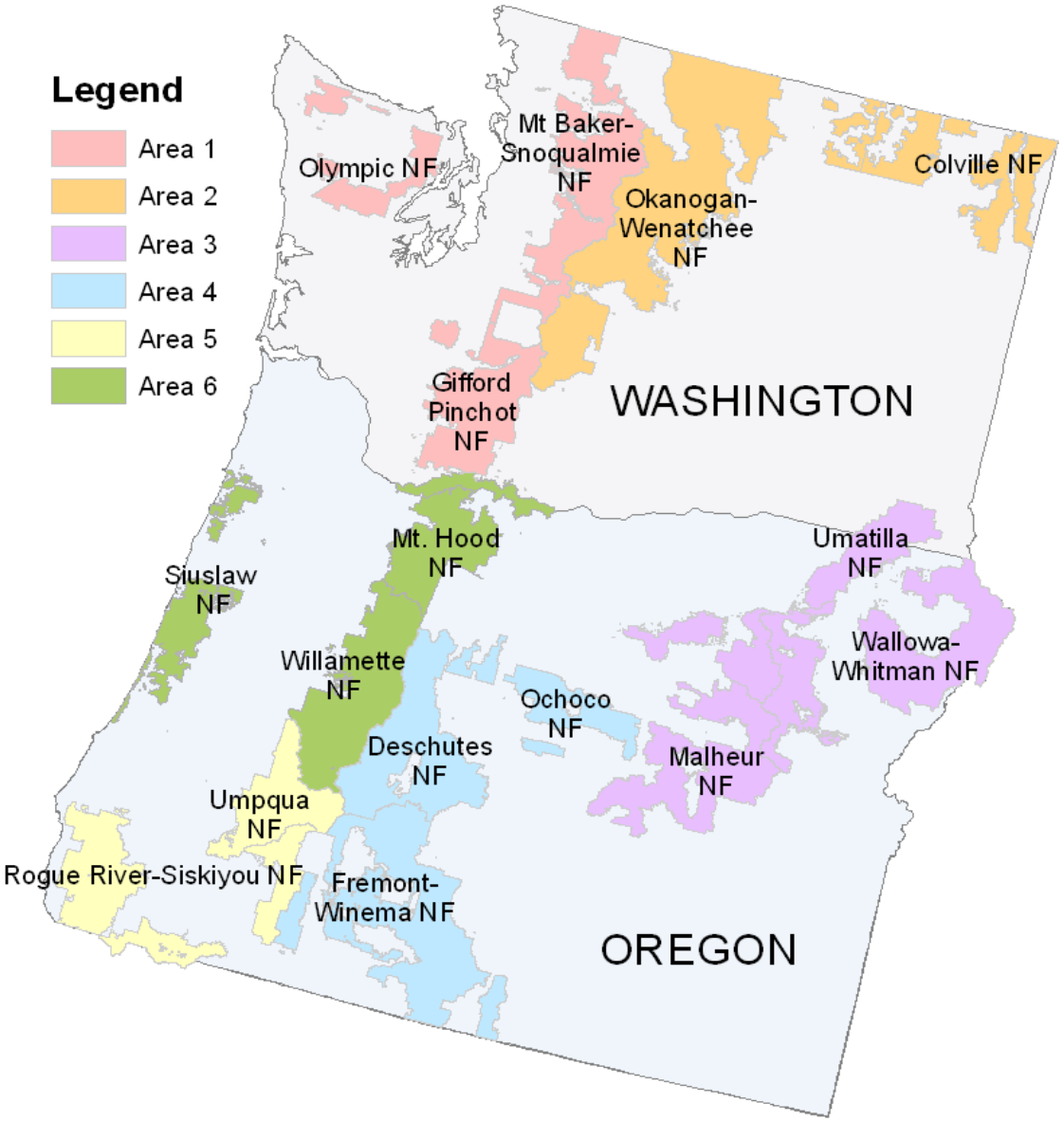
About the program:

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 meet 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.

Visit us at our website at http://ecoshare.info/ (or Google “ecoshare”). Ecoshare 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.



Western Washington Area Ecology Program (Area 1)
Mt. Baker-Snoqualmie, Olympic, and Gifford Pinchot National Forests

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

Overview of Program for FY2011

Ecology Area 1 experienced some turnover in personnel in FY2011 with the retirement of ecologist Robin Lesher. Robin retired at the end of the fiscal year after 27 years of service. Robin and Jan Henderson, who were stationed on the Mt Baker-Snoqualmie National Forest, were the Area 1 team for many years, and their achievements are considerable and enduring. Jan Henderson retired in 2010, after 32 years of service.

During FY2011, each of the three Western Washington forests chose to direct its Ecology Program focus primarily on its own forest-level project planning and implementation.

- **Mt Baker-Snoqualmie National Forest (MBS):** The primary focus for Robin Lesher in 2011 was to assist the Mt. Baker-Snoqualmie National Forest (MBS) in project planning and implementation. Lesher served on or provided input to inter-disciplinary teams, provided training on the Ecology Program corporate database to the MBS personnel and others, completed a revision of the Fire Regime Condition Class analysis for western Washington, and provided an ecological assessment and valuation for another timber theft on the Olympic National Forest.

  The Potential Natural Vegetation model paper was published as a General Technical Report by the Pacific Northwest Research Station. Lesher responded to numerous requests from the Forest Service and other agencies and organizations, tribes, academics and the public for ecology plot data, map products, plant association guides, and ecological expertise to address a diversity of issues. Jan Henderson contributed 43 days of volunteer time.

- **Olympic National Forest (ONF):** The annual meeting between ecologist Robin Shoal and the Olympic National Forest Natural Resource Staff Officer and Program Managers in October 2010 identified five key issues for FY2011 focus:

  Need for data about the location and condition of non-forested habitats, both wetland and terrestrial, with an emphasis on amphibians and threatened, endangered, and sensitive (TES) butterfly species;

  Need for data about the condition of riparian and lake aquatic habitats, including non-native aquatic species;

  Need for current data on the condition of Research Natural Areas and Botanical Areas;

  Vegetation management – restoration of under-represented native tree species;

  Restoration of native plant communities on disturbed sites.

  Potential projects within these five categories were identified, and the resulting FY2011 Ecology program of work focused on the five highest priority projects. All of these projects were acknowledged to be multiple-year efforts:

  1. Initiating an inventory of wetlands, and condition assessment of wetland structure and function;

  2. Restoring a historic native beargrass savanna ecosystem in the South Fork Skokomish River watershed;

  3. Initiating an inventory of rocky balds and other non-forested habitats;

  4. Restoring native plant communities on decommissioned roads and re-established stream banks in the South Fork Skokomish Watershed;

  5. Assisting with the development of a restoration program for western white pine and other under-represented native tree species.

  Shoal also provided support to Burned Area Emergency Response (BAER) project planning for the Big Hump burn area; and re-vegetation planning and design for numerous projects across the forest, including in-stream large wood installations, aquatic organism passage projects, elk forage enhancement, timber sale area improvement, and wetland restoration.

- **Gifford Pinchot National Forest (GPNF):** The primary focus for Jessica Hudec was the completion of her Master of Science degree in Forest Resources from the University of Washington. Other priorities included Fire Regime Condition Class watershed assessment; surveying the Coyote Timber Sale; pre and post fire plots and

implementation of the first phase of the Sawtooth Huckleberry Restoration project; fire effects monitoring and fuel treatment effectiveness on the Motherlode and Dollar Lake fires on the Mt. Hood National Forest; contribution to NEPA analysis for phase II of The Dalles Watershed restoration project; consulting with the sale administrator and contractor on the Gotchen biomass sale; and participation in various collaborative group meetings and field trips regarding hazardous fuels reduction, fire ecology, Fire Regime Condition Class, small diameter thinning, and insects and disease.

Accomplishments by Strategic Budget Objective:

More in-depth descriptions of some of the projects summarized here is included the Forest Projects section, below.

Strategic Budget Objective 1.1.1 Reduce risk from wildfire

- Completed the Fire Regime Condition Class (FRCC) analysis and mapping for western Washington, including Washington Coast Range, Washington North Cascades, and Western Washington Cascades mapping zones, for use in prioritizing and planning forest restoration efforts by watershed, in cooperation with Chris Ringo, Jane Kertis and Jan Henderson. Submitted report on methodology, analysis and results, including a critique of the Fire Regime Condition Class process for western Washington.

- Fuel treatment effectiveness and fire effects monitoring on the Dollar Lake and Mother Lode Fires;

- Research lichen-driven fire behavior and prescribed fire in wilderness, NEPA analysis for Phase II The Dalles Watershed Restoration;

- Surveyed Coyote Thin for hazardous fuel reduction opportunities;

- Worked with Timber to report integrated accomplishments and plan hazardous fuels reduction through hazard tree removal associated with insect and disease mortality.

Strategic Budget Objective 1.4.1 Invasive Species (Insects and Diseases)

- Used Ecology Plot and other data to develop criteria for identifying suitable locations for reintroduction of blister-rust-resistant western white pine on the Olympic Peninsula, where western white pine populations have been drastically reduced by the non-native fungal pathogen *Cronartium ribicola*;

- Accompanied collaborative groups on a field trip to observe the spread of Western spruce budworm and mountain pine beetle mortality areas around Mt. Adams;

- Tested 47 individual amphibians, from eleven wetlands across seven subwatersheds on the Olympic Peninsula, for presence of *Batrachochytrium dendrobatidis* (Bd), the

fungal pathogen that causes the fatal disease Chytridiomycosis in amphibians (more information in the Forest Projects section, below).

Strategic Budget Objective 1.4.1 Invasive Species (Plants and Animals)

- Provided ecology plot data to researchers at the Olympia Forestry Sciences Lab, Threat Characterization and Management Program for analysis on native and invasive plant species;

- Inventoried invasive plant and animal species on 104 acres of wetland habitat (more information in the Forest Projects section, below).

Strategic Budget Objective 1.5.1 Restore Watersheds

- Served on the inter-disciplinary team for the MBS Watershed Condition Classification (WCC), and completed the Fire Regime Condition Class (FRCC) analysis to fulfill the fire regime indicator component of the national WCC framework analysis. Submitted report on methodology, results and critique of FRCC process with review and input by Henderson;

- Evaluated redcedar trees identified as potentially "culturally modified" in the Suiattle River Road Re-route Emergency Relief for Federally Owned Roads (ERFO) Project on the Darrington Ranger District. Conducted site visit with forest archaeologist, district personnel, Federal Highway Administration staff, tribal members and Henderson, discussed the potential of these scars to indicate culturally modified trees, and other possible agents of scarring. Submitted report with Henderson on the ecological interpretation of the scarring of western redcedar trees in right-of-way for Suiattle River Road re-route, in consultation with agency and university forest pathologists, mycologists and other ecologists;

- Participated in the Harlan Ridge Restoration Resource Advisory Committee (RAC) project in collaboration with the Tulalip Tribes and the National Park Service. Developed species list for the project area, including notes on species' ecology and restoration potential, conducted site visit to identify and delineate sites for restoration treatments;

- Provided ecological input and expertise to vegetation managers, silviculturists and wildlife biologists to assist in implementation of the Finney Adaptive Management Area Plan, including field visit with district silviculturist, wildlife biologist and Henderson to interpret sites and discuss potential treatment opportunities;

- Provided data to define and map site potential tree heights by Plant Association Groups to calculate and map riparian buffers in the Upper White Project area and revise the riparian buffers for the MBS (with Henderson);

- Developed strategy for old-growth restoration analysis and attributes for the Forest Wildlife Biologist;

- Provided ecology plot data to the Olympic National Forest (OLY) for the Little Quilcene watershed analysis and restoration project;

- Designed and implemented revegetation of over 300 drainage features and reconstructed streambanks associated with 31 miles of decommissioned roads in the South Fork Skokomish River watershed, using local native plant species;

- Fire Regime Condition Class watershed assessment (Gifford Pinchot NF).

Strategic Budget Objective 1.5.2 Species Diversity (Wildlife)

- Provided map and ecological information to the Darrington District Wildlife Biologist on the distribution of hemlock dwarf mistletoe and stand year of origin; identified potential areas to survey for the rare Johnson Hairstreak butterfly (funded by Challenge Cost Share);

- Assembled data for sphagnum bogs on the MBS in response to request for distribution of potential habitat for rare beetles. Information was used to identify areas to conduct surveys under an existing regional ISSSSP project;

Strategic Budget Objective 1.5.2 Species Diversity (Plants)

- Assembled and verified records for the Natural Resource Information System (NRIS) Threatened, Endangered, and Sensitive (TES) Species legacy data call of vascular plants, bryophytes and lichens from ecology plots on the MBS and OLY. Format conversion for NRIS migration is nearing completion for over 400 records;

- Provided review of Sensitive and Special Status Species list with Forest Botanist in response to Regional Office request for update of the Regional Forester's List;

- Provided list of Survey and Manage species (vascular plants, bryophytes, lichens) documented on ecology plots on the Olympic National Forest to the Forest Botanist;

- Provided ecology plot data to document occurrence of white-bark pine on the MBS;

- Provided native plant species recommendations and revegetation planning support to Aquatics, Wildlife, and Botany projects;

- Began design and implementation of a multi-year ecological restoration plan for the beargrass savanna/prairie restoration project to restore and maintain native prairie, oak woodland, and wooded savanna ecosystems in the South Fork Skokomish River Watershed (more information in the Forest Projects section, below).

Strategic Budget Objective 5.1.1 Resource Information

- Ecology Program Corporate Database. We released version 1.1 of Ecology Program Corporate Database for the Mt. Baker-Snoqualmie NF, with over 3000 plots and data including plot location, environment and site conditions, stand age, potential vegetation, plant community composition and vascular plant species abundance, township maps of potential vegetation and plot locations, metadata documentation and user guide. Conducted training session for 25 participants from the MBS and Olympic NFs representing a broad range of disciplines including rangers, staff officers, timber, wildlife, botany, aquatics, fire, planning, GIS (DRM), recreation, and Regional office ecologist. Database has user-friendly interface with queries to facilitate retrieval of data. Henderson contributed significant time to this effort;

- Potential Natural Vegetation (PNV) model publication. This publication documents the development of the PNV model and environmental variables, and the methodology used to model and map the potential vegetation zones of Washington and Oregon. Copies are available from Tom DeMeo or the authors, and online at the PNW Research Station publications website: http://www.fs.fed.us/pnw/pubs/pnw_gtr841.pdf

  Henderson, Jan A., Robin D. Lesher, David H. Peter and Chris D. Ringo. 2011. A landscape model for predicting potential natural vegetation of the Olympic Peninsula USA using boundary equations and newly developed environmental variables. USDA Forest Service Pacific Northwest Research Station General Technical Report PNW-GTR-841. Portland Oregon. 35 p.

- Monitoring:

  Continued measurements of monitoring plots to document stand responses to thinning treatments. Completed measurements of six monitoring plots in Forgotten Thin project area, and three plots in the Tonga Ridge Silver Fir Spacing Trial. Also maintained and retrieved data from five long term temperature monitoring stations, and seven plots in the Hey Thin project area (with Henderson);

  Completed ecological assessment and valuation for timber theft in the Rocky Brook area of Olympic National Forest; conducted site visits with Henderson, law enforcement officers, district wildlife biologist and Olympic Forest ecologist. Submitted report to Special Agent Minden (co-authored with J. Henderson);

  Provided expertise and data to the FEMA Environmental Officer regarding site potential tree heights for riparian buffers in western Washington;

  Provided plot data and field plot protocols to City of Seattle - Cedar River Watershed ecologist on permanent ecology plots, provided expertise on protocols to monitor and document trends over time.

Forest Projects

Mt Baker-Snoqualmie (MBS) National Forest Projects:

The ecologist (Lesher) esponded to inquiry from the Forest Archaeologist regarding cultural resources relative to the Proposed Action in the Suiattle Access and Travel Management project (Darrington District). Provided data and expertise on distribution of Alaska yellowcedar and huckleberry species in the planning area, and habitats of interest for cultural resources and practices, to be used as background information to address tribal and public concerns.

Other forest-level projects on the Mt Baker Snoqualmie:

1. Finney Adaptive Management Area - provided ecology plot data to silviculturists to use in defining stocking relationships, developing silvicultural prescriptions and treatments for the project area.

2. Contributed Ecology section to the MBS National Forest Plan Annual Monitoring Report.

3. Developed grant proposal in collaboration with Tulalip Tribes to develop habitat model and map for Big Huckleberry (*Vaccinium membranaceum*), a species of cultural importance on the MBS, and a priority task identified in the MBS/Tulalip Memorandum of Agreement. Tulalip Tribes received FY12 funding from the Environmental Protection Agency to complete the project.

4. Provided fire history, ecology and vegetation information to the Forest Silviculturist for the Upper White Project Area (Snoqualmie Ranger District)

5. Special Forest Products Program – consulted with the vegetation manager and special forest products forester to provide expertise on species, ecology, management and economic potential for species of interest in developing the Special Forest Products program on the MBS.

Olympic National Forest Projects:

Wetlands inventory and condition assessment: This is an integrated team project that includes a wildlife biologist and a botanist, with the Ecologist (Shoal) as team lead. Data collected included 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 influence; inventory of invasive plant species; and wildlife observations, including assessment of habitat suitability for threatened, endangered, and sensitive (TES) species.

Survey sites were selected based on their potential to provide high quality habitat for TES wildlife and plant 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. Based on data collected, field observations, aerial photography review, and management history, the project team developed recommendations for potential restoration activities for each site. Fifteen wetlands totaling 104 acres were surveyed.

One survey resulted in the first verified documentation of American bullfrog (*Lithobates catesbeianus*), a non-native invasive amphibian species, on the Olympic National Forest.

One of two adult bullfrogs encountered during the survey. The first documented occurrence of this non-native invasive frog on the Olympic NF.

The project team also caught and swabbed amphibians in eleven wetland sites to test for the presence of *Batrachochytrium dendrobatidis*, or Bd. This fungal pathogen that causes the fatal disease Chytridiomycosis in amphibians and is directly linked to the recent extinction or serious decline of many amphibian species worldwide. No structured Bd sampling had previously taken place on the Olympic Peninsula.

A total of 47 amphibians representing five species was sampled: 15 western toads (*Bufo boreas*), 14 northern red-legged frogs (*Rana aurora*), 12 Cascades frogs (*Rana cascadae*), 4 rough-skinned newts (*Taricha granulose*), and 2 Pacific tree frogs (*Pseudacris regilla*). Collaboration with Olympic National Park provided an additional 17 samples, all *Rana cascadae*, collected from eight high elevation wetlands within the National Park boundaries.

Samples were sent to Pisces Molecular (Boulder, CO) for polymerase chain reaction (PCR) testing. Samples were initially pooled based on collection site. Where pooled sample results were positive for presence of Bd, samples from individual animals were retested to determine which species were infected.

Pooled samples from seven of the eleven sampled sites tested positive for Bd. Individual samples testing positive for presence of Bd were from *Bufo boreas, Pseudacris regilla,* and *Rana aurora.* The *Rana cascadae* and *Taricha granulose* samples were all negative for presence of the pathogen.

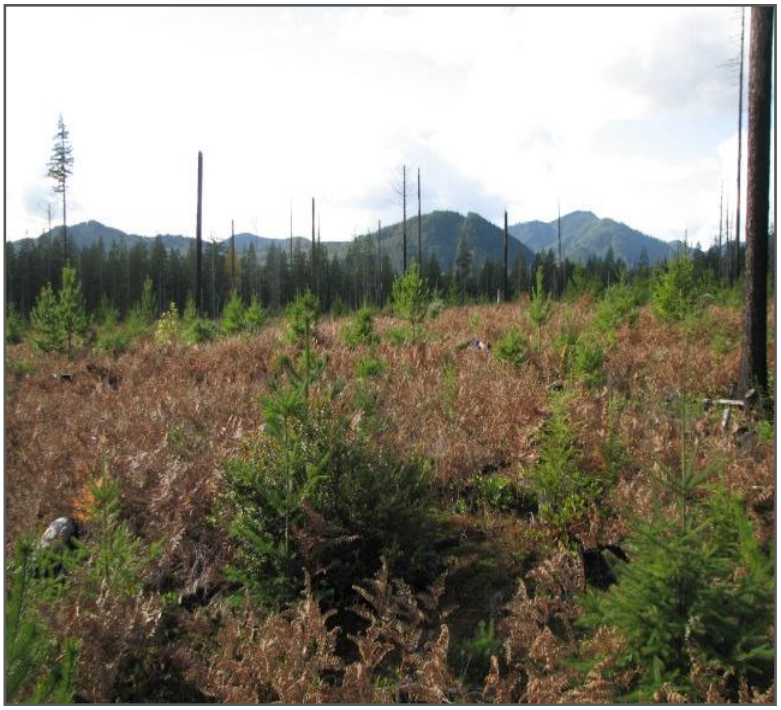
This western toad was caught, swabbed, and released as part of the 2011 Bd sampling. Sampling consists of gently rubbing the amphibian's belly with a cotton swab, then releasing the animal. The entire process is conducted at the location where the animal was found, takes only a few minutes, and does not harm the animal.

Beargrass savanna restoration: This project revives a restoration effort initiated in the late 1990s as part of the Boundary Timber Sale. The Boundary project included a heavy thinning and subsequent prescribed burn on a 32-acre unit. This unit is located within a much larger area that is underlain by glacial outwash soils, and 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.

The beargrass savanna/prairie restoration project is an integrated team project involving the Ecologist (Shoal) and the Forest Wildlife Biologist as co-leads, Fire, Botany, Silviculture, and the Olympia PNW Lab. The project has the support of the Skokomish Tribe and the collaborative Skokomish Watershed Action Team (SWAT).

The prairie restoration unit was harvested in 2002 and burned in early September 2003. Because of a heavy accumulation of fuels, the fire burned hotter than planned. The native grass species poverty oatgrass (*Danthonia spicata*) was sown in some heavily burned areas. No additional vegetation management activity has taken place on the restoration site since 2003. PNW Lab Ecologist Dave Peter recently established a series of ecology plots to monitor vegetation recovery.

View of the Boundary Prairie Restoration Unit in November 2011, eight years after the original prescribed burn. It is estimated that an eight to ten year burn cycle is appropriate for maintaining the site's vegetation in a condition similar to the pre-settlement beargrass savanna ecosystem.



The current effort focuses on the development of a burn plan that will be implemented on approximately one-third of the unit in summer or fall of 2012, and a restoration planting plan involving seed collection and propagation of beargrass and other grass, shrub, and forb species known to have been important components the former savanna ecosystem. A long-term restoration and maintenance plan will be developed, based on the monitoring plot data and the results of the 2012 burn.

Initiating an inventory of balds and other dry, non-forested habitats: The Hood Canal Ranger District contains numerous natural rocky balds that support many populations of plants and animals not found in other habitats. This list includes the Taylor's Checkerspot butterfly (*Euphydryas editha taylori*), which became a federal Endangered Species Act (ESA) candidate species in October 2001, and was designated endangered by Washington State in 2006. Fire suppression and timber management have led to conifer encroachment and increased fire risk for many of these balds habitats.

The 2011 Ecology program of work item for this issue was to locate and map balds and potential balds using known sites, aerial photographs, and ecology plot and other survey data; and to identify an interdisciplinary group of specialists to take part in the project. This has been completed, and in 2012 the team will develop a protocol for surveying balds, and identify methods of restoration for degraded balds habitats. Surveys are scheduled to begin in summer of 2012.

Aerial view of Three-o'clock Ridge, a sizeable rocky balds complex in the Dungeness River Watershed. Natural rocky balds that support many populations of plants and animals not found in other habitats.

Gifford Pinchot National Forest Projects:

Fire severity and post-burn fuel characteristics in forests with mixed severity fire regimes: Fire severity influences post-burn structure and composition of a forest and the potential for a future fire to burn through the area. The effects of fire on forests with mixed severity fire regimes are difficult to predict and interpret because the quantity, structure, and composition of forest fuels vary considerably. This study examines the relationship between fire severity and post-burn fuel characteristics in forests with mixed severity fire regimes.

We sampled live and dead canopy and surface fuels across four fire severity classes on three wildfires that occurred on the east side of the Cascade Range, USA, in 2007 and 2008. Empirical fuels data and stand structure and composition characteristics were used to calculate potential surface fire behavior for the four fire severity classes. The average canopy cover is 25-30% in the low severity class and <10% in the high severity class for all fires. All of the variables representing post-burn canopy fuels differ by fire severity class. The average loading of dead, down fuels <7.6 cm diameter, including litter, is 0.9-1.1 kg m^{-2} in the low severity class and 0.6-0.8 kg m^{-2} in the high severity class.

The fuel loading variables cover a wide range of values within and among fires, and substantial overlap exists among severity classes. Fire severity is generally not related to post-burn dead, down fuel loading. Estimates of potential fire behavior also cover wide ranges of values, particularly among fires. The average potential flame length, modeled with a 16.1 km/hr wind speed, varies up to 0.5 m among severity classes within a single fire and up to 1.0 m among the three fires. Fire severity does influence potential fire behavior, but just one of the severity classes differs from the other three classes.

These results indicate that fire severity influences post-burn canopy fuels and potential fire behavior but does not influence dead, down surface fuel loading for the three fires studied. The wide ranges of values for the fuel components analyzed demonstrate the variability that is characteristic of forests with mixed severity fire regimes and emphasize the need to consider the natural heterogeneity of these forests in fire and fuels management. Quantification of post-burn fuel variability is critical for understanding the ecological significance of mixed severity fires and developing restoration strategies that emulate characteristics of the historic fire regime.

FY2012 Goals

The Area 1 Ecology team will continue to provide leadership and support to forest-level projects in FY12. The Ecology team will also continue to routinely provide input to NEPA processes for these and other projects as requested, and will continue to provide Ecology Plot data and analysis as needed for internal and external requests. Some adjustments are expected as a result of Robin Lesher's retirement.

Ongoing projects for the Olympic NF include continuing the wetland inventory and assessment project, implementing the beargrass savanna restoration project, and initiating the field-going portion of the balds inventory. Ecologist support to the restoration of under-represented native tree species will expand, with golden chinkapin (*Chrysolepis chrysophylla*), quaking aspen (*Populus tremuloides*), and Oregon white oak (*Quercus garryana*) as additional target species. The Ecologist will continue to provide revegetation plan support to all program areas for projects requiring revegetation or the enhancement of native vegetation.

Ongoing projects for the GPNF include the Sawtooth and Cowlitz huckleberry restoration projects, strategic fuel treatment assessment, working with the NW Oregon ecologists on the use of prescribed fire in the wilderness; assisting with the analysis for Phase III of The Dalles Watershed Restoration; and fire effects monitoring efforts and fuel treatment effectiveness assessments on the Gifford Pinchot and Mt. Hood. An additional goal for FY12 is the publication of Jessica Hudec's thesis.

Eastern Washington Area Ecology Program (Area 2)
Colville and Okanogan-Wenatchee National Forests

Area 2 Ecology Program Team:
Rod Clausnitzer, Plant Ecologist/Botanist
Kelly Baraibar, Botanist
Bill Gaines, Wildlife Ecologist
Richy Harrod, Fire Ecologist
Pete Ohlson, Fire Ecologist

Overview of Program for FY2011

During FY2011 the Area 2 Ecology Team focused efforts across functional boundaries initiating, continuing, or completing projects in botany, fire ecology and fuels management, range management, riparian 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 goals, vegetation responses to management treatments, and wildlife community process and function. Colville and Okanogan-Wenatchee National Forest resource staff /program managers validated and supported these emphases during the FY2011 annual meeting.

In addition, resource staff officers noted that as forest plan revision nears completion in Area 2, further discussion should occur on Area Ecology's role in forest plan monitoring. The Area role should be defined and, possibly, expanded to support effective and efficient efforts to meet our forest plan monitoring responsibilities and inform the adaptive management process.

Accomplishments by Strategic Budget Objective

Strategic Budget Objective 1.1.1 Reduce risk from wildfire

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

- Established and collected data from additional 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 canopy cover and surface fuel loadings. Some of these plots are new, pre-treatment plots and some of these plots were post-treatment, re-measurements following thinning of plots initially installed in 2009. These thinned areas also are planned for fuel reduction treatments (burns) which have not yet occurred and will be sampled again following those treatments.

- Additional permanent forest monitoring plots were installed in several units on the Methow Valley RD where treatment is planned to restore healthy aspen stands. Many decades of fire exclusion has allowed substantial amounts of conifer encroachment to the point that existing mature aspen is being crowed out by young Douglas-fir and ponderosa pine. This increased conifer density has also made it difficult for new aspen regeneration to take hold. Treatments are to thin most understory and some overstory conifer while leaving scattered large remnant overstory trees. Harvest will be followed up with slash piling and burning to remove residual fuels.

Aspen restoration unit in the Wrangle sale area on the Methow Valley RD

- Continued investigation of the effects of prescribed fire to vegetation cover and surface fuel loading in riparian corridors. No additional sites were identified where riparian corridors exist within planned prescribed fire units; however one unit that was sampled in FY2010 for pre-treatment conditions was burned late that fall and re-sampled in FY2011. Regulations restrict ignitions within 75 feet of riparian corridors, but prescribed fire was allowed to back into these areas which resulted in only minimal impacts on the vegetative cover and fuel loads within the riparian area.

Overall, average total fuel loads within this corridor was reduced by 0.31 tons/acre (a change that was not statistically significant). The impact of fire was also variable within our sample area as only some transects were burned. The following photos are pre- and post-fire photos at a monitoring point where the controlled burn did back down into the riparian corridor.

Riparian before – 2010

Riparian after – 2011

- Completed aerial photo interpretation of Mission Peak/Libby Creek Watershed for Restoration Strategy, an area of 25,850 acres. This included delineation of 663 individual stands and definition of the attributes of those stands. Following this interpretation effort, 2 days of on-the-ground follow up was conducted to "ground truth" verify the accuracy of the photo interpretation.

- Completed 26 plots to measure density, size and species of forest regeneration in 3 different stand replacement fire areas in the vicinity of the 2006 Tripod Fire. Collected 60 different cross-sections from fire-killed trees within stand-replacement fire areas within the Tripod Fire to determine stand ages within that fire.

<u>Strategic Budget Objective 1.1.1 Reduce risk from wildfire, and</u>
<u>Strategic Budget Objective 1.5.2 Species Diversity (Wildlife)</u>

- Completed re-sample of 60 Snag Monitoring Plots in the Deer Point Fire area on the Chelan RD. 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 determine decay rates and snag longevity for different conifer species and by diameter and height classes following stand replacing fire events. A total of 2132 snags were initially tagged in 2003 and subsequent re-sampling was completed in 2005, 2008 and 2011. Full analysis of the data collected in 2011 and report of the findings will be completed this winter. Preliminary examination has shown that ponderosa pine has displayed the highest rate of snag loss in 2011 with only 27.3% of the original snags still remaining.

At this mid-elevation Deer Point site in 2011, most of the Douglas-fir and ponderosa pine snags have broken from the top down or have fallen completely and only a small percentage remain intact

Strategic Budget Objective 1.5.2 Species Diversity (Plants), and
Strategic Budget Objective 2.2.1 Rangeland Management

- In FY2011 rare plant taxa and plant community diversity were the focus of monitoring activities on several ranger districts of the OKW NF. Information needs related to rare species distribution and plant community responses to management actions were addressed. The field-related monitoring included:

- Vegetation monitoring activities in collaboration with the Methow Valley RD. These efforts, initiated in 2009, are designed to evaluate vegetation and site responses to annual and recurrent livestock grazing of the fen meadows and rare sedge species, *Carex gynocrates,* in upper Falls Creek. Permanent transects were established within fenced exclusions of the meadow complex and monitored the past three 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 annually through FY12 and periodically in future years.

Site 3 Transect 2 inside exclosure Aug 2009 Site 3 Transect 2 inside exclosure Aug 2011

- Re-establishment and monitoring of eight range condition and trend (c&t) clusters on the north end of the OKW NF. The Area 2 Ecology Program focused efforts on these historical key areas during the 2011 summer season and implemented site monitoring protocols following Nested Frequency, Cover Frequency and Parker 3-Step methodologies. Data collection is compatible with the R6 Range protocols and NRIS-Terra databases. Allotment priorities were established by forest and district personnel and collaboration with district range programs was key to locating and completing data collection and analyses. A total of eight permanent clusters were re-sampled. Efforts to locate an additional four more clusters were unsuccessful because of loss of plot monuments or landscape changes since initial establishment (40+ years ago). Processing of site digital images, GPS locations, and Parker 3-Step database entry was completed. All site and vegetation data from Cover/Frequency and Nested Frequency will be entered in NRIS. Analysis has been completed to estimate current condition and trend for the eight clusters monitored in FY2011.

Strategic Budget Objective 1.5.2 Species Diversity (Plants)

- The rare pale blue-eyed grass, *Sisyrinchium sarmentosum,* was the target of monitoring efforts in the William O. Douglas Wilderness on the Naches RD. *S. sarmentosum* is a rare plant of south central Washington and north central Oregon; its status is currently being reviewed by the USFWS. In cooperation with Washington Natural Heritage Program and the GP NF, extant occurrences were relocated, taxa identified, and plant material collected for Forest Service Isozyme Lab analyses. The

field work will provide information on existing populations of *S. sarmentosum* as well as the genetics of potential hybrids with *S. idahoense*.

Strategic Budget Objective 1.5.2 Species Diversity (Plants), and
Strategic Budget Objective 5.1.1 Resource Information

- Revision of NE Washington Plant Association Group (PAG) map was a priority task identified by COL and OKW NFs PAG Map users and was accomplished during FY2011. The product, almost completed, needs field validation during FY12 spring/summer. Further, users will be asked to evaluate this version's application to landscape project planning and assessment during the winter/spring months.

- Colville and Okanogan-Wenatchee National Forests' Land Management Plan Revision. Area Ecology functions in a support role for forest plan revision IDT. Ecologist assisted in assessments for wilderness recommendations, wild and scenic river candidates, and developed non-forest vegetation, invasive plant, and rare plant forest plan components.

Strategic Budget Objective 1.5.2 Species Diversity (Wildlife)

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 FY2011.

- Wildlife Habitat Connectivity: Wildlife Ecologist from the Area Ecology Program provided continued participation in the Washington Wildlife Habitat Connectivity Working Group which includes a wide variety of state, federal and non-governmental partners. The working group completed the initial assessment of Habitat Connectivity and has published the results. An executive summary of the report titled: Washington Wildlife Habitat Connectivity Working Group (WHCWG). 2010. Washington Connected Landscapes Project: Statewide Analysis. (Washington Departments of Fish and Wildlife, and Transportation, Olympia, WA. http://www.waconnected.org.).

  Work in FY2011 included two major tasks: 1) the development of implementation tools for local land managers so they know how to use and understand the information developed through the state-wide assessment; and 2) field validation of some of the wildlife habitat connectivity models in collaboration with the North Cascades Carnivore Connectivity Project. Major Partners: Washington Department of Fish and Wildlife (Co Lead), Washington Department of Transportation (Co Lead), US Forest Service, US Fish and Wildlife Service, Conservation Northwest, The Nature Conservancy, Western Transportation Institute, University of Washington.

- White-Headed Woodpecker Monitoring: We participated in the regional effort to monitor white-headed woodpecker habitat and population trend. Last year monitoring

sites were identified on the Wenatchee River and Cle Elum Ranger Districts and the Regional Monitoring protocol was tested. We successfully completed all sites and participated in the regional network in FY2011. The sites monitored in 2011 were located on the Methow and Tonasket Ranger Districts. Monitoring of the white-headed woodpecker is particularly important because this is both a focal and management indicator species in our revised Forest Plan. Major Partners: University of Idaho.

- Effects of Restoration Treatments on Prey Species of the Northern Spotted Owl: This funding allowed us to begin monitoring, in collaboration with the Pacific Northwest Research Station, 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. To date, one site on the Cle Elum Ranger District has been identified and pre-treatment monitoring will begin in FY12. Major Partners: Wenatchee Forestry Sciences Lab

- Colville Snag Monitoring: This effort is a continuation of monitoring on the Colville National Forest to determine the effects of harvest treatments on meeting snag retention standards. This effort is being led by wildlife biologist, Chris Loggers, and includes a wide-array of partners to leverage limited dollars.

Summary on 2011 Leadership Direction and Accomplishments

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. Accomplishments for FY2011 are evaluated within that framework of expectations.

FY2012 Goals

While Area Ecology staff is in transition with retirements and reassignments, FY12 will allow us to pursue continuing projects, albeit at a reduced level of effort. The studies associated with fire effects and fuels, vegetation dynamics, vegetation and wildlife community responses to management activities, diversity, and database development and maintenance will continue in FY12 with efforts diminished by reduced funding levels. Our ability to implement new initiatives may be impacted as well, but, priorities for FY12 include forest plan monitoring protocols and ecology program direction and delivery into the future.

Northeastern Oregon Area Ecology Program (Area 3)
Wallowa-Witman, Malheur and Umatilla National Forests

Area 3 Ecology Program Team:
Sabine Mellmann-Brown, PhD
Jennifer Ferriel
Ken Stella

Overview of Program for FY2011

In 2011, the NE Oregon ecology program worked on five major projects in addition to providing project support to local Forest Service units.

1. Whitebark pine monitoring in the Wallowa Mountains, Elkhorn Mountains, and Seven Devils: We inventoried the health of whitebark pine and other tree species on 126 permanent transects, in close collaboration with forest health and the Blue Mountains Pest Management Service Center. A candidate for federal protection under the Endangered Species Act, whitebark pine is now considered a forest sensitive species. First analysis indicates a further decline of whitebark pine health throughout the study area due to white pine blister rust and bark beetle. Subalpine firs are impacted by balsam woolly adelgid.

White pine blister rust affecting stem of young whitebark pine.

2. 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. We detected five white-headed woodpeckers and documented 1 nest site on the transects. This monitoring effort is in cooperation of the Rocky Mountain Research Station and will continue through 2013.

Old growth ponderosa pine on white-headed woodpecker inventory transect

3. Fire-effects monitoring: Entering the 26th year of fire-effects monitoring, we inventoried the post fire vegetation development of 49 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.

4. Fungi inventory: We received Interagency Special Status Sensitive Species Program (ISSSSP) funding to facilitate two mushroom forays in the vicinity of Anthony Lakes. The inventory of the area currently includes 246 fungi species, with uncertain species identification of several vouchers which are verified by specialists. The forays documented the occurrence of one R6 strategic species and vastly increased our knowledge of fungi in our area.

5. Legacy data rescue and management: As data stewards of a large body of legacy data we are in the constant process of scanning and cross-referencing slides, updating our spatial layers, and writing metadata. In 2011 we scanned and partly cross-referenced approximately 10,400 slides. We also relocated, inventoried and documented 14 historic photo points and 13inventory plots in the Wallowa Mountains dating back as far as the early 1900s. We are currently updating the spatial layer for approximately 180 photo monitoring sites and vegetation transects established in the 1950s and

1960s by now retired regional ecologist Fred Hall. These data are of high value to range and vegetation management as well as landscape scale vegetation analysis.

Leadership Direction

Our annual call for assistance requests from the forests and districts resulted in 36 individual requests. With cooperation from the staff officers from the Wallowa Whitman, Malheur and Umatilla, we came up with 22 combined requests that needed individual action, in addition to the above mentioned projects that were all approved by leadership. Three major areas of work were assistance to rangeland monitoring, management of moist forests (fire regime III), and departure from reference conditions in riparian areas. We also serve as advisors in multiple subject areas for the Blue Mountain forest plan revision, a priority on all three forests.

Accomplishments by Strategic Budget Objective

Strategic Budget Objective 1.1.1 Reduce risk from wildfire

- Wenatchee Creek prescribed fire: Site visit to determine prevailing plant associations and fire regimes for project proposal and NEPA document. Follow up needed in 2012 to assist with monitoring design.

- Treatment of moist forests and description of fire sub-regimes IIIa, IIIb and IIIc in collaboration with the Fire Sciences Lab in Missoula. Creating crosswalk table between potential plant associations and fire sub-regimes.

- Upland Plant Association Training for Malheur National Forest employees and Blue Mountain Forest Partners Collaboration Group in proposed timber project area (Elk 16).

Strategic Budget Objective 1.4.1 Invasive Species (Insects and Disease)

- Whitebark Pine health monitoring on 126 permanent transects: Analysis of forest health with emphasis on white pine blister rust, mountain bark beetle, balsam woolly adelgid in collaboration with Forest Health Protection and Blue Mountains Pest Management Service Center. See Key Issues for further information.

Strategic Budget Objective 1.4.1 Invasive Species (Plants)

- Assessment of invasive blackberries in Hells Canyon: Impact on recreation and sensitive species habitat

Strategic Budget Objective 1.5.1 Restore Watersheds

- Analysis of condition and trend monitoring data to assess landscape scale soil and vegetation conditions in rangelands. Assistance requested by forest hydrologist to support the Watershed Condition Framework.

Channel redesign at Meacham Creek.

- Meacham Creek riparian restoration: Field review with natural resource personnel from the Umatilla NF and project lead from the Confederated Tribes of the Umatilla Indian Reservation. Identified reference conditions and potential plant associations, provided suggestions for revegetation after channel reconstruction.

Strategic Budget Objective 1.5.2 Species Diversity (Wildlife)

- White-headed woodpecker habitat inventory on 12 randomly selected transects in Ponderosa Pine forests of the Blue and Ochoco Mountains. Inventory is part of regional project and provides wildlife biologists with Forest Plan mandated data on management indicator species. Key issue in 2011.

Strategic Budget Objective 1.5.3 Species Diversity (Plants)

- ISSSSP funded fungi forays in the Elkhorn Mountains. Documented more than 200 fungi species including one R6 strategic species. Key issue in 2011.

- Monitoring of *Silene spaldingii* and *Mirabilis macfarlanei*, two threatened and endangered species on the Wallowa-Whitman NF. Evaluation of monitoring protocol with forest botanists.

- Surveys for *Mirabilis macfarlanei* (200 acres surveyed), *Pyrrocoma scaberula* (400 acres surveyed) and *Spartina pectinata* (71 river miles surveyed). Assistance to forest botanist.

- Participated in Botanical foray in Greenhorn Mountains organized by Umatilla and Malheur NF botanists, 400 acres surveyed for vascular and non-vascular plant species.

Plant association training on the Malheur National Forest

- Identified 15 potential blister rust resistant whitebark pines for seed collection and collected needle samples from whitebark pine and limber pine for gene conservation.

<u>Strategic Budget Objective 2.2.1 Rangeland Management</u>

- Created height weight curves for ten common grasses and sedges in NE Oregon to assist rangeland managers with implementation monitoring.

- Data analysis for rangeland monitoring: provided training to evaluate vegetative condition and trend using hypothesis testing and state and transition models on the Malheur NF.

- Inventoried vegetation cover and basal area in four 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.

- State and transition models: assisted in the landscape scale analysis of CVS plots in grazeable range and forest lands for Forest Plan revision.

- Assisted districts with extraction and interpretation of condition and trend data from ecology database and archived records, in preparation for AMP revision.

Strategic Budget Objective 1.5.1 Data and Resource Information

- Fire-effects monitoring: Inventoried the post-fire vegetation development of 49 riparian and upland sites in Hells Canyon, the Wallowa Mountains and the Blue Mountains.

- Inventoried whitebark pine habitat in conjunction with whitebark pine health monitoring (see key issues) on 123 transects and 4 historic ocular macroplots.

- Legacy data rescue and database management: Started to organize and document 180 photo monitoring sites and vegetation transects in the Blue and Ochoco Mountains. Scanned and partly cross-referenced approx.10,400 slides. Maintained ecology database.

- Revisited and documented 14 historic photo points and 8 inventory sites in the subalpine grasslands of the Wallowa Mountains.

- Finished draft establishment report for Baldy Mountain RNA.

Summary on 2011 Leadership Direction and Accomplishments

At the beginning of the 2011 field season, we lost our ecologist Ken Stella to the National Park Service. This necessitated major restructuring of our plan of work. In addition, two of our three staff officers retired and the Wallowa-Whitman National Forest experienced a major change in leadership. Despite our current reduction in work force, we were able to fulfill our monitoring and inventory obligations. We also addressed most assistance requests from the forests, with work ongoing in several instances. A few low priority projects were deferred to 2012.

Goals for FY2012

The NE Oregon Ecology Team is heavily involved in the review of the Draft Blue Mountain Forest Plan EIS which is scheduled to come out in spring 2012. This is a high priority on all three National Forests in the area. Our call for assistance requests will go out in February, to all district and supervisor offices in the Blue Mountains.

The Malheur NF has already communicated a high need for assistance with rangeland monitoring data for allotment management plan revisions.

Other goals for 2012 include the continuation of the white-headed woodpecker inventory project, fire-effects monitoring on approximately 50 sites, additional whitebark pine health monitoring in the Strawberry Mountains and the Seven Devils, and beginning work on the development of state and transition models in riparian areas.

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 FY2011

In FY2011 Area 4 ecologists worked on projects in wildlife ecology, fire ecology, range management, riparian ecology, interpretation, and landscape vegetation dynamics modeling and mapping to assist planning efforts.

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; and preparing and submitting the paper "Predicting the Occurrence of *Bromus tectorum* in Central Oregon" to Invasive Plant Science and Management.

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.

Accomplishments by Strategic Budget Objectives

Strategic Budget Objective 1.1.1 Reduce risk from wildfire

- Contributed precondition attributes derived from Gradient Nearest Neighbor (GNN) and LIDAR remote sensing datasets for Crown Bulk Density, Canopy Height, and Canopy Closure to the Skyline Collaborative Forest Landscape Restoration Act (CFLRA) current landscape file. The Skyline CFLRA project is one of 10 pilot projects across the nation. This landscape file provided the existing condition information to complete the Wildland Fire Management Risk and Cost Analysis Tool (R-CAT) analysis and compare cost effectiveness of 10 years of restoration treatments.

- Worked on Landfire Biophysical Setting (BPS) updates for Central Oregon and coordinated with Northwest and Southwest Oregon Ecologists on both BPS and Fire Regime Condition Class (FRCC) models to assess departure of vegetation structure and species composition across Central Oregon Landscapes. This information contributed to FRCC assessments for fire and fuels planning on the Deschutes, Fremont-Winema, and Ochoco National Forests as well as the Crooked River National Grasslands.

- Remeasured fifteen 1-hectare long-term study plots as part of the Repeated Fire Interval Study. This study was started in the early 1990's, making it the longest repeated fire interval study in the northwest. 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. We are measuring changes in understory composition and structure, soil processes, and fuels.

Student Temporary Employment Program employee from Oregon State University, Ross Henshaw, surveying post-fire understory vegetation with Area 4 Ecology Program ecologists.

- Continued field work for a study of alternative fuels treatments. This study began in 2001, and we have 73 1-hectare plots on 3 National Forests. Treatments include prescribed fire, prescribed mowing, thinning followed by prescribed fire, and control. In 2011 we conducted understory, overstory, and litter/duff at 27 study plots.

Strategic Budget Objective 1.4.1 Invasive Species (Plants)

- Worked with Central Oregon Fire Management Service (COFMS) to monitor and analyze the spread of medusa head (*Taeniatherum canput-medusae*) in the Coyote Hills Rx burn unit, which occupies 2200 acres on the Crooked River National Grassland. The burn occurred in late summer of 2011 with the goals of improving vigor of native plants and reducing juniper cover. Because the unit is known to have medusahead, preventing an expansion of infested sites is also a burn objective.

  In 2005, Region Six of the USDA Forest Service completed an invasive plants analysis, and the Record of Decision included the need for developing weed prevention standards. The Ochoco and Deschutes National Forests are currently doing an Invasive Plants EIS. Area 4 ecologists were part of an interdisciplinary team (IDT) to develop a plan for treatment, monitoring and analysis at Coyote Hills.

Strategic Budget Objective 1.4.1 Invasive Species (Insects and Diseases)

- 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).

- Funded by Forest Health Protection: Evaluated the Oregon and Washington Host Tree Species surfaces for R6. These surfaces produced by the Forest Health Technical Enterprise Team (FHTET) in Ft Collins will serve as input data for the NIDRM risk models.

Strategic Budget Objective 1.5.1 Restore Watersheds

- Rated the Riparian Vegetation Condition attribute for 199 sub- watersheds, during the Watershed Condition Framework (WCF) Assessment, for the Deschutes and Ochoco National Forests and Crooked River National Grasslands using local riparian vegetation information and streambank stability estimates. Also participated in the overall watershed rankings. The WCF assessment was used to validate the Forest's prioritization of watersheds for watershed and fisheries restoration improvement projects.

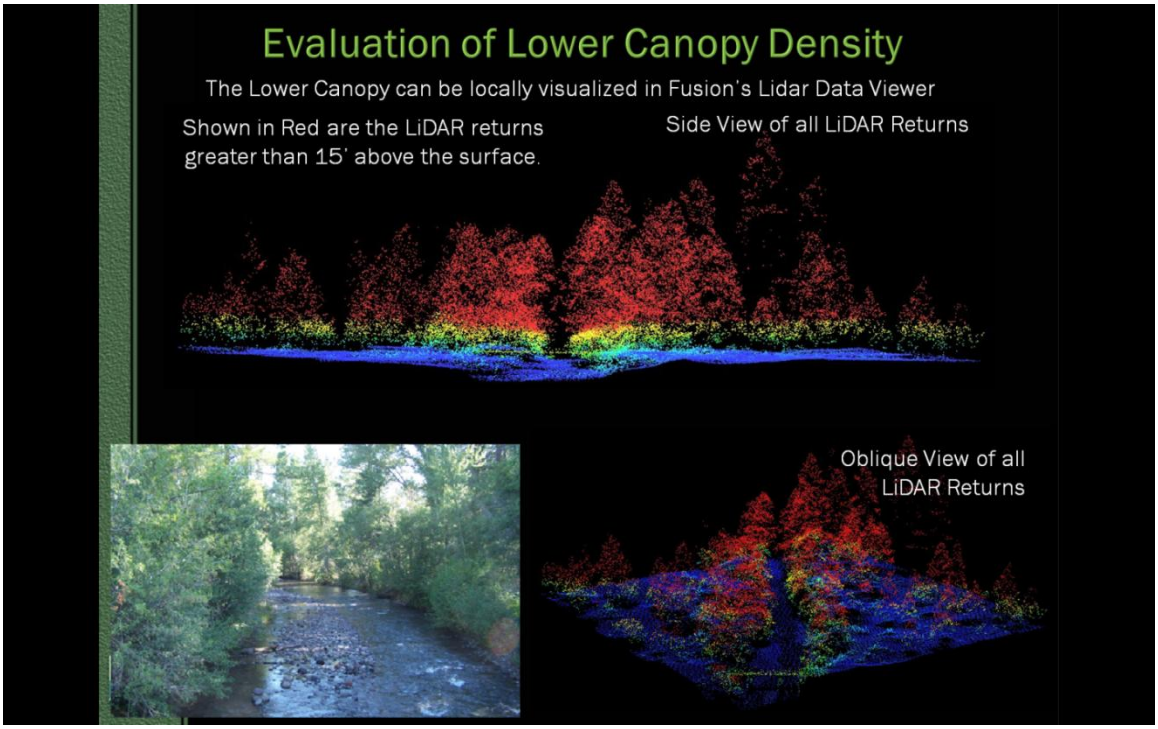
Hardwood dominated plant community in excellent condition. Lower Wychus Creek. Crooked River National Grasslands.

Subalpine wet moist meadow in good condition on Three Creek below Three Creeks Lake, Sisters Ranger District Deschutes National Forest.

- Currently collaborating with Forest Health Protection, Hydrologists and Fisheries Biologists from the Deschutes and Ochoco National Forests, and Remote Sensing Applications Center (RSAC) on a LIDAR Stream Shade pilot project for Wychus Creek on Sisters Ranger District, Deschutes National Forest. Helen Maffei from Central Oregon Forest Health Protection Service Center was instrumental in securing the competitive project grant from RSAC for developing the LIDAR Stream Shade methodology and for funding the field work to validate the results. Results of the project will allow estimates of hours of shade and shade effectiveness for any point of interest on all streams within the LIDAR coverage.

- Proposal for aspen and watershed restoration stratification with Trent Seager, Dave Hibbs (OSU) and Gregg Riegel. 2011 Climate Change: Disturbance, Moisture, and Aspen in the Inland Pacific Northwest, March 8, 2010. On-going.

- Hosted World Affairs Council of Oregon, Forest Resource Management Tour for Congo Basin Delegation, June 23-26, 2010.



Screen capture depicting side and oblique views of riparian canopy derived from LIDAR point clouds and an actual image of the canopy looking upstream on Whychus Creek, Sisters Ranger District just south of the town of Sisters.

Strategic Budget Objective 1.5.2 Species Diversity (Wildlife)

- Worked with wildlife biologists from Ochoco, Deschutes and Fremont-Winema National Forests to develop Habitat Relationships for Management Indicator Species wildlife species using GNN existing vegetation layers. Estimates of current amounts

of Management Indicator Species habitat were then compared to Historic Estimates of habitat based on the Historic Range of Variability (HRV) estimates of seral/structural vegetation states in the Viable Ecosystems state and transition models by plant association group (PAG).

Also used General Land Office (GLO) land survey data from 1860-1900 to estimate vegetation state HRVs for 2 new PAGs recently defined for the East Cascades Eco-Region. (Ponderosa Pine- Lodgepole Pine and Cold Dry White Fir).

- Developed current Late-Old Structure (LOS)/ Old Growth estimates based on GNN, LIDAR, PAG layer inputs, and the R6 interim Old Growth definitions for the Ochoco and Deschutes National Forests. The dataset derived from this analysis was used to select areas requiring equivalent-effort surveys for fungi/mollusks within proposed projects on the Deschutes National Forest. The equivalent-effort surveys were a new requirement in 2011 based on the 2001 Record Of Decision for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines.

- The Bend/Fort Rock Ranger District requested the Ecology Program to analyze data collected on the Townsend bat population. Ecologists researched methods to analyze the population counts in local caves. We used a random-coefficient model on the natural logarithm of the bat counts. We also used the Mann-Kendall correlation test to find trends in the population by cave. The overall Townsend bat population for the China Hat area did not seem to be changing significantly (p-value=0.39). 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 caused by humans, but there is no evidence of a significant drop in the population due to disease such as white-nosed syndrome.

Glenn Ardt, Oregon Department of Fish and Wildlife biologist (holding map), discussing mule deer habitat with Area 4 ecologist Beth Johnson, STEP employee Ross Henshaw, Area 5 ecologist Amy Nathanson, and Regional Ecology Program ecologist Nikola Smith.

- Worked with Kim Mellen-McLean, Regional Wildlife Ecologist and Vicki Saab, Rocky Mountain Research Station Research Wildlife Biologist, on a region-wide white-headed woodpecker monitoring program. We installed 12 1.7 kilometer long transects each with 10 plots/callback points per transect. Callbacks for white-headed woodpeckers were conducted twice at each point. Vegetation measurements were done for all plots on a 4 of these transects.

- Dry Forest Landscapes Working Group Member- Northern Spotted Owl Recovery Plan, US Fish Wildlife Service. On-going

- Review of, Jack Creek Oregon Spotted Frog (Rana pretiosa) Site Management Plan. Antelope Livestock Grazing Allotment Management Plan, Chemult R.D., Fremont-Winema NF. On-going.

- Used Viable Ecosystems state and transition models to complete landscape analyses for existing vegetation within the Blue Jay project area on the Chiloquin Ranger District, Fremont-Winema National Forest and within the Jackson project area on the Ochoco National Forest.

Strategic Budget Objective 1.5.2 Species Diversity (Plants)

- Participated in matsutake mushroom monitoring project on the Fremont-Winema National Forest

Strategic Budget Objective 2.2.1 Rangeland Management

- Participated in field discussion on grazing impacts in subalpine meadows and produced a soil and vegetation assessment for Gotchen Meadows, Gifford-Pinchot National Forest.

- Pre-publication review of management implications with author Becky Kerns (PNW). Kerns, Becky K., M. Buonopane, W.G. Thies, and C. Niwa. 2011. Reintroducing fire into a ponderosa pine forest with and without cattle grazing understory vegetation response. Ecosphere 2:1-23.

- Field review of proposed study "Interpreting Riparian Monitoring Indicators Across Spatial Scales: from ground level transects to remote sensing. Cooperative effort with Region 5 Range Program, USDA ARS (Burns, OR) and Univ. of Calif., Davis. August 31-September 1, 2011. Plumas, NF. On-going.

- Team Member, National Riparian Vegetation Monitoring Core Protocols. On-going

- USFS Representative, Interpreting and Measuring Indicators of Rangeland Health National Team, National Riparian Vegetation Monitoring Core Protocol National Team. On-going.

Karen Zamudio, ecologist with the Fremont-Winema National Forest and longtime collaborator with the Area 4 Ecology Program, retired in 2011. Here she is working on the last riparian plot of her career along Mud Creek in the north Warner Mountains.

Strategic Budget Objective 5.1.1 Resource Information

Data and databases

- Created trees/acre by size class, basal area/acre, and stand density index GIS layers from the LIDAR data on for the portions of the Deschutes, Fremont-Winema, and Ochoco National Forests and Crooked River National Grasslands where LIDAR data have been delivered.

Workshops and conferences attended

- Attended a two-day training for the new state-and-transition modeling platform, referred to as the Path Landscape Model, which uses the Vegetation Dynamics Development Tool (VDDT). The software provides a state and transition landscape modeling framework for examining the role of various disturbance agents and management actions in vegetation change. It allows users to create and test descriptions of vegetation dynamics, simulating them at the landscape level.

- Region 6 Range Program Representative, Society for Range Management, Annual Fall Meeting, February 6-10, 2011 Billings, MT.

- Region 6 Range Program Representative, Society for Range Management PNW & CalPac Sections, 2010 Annual Fall Meeting October 7-8, Lava Beds, NPS National Monument, CA.

Workshops and classes taught

- Workshop and Field Trip, Fire-Fuels and Riparian Issues on the Deschutes and Ochoco and Fremont-Winema NF's, October 28-29, 2010.

- Invited Lecture, RX-310 Introduction to Fire Effects: Flora and Weed Module. Region 6 Fire Training Center, January 31, 2010.

- Invited Lecture, Ecology and Restoration of Ponderosa Pine Forests of Central Oregon and Northeastern California. Humboldt State Univ., School of Natural Resources, April 1, 2011.

- Invited Field Trip Presentation: Fire: the process and effects in ponderosa pine ecosystems, For Prof. John Bailey (OSU) Silvicultural Practices (FOR 443) class, Metolius Research Natural Area, May 18, 2011.

- Coupled Natural and Human Systems in Fire-Prone Landscapes: Interactions, Dynamics, and Adaptation. Landowner Interviews: Chemult, Chiloquin, Klamath Falls and Lakeview, OR, October 13-15, 2010. National Science Foundation, Project Coordinator: Tom Spies (PNW). On-going.

- Whitebark Pine Workshop: Current Threats and Status of our Knowledge Warner in the Mountains of Oregon and California. Fremont-Winema and Modoc NF. Workshop, October 5 and 6, 2010.

- Flora of the Warner Mountains. Judy Perkins, Gregg Riegel, and Beth Johnson. Jepson Herbarium Workshop. Jepson Herbarium Workshop, Univ. of California, Berkeley, July 28-31, 2011.

- Ecological Site Description National Pilot Workshop. New Mexico State Univ., Las Cruces, November 16-18, 2010.

- Invited Middle School Lecture: The Biology and Physics of Plant-Soil Water Relationships. Cascades Academy of Central Oregon, May 25-27, 2011.

- Project Advisor, Fish and Fire Network (PNW and OSU), Joint Fires Science Program. On-going.

- Gotchen Meadow Assessment: Field Trip Report Mt Adams Ranger District, Gifford Pinchot National Forest. 17 pages. For NEPA decision support, November 1, 2011.

- Thesis advisor to the following graduate students:

  Shuffield, C. D. 2010. Overstory Composition and Stand Structure Shifts within Inter-mixed Ponderosa Pine and Lodgepole Pine Stands of the South-central Oregon Pumice Zone. M.S. Thesis, Department of Forest Engineering, Resources and Management, Oregon State Univ.

  Hoban, I. Renewable Natural Resources, Master of Science, Non-Thesis Option. Dept of Forest, Range, and Watershed Stewardship, Colo. State Univ. Expected completion date, September 2012. Co-Major Professor.

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.

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.

Forest Resource Management Tour for Congo Basin Delegation, June 23-26, 2011

Publications and educational materials

- Rangeland Technical Team Lead Author, Oregon Pilot Study for the Oregon Pilot Study for the National Assessment of National Assessment of Rangelands. On-going.

- Part of an interdisciplinary team which completed a corridor management and interpretive plan for the Cascade Lakes National Scenic Byway.

- Pulled together the various pieces of Riparian Field Guide for Fremont National Forest and Lakeview BLM District as a draft. Riparian Ecological Types and Scorecard, Fremont and Lakeview BLM review of Final Draft.

- Prepared and submitted the paper "Predicting the Occurrence of *Bromus tectorum* in Central Oregon" to Invasive Plant Science and Management. Worked with bitterbrush plots from 1998-2000 to verify the model reported in the paper. Responded to reviewers and made resubmitted edits.

- Miniaturized the Silver Fir chapter of the Forested Plant Associations of the Oregon East Cascades guide as a demonstration of how the entire guide could be formatted to be useful on a small screen, for use with smart phones or data recorders.

- Created a user's guide for ECOSHARE's Climate Change Maps and Data pages and developed the meta data for the GIS data files with Chris Ringo.

- Wexielman, D.A. and G.M. Riegel. Measurement of spatial autocorrelation of vegetation in mountain meadows of the Sierra Nevada, California and western Nevada. Madroño A West American Journal of Botany. Manuscript Accepted.

- K.A. Dwire, K.E. Meyer, S.E. Ryan, G.M. Riegel, and T. Burton. 2011. A Guide to Fuels Management in Riparian Areas of the Interior West. Final Report to Joint Fire Science Program.

- Perry, D.A., P.F. Hessburg, C.N. Skinner, T.A. Spies, S.L. Stephens, A.H. Taylor, J.F. Franklin, B. McComb, and G. Riegel. 2011. The ecology of mixed severity fire regimes in Washington, Oregon, and Northern California. Forest Ecology and Management 262: 703–717.

Goals for FY2012

Goals for FY2012 include continuing white-headed woodpecker monitoring, long-term fire and fuel treatment effects monitoring, assisting riparian monitoring efforts on the Fremont-Winema and Ochoco NF's, begining development of Ecological Site Descriptions (ESD) in partnership with the NRCS, providing assistance for Area Forests and Regional Range Programs, interpretive programs on ecology, wildlife, and climate change work with Forests.

Mike Simpson is currently 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 Gradient Nearest Neighbor (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 EcoRegion 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.

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.

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 FY2011

The Southwest Oregon Ecology Program is extraordinarily diverse in both its geographic extent and the variety and complexity of socially charged issues. In addition to its contribution to Forest Service programs, one focus of the Southwest Oregon Ecology group is their involvement and service to social and public outreach, events and projects.

During FY2011 the Ecology Program presented 18 scholarly public lectures and trainings and conducted several field days for local school children. The Ecology Program also provided data, input, and support for numerous high priority Forest Projects, including down wood and snag information, input into the Survey and Management settlement agreement, assisted with the Watershed Condition Framework analysis for fire effects and regime condition and forest cover condition for both the Umpqua and Rogue River-Siskiyou National Forests, and consultant for the monitoring team for the Ashland Forest Resiliency Landscape Restoration Project and the southwest Oregon Secretarial Pilot Projects for Landscape Restoration in conjunction with the BLM, Jerry Franklin and Norm Johnson.

Leadership Direction

The southwest Oregon Ecology Program's primary emphasis, made clear by the Forest Leadership Team for both forests, included both an internal and external emphasis.

First was to serve and support the ecological needs of ongoing forest programs including fish and wildlife habitat, soil and water, forest management, and climate change issues.

Secondly, to encourage, participate, and continue proactive forest ecology outreach programs with schools, as well as public, private, and environmental organizations.

Lastly, we were to be actively involved in the projects that are currently high priority for the region, in particular the revision of the FRCC (Fire Regime Condition Class) and Pland Association Group maps used for the Watershed Condition Framework and the Survey and Manage Agreement.

Accomplishments by Strategic Budget Objective:

Strategic Budget Objective 1.1.1 Wildfire and Fuels

- The SW Oregon Ecology Program is fully 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. Throughout the year we jointly developed and edited fire regime maps for Southwest Oregon, which also tied into the Watershed Condition Framework (WCF) analysis that occurred on the Rogue River-Siskiyou and Umpqua National Forests for southwest Oregon.

- Fire ecology – After the 1987 fires in southwest Oregon, the Ecology Program established a post- wildfire monitoring program to track and assess post-fire ecological processes including re-vegetation, tree mortality, regeneration and habitat. Twenty-two permanent transects were established at that time, with six of these plots being relocated, monumented, and evaluated in 2011, almost completing these surveys (two transects left to complete).

Amy Nathanson (standing) and Marilyn Elston surveying post-fire understory vegetation with Area 4 Ecology Program ecologists.

Strategic Budget Objective 1.5.1 Watershed Restoration and Forest Health

- Participant and contributor to the Briggs Valley (Wild Rivers Ranger District) and the ByBee Creek (High Cascades Ranger District) forest restoration interdisciplinary teams.

- Consultant for the monitoring team for the Ashland Forest Resiliency Landscape Restoration Project.

Field tour for the Secretarial Pilot Project for Landscape Restoration in southwest Oregon.

- Consultant for the southwest Oregon Secretarial Pilot Projects for Landscape Restoration in conjunction with the BLM, Jerry Franklin and Norm Johnson.

- Conducted the Watershed Condition Framework analysis for fire effects and regime condition and forest cover condition for both the Umpqua and Rogue River-Siskiyou National Forests.

Strategic Budget Objective 1.5.2 Wildlife and Species Diversity

- For local use wildlife and habitat planning, the ecology program prepared an analysis (data compilation) for down wood and tree snags for southwest Oregon. Using this data and working with the Northwest Oregon Ecology Group and GIS folks, we are working on preparing a dataset that can be used for down wood and snag analysis using the model DecAid, a predictor of potential for down wood and snags.

- Started the preparation that is necessary for 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 Management Species

Agreement for the southwest Oregon Bureau of Land Management, Medford District, and the Forest Service.

- The ecology program participated and contributed to the Klamath Province Dry Forests spotted owl working group.

Strategic Budget Objective 1.5.2 Plants and Species Diversity

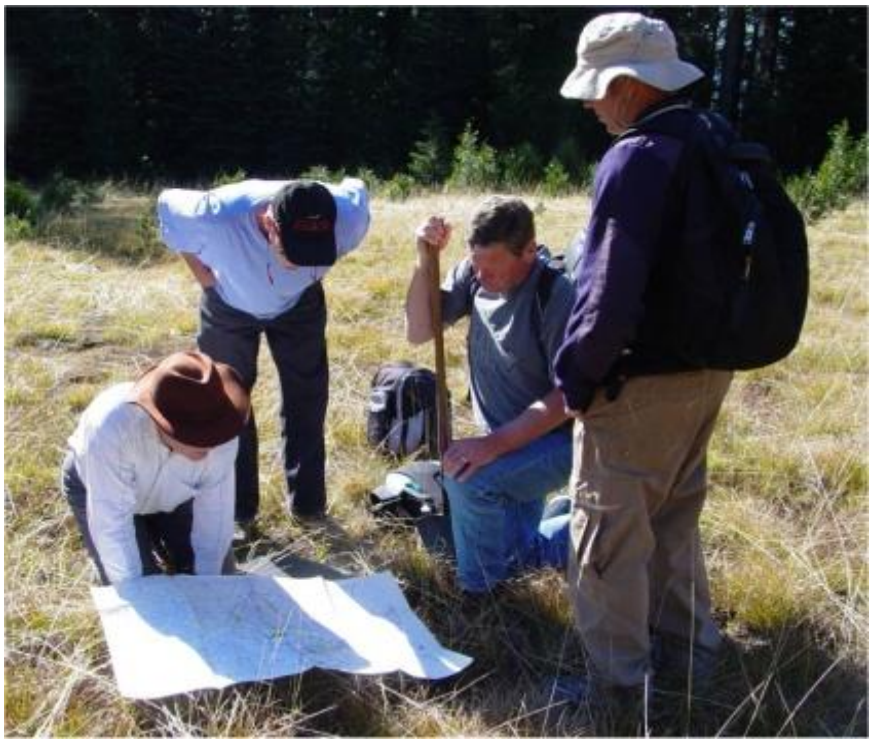
- Participated and contributed to the Port-Orford Cedar Technical Team. A science-based team tasked with management of Port-Orford Cedar for the reduction of Phytophthora lateralis, an introduced root disease responsible for the demise of large populations of Port-Orford Cedar throughout southwestern Oregon.

Strategic Budget Objective 2.2.1 Rangeland Management Issues

- Participated in the rangeland utilization monitoring project review for forest cattle allotments including Alkali, Beaver, and Sherwood Meadows on the High Cascades Ranger District.

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 were conducted on the Powers, Gold Beach, and High Cascades Ranger Districts, including the Sky Lakes Wilderness area.



Range monitoring with Gregg Riegel, Chuck Anderson, Mark Hocken, and Wayne Rolle.

- Facilitated a service contract with retired ecologist Dr. Thomas Atzet to interpret and convert to a usable format from historic ecological data.

- Assisted with the Medford BLM District field trip to visit and discuss future management recommendations for pine plantations on the Dead Indian Plateau.

- Replied to many requests, several from PhD students, for ecological data related to our permanent ecology plots.

- Peer reviewed several professional papers, as requested.

Strategic Budget Objective 1.5.1 Data and Resource Information

The following are events, programs, and presentations conducted throughout 2011

- Oregon Public Broadcasting (television) – Tenth Anniversary of the Biscuit Fire, views April 2012

- Forest Ecology and Succession - Crater High School

- Forest Ecology Demonstration - Crater High School Field Trip

- Fire Ecology and Stand Development - The Nature Conservancy, University of Washington, Oregon State University, Northern Arizona University

- Fire and Forest Habitat Relationships - Southern Oregon Timber Industry Association, Christmas Banquet Program

- Global Fire Ecology - Oregon State University

- Wildland Fire Policy - Yale University

- Geophysics of Global Fire Ecology and Management Implications for Dry Forest Ecosystems - Yale University

- Ecology and Post Fire Management - Yale University

- Forest Ecology and Management - Oregon State University Forest Land Steward Program.

- Ecology of the Klamath-Siskiyou Bioregion - Oregon Caves National Monument

- Park Employee Training/Ecology and Fire History of SWO - Oregon Caves National Monument

- Exploring Klamath-Siskiyou Biodiversity - Siskiyou Field Institute, Southern Oregon University
- Ecology of the Klamath-Siskiyou Bioregion - Oregon State University
- Forest Management - Oregon State University Master Land Stewart Certification
- Forest Ecology - Camp Echo, Girl Scouts
- Fire in Oregon Forests - Lions Club

Tom Sensenig with North Medford High School students on Forestry Adventure Tour

- Ecology of Southwest Oregon - Professional Women's Teachers Conference
- Geophysics and Ecology - Society of American Forester's National Conference
- Managing Forests for Multiple Objectives - High School Forestry Adventure Tour Southern Oregon High Schools Forestry Adventure Tours, 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; Bureau of land Management

Summary on 2011 Leadership Direction and Accomplishments

The Southwest Oregon FY2011 Ecology Program was again deemed as a valuable asset to the forests of southwest Oregon, as well as the Bureau of Land Management, Medford District, in addressing both local and regional ecological needs and controversial management issues.

The program also responded to ongoing requests throughout the year, proactively participating in and engaging with educational and school programs, as well as public, private, and environmental organizations. We were frequently asked to provide information using the data that were collected on our ecology plots. Information such as 'can you answer this question using your plot data', to 'what analyses have you completed or compiled related to the data you collected on the Ecology plots'. There were many inquiries into the use of both the Plant Association Group map and the plant association guides, especially for the Survey and Manage Settlement, silvicultural prescriptions, and PhD candidates throughout the nation.

Goals for FY2012

In 2012, 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, Fire Regime Condition Class mapping, Landtype 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.

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

We formed a chartered group, with membership from Forest Service and BLM: Jenny Lippert (Willamette NF botanist), Cheryl Friesen (Willamette NF science liaison), Doug Glavich (Siuslaw NF lichenologist/botanist), Robin Dobson (Columbia River Gorge National Scenic Area ecologist), Hugh Snook (Salem BLM ecologist), Chris Langdon (Eugene BLM wildlife biologist).

Overview of program for FY2011

Several key issues have been identified by the Northwest Ecology Program and their chartered group.

- Climate Change — Forests' response to, status (scorecard), and planning;
- Landscape analysis — large scale, long time period assessments, and vegetation and fire modeling;
- Fire — assessing deviation from reference conditions (Fire Regime Condition Class), post-fire development, fire regimes, and understanding fire ecology and fire behavior interactions;
- Special Habitats (e.g. meadows, oak/pine) — definition, mapping, and vulnerability;
- Coarse Woody Debris — spatial and temporal variability, and wildlife habitat;
- Vegetation — successional pathways, and large scale planning and analysis;
- Technology Transfer — workshops, participation on teams, and formal and informal exchange of information.

Leadership Direction

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

1. Provide and support long term, large scale planning and analyses;

2. Provide Forest and project level support — ID Team participation and technology transfer;

3. Climate change — planning, and technology transfer;

4. Monitoring — vegetation and disturbance process changes through space and time;

5. Technology Transfer — workshops, person to person, literature, etc.;

6. Work collaboratively with Districts, Forests, Region and partners;

7. Finish ongoing projects.

Eastside meadow fieldtrip, Mt Hood National Forest

Accomplishments by Strategic Budget Objective

Strategic Budget Objective 1.1.1 Reduce risk from wildfire

- Regional Fire Regime Condition Class (FRCC) Analysis — collaborated with ecologists, planners, fire and wildlife to begin regional updated analysis (updated from 2005). Expected completion date FY12

- 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. Large scale analysis to determine and prioritize potential focus areas.

- Post-fire trends in high elevation and mixed elevation Forests — 15 year post fire sampling at Charlton Fire (high elevation). Peer review paper on coarse wood dynamics after 10 years after high elevation fire (expected publication FY12). 14 years post fire trajectories of the Warner Creek Fire--Draft PNW Research Paper completed (expected publication FY12).

Fifteen year post-fire establishment sampling, Charlton fire, Willamette National Forest.

- Prescribed fire monitoring — worked with fire, silviculture, and botany to develop multi-resource monitoring protocol for Willamette NF. Framework is in development.

Strategic Budget Objective 1.4.1 Invasive Species (Plants)

- Presentation at a workshop on the Ecology, Management and Control of False-brome (*Brachypodium sylvaticum*) in the Willamette Valley on March 11, 2011 (sponsored by The Institute for Applied Ecology, Benton County, Greenbelt Land Trust and the Benton SWCD).

- 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.

- Benton County invasive Species Strategy task force participant.

Strategic Budget Objective 1.5.1 Restore Watersheds

- Watershed condition framework team members — provided terrestrial indicator conditions (forest cover, riparian condition, invasive species, Fire Regime Condition Class).

- Meadows session — technology and science transfer with Mt Hood Forest employees and partners.

- Contributed to EAs/EIS — ID Team member on 2 Forest projects (Prescribed fire in Wilderness project (Willamette/Deschutes NFs), Jim's Creek savanna restoration, Willamette NF), performed Coarse Woody Debris (CWD) analyses for 3 EAs (Siuslaw NF)

- Climate Change Workshop — sponsored 1 day event on the state of knowledge of climate change and effects on Oregon Coast Range vegetation, fish, water, insects and pathogens, and roads. Included breakout session with partners discussing accomplishments, needs and future opportunities.

- Climate change scorecard — Completed March and September Performance Scorecard reports (Mt. Hood and Siuslaw NFs). Facilitated planning and program of work toward answering yes to all 10 elements by 2015. Attended Zero Waste session with University of Oregon.

- Olallie Protocol: An applied sustainability analysis — final paper submitted to Portland State University and submitted to Society & Natural Resources for publication. Looks at 'all lands' approach and adaptive management centered on sustainability concepts in project planning. This was a collaborative project with Portland State University and the Mt Hood National Forest.

- FSVeg Spatial Migration — helped Mt Hood and Willamette NF in migrating existing spatial and tabular vegetation data into FSVeg Spatial.

- Vegetation Modeling — worked with Interagency Landscape Analysis team to complete the VDDT state and transition models for NW Oregon. Explored using models for watershed analyses on the McKenzie District, Willamette NF.

Strategic Budget Objective 1.5.2 Species Diversity (Wildlife)

- Elk forage — interfaced with elk habitat model developers tailoring model to local area; provided wildlife biologists and silviculturalists with plant species lists and elk forage selection ratings (from the model).

- Gap prescription and thinning — led plant association trainings on Hebo RD (Siuslaw NF) and Detroit RD (Willamette NF) in new planning areas; major focus was potential vegetation response to gap creation during thinning for wildlife habitat enhancement.

- Meadow maintenance — developed maintenance prescription for meadows (N. Fork Siuslaw, Tamara Quays, Central Coast RD, Siuslaw NF) created for wildlife habitat; initiated pre-restoration songbird monitoring for meadow restoration on old homestead (Pioneer Butte, Central Coast RD, Siuslaw NF).

- Deadwood Assessment — data analysis of NW Oregon looking at abundance and distribution of deadwood habitat for future land and project planning. Updated with most current GNN coverage and adding ownership for EA analysis. Complete inventory assessment for the Mt Hood NF and assisting wildlife biologists at their request. Provided updated tables for Willamette NF wildlife program. Collaborated with Siuslaw NF Wildlife and Planning specialists on analysis of current and reference conditions of snags and down wood for three EAs.

Strategic Budget Objective 1.5.2 Species Diversity (Plants)

- Estuary restoration — developed and collaborated on implementation of planting plan for Pixieland project (Salmon River, Cascade Head Scenic Research Area, Siuslaw NF).

- Oak Pine habitat — Mapping was completed for existing and historic extent of oak pine habitat on the eastside Mt Hood NF and Columbia River Gorge Scenic Area in fall of 2010. Information was presented in a workshop with partners and other agencies in spring of 2011.

Planting willows at Pixieland, Siuslaw National Forest to test success in reed canary grass competition.

- Huckleberry habitat — monitoring and tribal collaboration on local projects, meeting trust responsibilities for providing traditional uses. Monitored four photo points on the Salmonberry timber sale, installed five transects/photo points on the Huck timber sale, and provided input for timber sale program on Clackamas River RD for huckleberry management.

- Special habitats — sampled non-forested habitats on an area of the Willamette NF that had special habitats GIS layers developed using different methodologies (Willamette NF and Eugene BLM); assembled suite of non-forest GIS layers for draft recommendations on special habitat mapping and attributes for NW Oregon members.

Strategic Budget Objective 5.1.1 Resource Information

- Annual NW Oregon Information Sharing Workshop— co-sponsored 1 day event with CCAMP on eastside NW Oregon ecological issues; technology and science transfer with Forest employees, partners, tribes, state, and other agencies.

- Plant Association Workshops – sponsored two interagency field workshops (1 Willamette, 1 Siuslaw) using plant associations to 'read' and manage landscapes.
- Fire Ecology and Fire Management Workshop — co–sponsored 1 day workshop with CCAMP on ecological and management interactions.

- Presentations — gave talks at Willamette NF climate change workshop, FLT presentations on NW Oregon Ecology Program (Siuslaw NF) and Dunes Ecology, FLT presentations on climate scorecard and "Getting to Zero Waste" (Mt Hood NF), NW Oregon Information Sharing Workshop, Fire Ecology and Fire Management workshop.

- Oak metric development — team member on interagency/NGO group to develop a metric for assessing oak habitat quality to be used in an ecosystem services context.

- Forest Plan monitoring report — completed the 2010 Mt Hood NF annual monitoring report.

- Active Monitoring Projects — upland and wetland 15 yr Charlton fire (Willamette NF) ; Tamara Quays (Siuslaw NF) , Jim's Creek savanna (Willamette NF) Mutton Meadow seasonal fire effects (Willamette NF), and Salmonberry's and Huck's huckleberry photo points (Mt Hood NF).

Summary on 2011 Leadership Direction and Accomplishments

1. Provide and support long term, and large scale planning and analyses

   Watershed Condition Framework, Fire Regime Condition Class, Special Habitats, Coarse Woody Debris analysis, wood levels, ILAP vegetation modeling and mapping, Potential Natural Vegetation (PNV) mapping, large scale analysis for Prescribed Fire in Wilderness.

2. Provide Forest and project level support — ID Team participation, and technology transfer

   ID team participation and or technology transfer on several Forest (2) and District (4) teams. Technology transfer — several workshops (e.g. Oregon Ecology Info Share workshop, Meadows, Plant Association workshops, Sustainability analysis), presentations.

3. Climate change — planning, and technology transfer
   Climate change coordinator for Mt. Hood and Siuslaw NFs. Facilitated workshops, information exchange (e.g. newsletters), developed program of work to complete scorecard requirements

4. Monitoring

   Active monitoring projects (see above), lead on Forest Monitoring Report (Mt Hood), integrating with fire, botany, silviculture in monitoring efforts (Willamette NF).

5. Collaboration

   Worked collaboratively with BLM, Joint Fire Sciences, Regional Office, CCAMP, various Districts, provides and shares information with the Confederated Tribes of Warm Springs.

Goals for FY2012

1. Continue Climate Change role;

2. Complete Fire Regime Condition Class update;

3. Develop Special Habitats mapping recommendations for NW Oregon;

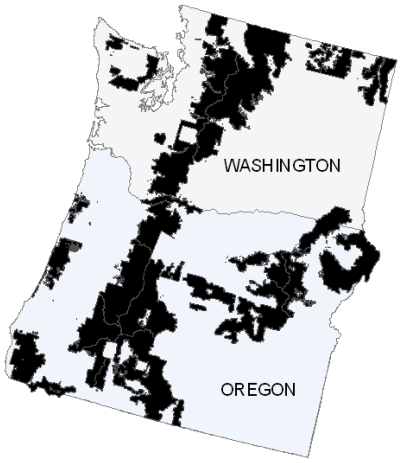
4. Complete publications on monitoring projects;

5. Communicate relevant science and management projects via Information Sharing workshop and Newsletter;

6. Initiate monitoring/assessment project to support restoration of Siuslaw NF's Dunes;

7. Participate on ID teams on high priority forest projects (e.g. prescribed fire, alder management/early seral management within LSRs, coarse wood analyses, meadow restoration, landscape analyses).

Pacific Northwest Regional Office
33 SW First Avenue, Portland, Oregon



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

Overview of program for FY2011

At the Regional Office in FY1, the ecology effort focused on climate change, assisting Watershed Condition Framework development, facilitating ecology support to the whiteheaded woodpecker habitat monitoring effort, and leading creation of the Terrestrial Condition Framework. Administratively, we added an ecologist to the Southwest Oregon area ecology team (through the SCEP process), made permanent Mike Simpson's position in Central Oregon, and assisted in the recruiting of an ecologist for the Northeast Oregon Ecology Area to fill a vacancy there. In March we held a meeting with Forest staff officers to chart the course of the ecology program in coming years. We also had a significant role in organizing and implementing the annual interdisciplinary meeting, and in organizing the Interior West Fire Ecology conference in Snowbird, Utah.

Accomplishments by Strategic Budget Objective

Strategic Budget Objective 1.1.1 Reduce risk from wildfire

- After lecturing people on fire ecology for years, Tom decided to go take a look at one once in a while. Accordingly, he tested "Arduous" in the pack test this year and served on the Shadow Lake Fire (High Cascades in the Deschutes and Willamette National Forests) in September as a fire effects monitoring trainee.

  During the fire he was paired up with a small team doing fire observer work and putting in opportunistic fire effects monitoring plots. Discussions with team lead Amanda Rau, a fuels technical specialist from the Sisters Ranger District, led to a decision to bring this to a broader audience. Accordingly, in October we held a meeting of key personnel from the Central and Northwest Oregon areas in fire, fuels, and ecology to discuss how fire effects monitoring could be implemented as part of the active management of project wildfires. Geoff Babb and Ali Dean of the Central

Oregon Fire Management Service (COFMS) played an integral role in bringing this together. There was loose consensus on using modified FIREMON protocols for monitoring. At the interdisciplinary meeting in Bend in November we discussed this further and agreed to draw up a proposal, which is planned for FY12.

- Another development was looking at the future of Fire Regime Condition Class (FRCC) in a changing climate. We used water balance deficit during the growing season at mid-century (roughly 2050) as a rough predictor of climate change effects, and overlaid this map layer on the current FRCC map. This provides a rough prediction of how FRCC might experience further stress from climate change. Results indicated that our departed ecosystems (FRCC classes 1 and 2) will likely receive more stress from drying during the growing season. This indicates that fuels reduction in these ecosystems, as well as better management of wildfires, are likely good management strategies to prepare our landscapes for an uncertain future. Chris Ringo, GIS specialist with the ecology tech team, is credited with developing the maps.

Strategic Budget Objective 1.1.1 Reduce risk from wildfire, 1.4.1 Invasive Species (Insects and Diseases), 1.4.1 Invasive Species (Plants), 1.5.1 Restore Watersheds, 1.5.2 Species Diversity (Wildlife), 1.5.2 Species Diversity (Plants), and 5.1.1 Resource Information

- Guidance on Addressing Climate Change in Management of Non-forested Habitats in Northwest Oregon

  Nikola is continuing the work of Robin Shoal, ecologist on the Olympic National Forest, who produced a report in 2010 on non-forested habitats vulnerable to climate change in Western Washington, focusing on alpine and subalpine, native dry grasslands, and wetlands. This report was a component of Climate Change and Forest Biodiversity: A Vulnerability Assessment and Action Plan for Forests in Western Washington by Carol Aubry et al. Nikola is continuing the non-forested habitat assessment for Northwest Oregon.

  The approach for Northwest Oregon will be somewhat different than Western Washington, per the request of the area ecologists. Nikola is working with the Northwest Oregon Ecology Group to develop an analytical framework at the planning area scale on how to address non-forest types, their location, condition, vulnerability to climate change, and management considerations.

  This project addresses all of the above strategic budget areas by developing guidance for managers on how to consider the impacts of climate change on non-forested habitats including shifting fire and hydrologic regimes and invasive species encroachment. A primary aim of this effort is to sustain the resiliency of these habitats so they can support biodiversity.

In 2011 Nikola consulted with ecologists and botanists on the Mount Hood, Siuslaw and Willamette National Forests, the Institute for Natural Resources, the Eugene District of the BLM, faculty at Oregon State University, the Institute for Applied Ecology and Defenders of Wildlife to identify priority non-forested habitats vulnerable to climate change in Northwest Oregon. The resulting list of priority types included alpine/subalpine, wetlands, meadows, coastal dunes and oak woodlands and savannahs. Nikola collected available spatial data for these types and worked with a GIS specialist to have all but oak mapped.

Strategic Budget Objective 1.5.2 Species Diversity (Wildlife) and 5.1.1 Resource Information

- White-headed Woodpecker Monitoring – Central Oregon Field Crew

In FY2011 the ecology program was asked to provide personnel and lead the transect monitoring for whiteheaded woodpecker habitat in central and northeast Oregon, and eastern. This was a very good example of the service and collaborative nature of the program. Early in the season, white-headed woodpeckers were sampled on 30 transects established by area ecology crews working with Forest personnel. Later in the season vegetation data were collected by the crews. Oversight was provided by the Regional wildlife ecologist, Kim Mellen-McLean, and a biologist from the Rocky Mountain Station, Vicky Saab. Vicky and colleagues are providing the statistical analysis and reporting.

Nikola conducted 6 weeks of field work with the Area 4 Ecology Program.

Strategic Budget Objective 1.1.1 Reduce risk from wildfire, 1.5.1 Restore Watersheds, 1.5.2 Species Diversity (Wildlife), 1.5.2 Species Diversity (Plants), 5.1.1 Resource Information

In FY2011 Nikola was jointly funded (40%) by the Pacific Northwest Research Station to work on an ecosystem services program with the region, in cooperation with Becky Gravenmeier of the Station. We gratefully acknowledge the support and collaboration. (In FY12 leadership of this transferred to climate change coordinator Marc Kramer, and became a collaborative effort of Marc, State and Private, and the ecology program.) Below are Nikola's primary projects from that program area.

- Deschutes National Forest: Ecosystem Services as a Framework for Forest Stewardship

The Deschutes National Forest has been working with the PNW Research Station 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 its decision-making processes. A key component of this project is to explore

ways that ecosystem service language can enhance the way the agency articulates its management outcomes and performance beyond target accomplishments.

The Deschutes is now moving into an implementation phase and is integrating ecosystem service considerations into project planning. John Allen, Forest Supervisor, has selected the Marsh Project on the Crescent Ranger District as a pilot. Nikola is working with the District Ranger and the Interdisciplinary Team on this process, and is collaborating with social scientists to engage the public and stakeholders in mapping key values associated with the ecological, economic and social benefits provided by the Marsh Planning Area. This collaborative process will be used to define the Purpose and Need of the project. Impacts of project alternatives on a subset of ecosystem service benefits will be defined quantitatively and/or qualitatively.

The first phase of this project resulted in the publication of a General Technical Report in August of 2011, Ecosystem Services as a Framework for Forest Stewardship: Deschutes National Forest Overview. Nikola was the lead author.

Nikola also co-organized a workshop with staff from the Deschutes and Willamette National Forests, Regional Office, PNW Research Station and partners about potential application of an ecosystem services framework to NFS management.

The Marsh Planning Area contains critical habitat for the Oregon Spotted Frog and supports several species of rare plants. Nikola is working with the Crescent Ranger District's Interdisciplinary Team to map ecosystem service values provided by the planning area so that fuels treatments can be designed strategically to protect and enhance these species and habitats.

Strategic Budget Objective 1.5.1 Restore Watersheds

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

Cindy Glick, Sweet Home District Ranger, has initiated a collaborative effort among district staff, the Willamette NF Supervisor's Office, State and Private Forestry, the PNW Research Station and external partners to expand a cooperative watershed management approach with Cascade Timber Consultants (CTC), whose land is in a checker-boarded ownership pattern with the USFS in the South Santiam Watershed. The aim is to improve the overall watershed condition, provide early seral habitat, and encourage the development of natural resource-related jobs in the community.

Nikola is coordinating this project's Watershed Restoration Subgroup to collaboratively establish restoration priorities and an action plan with Forest Service staff, partners and stakeholders (South Santiam Watershed Council, CTC, NRCS, Willamette Partnership, OWEB and others). A key component of this work is exploring opportunities for private landowners to receive payment incentives from

NRCS cost-share programs and ecosystem services markets to implement restoration activities. Nikola is consulting with these partners as well as the City of Albany's Department of Public Works to discuss opportunities for TMDL mitigation programs and restoration in its municipal watershed.

- Partnership with Eugene Water and Electric Board to Develop an Ecosystem Service Market in the McKenzie River Basin

  The Willamette National Forest is partnering with the Eugene Water and Electric Board to develop a payment for watershed services program in the McKenzie River Basin to sustain Eugene's municipal drinking water supply. The proposed program will direct a portion of rate payer funds to private landowners to protect and restore key riparian areas, and may involve cooperative maintenance of the McKenzie headwaters on National Forest System land.

  Nikola participates in a working group that meets every 6-8 weeks to build a vision and structure for this process with partners. Meetings have addressed market infrastructure and governance.

- Rural Voices for Conservation Coalition (RVCC) Payments for Ecosystem Services (PES) Subgroup

  In 2010 Nikola was asked to participate in RVCC's Payments for Ecosystem Services Subgroup, which is a collective of landowners and local, regional and national organizations that (1) tracks, reviews and comments on PES opportunities in the Farm Bill, (2) refines and develops policy recommendations related to PES and (3) develops PES pilots. The primary objective of the subgroup is to promote the development of PES programs that benefit private landowners and keep working lands working. A secondary objective is to develop outcomes-based ecosystem service performance measures for management of public lands.

  - Participated in monthly PES subgroup calls and co-authored briefing materials on PES opportunities for private and public land managers

  - Spoke about the region's ecosystem services program at RVCC's Annual Policy Meeting

<u>Strategic Budget Objective 1.5.1 Restore Watersheds, 1.5.2 Species Diversity (Wildlife), 1.5.2 Species Diversity (Plants), 5.1.1 Resource Information</u>

- Involvement in Working Groups to Further the Development of Ecosystem Service Markets and Metrics: Willamette Partnership

  Nikola is a member of the Willamette Partnership Working Group, which developed standards and tools for an integrated, functions-based ecosystem service accounting system to encourage investment in restoration in the Willamette Basin. The Counting

on the Environment (COTE) process built standards and market designs for compliance and voluntary markets including wetlands, salmonid habitat, prairie and water temperature. The COTE protocol was finalized in 2009 and entered a pilot implementation phase.

Nikola participates in working group meetings (three in FY2011) to discuss lessons learned from pilots. She also participated in a subgroup to develop a metric for oak woodlands, which was tested by Jane Kertis on the Willamette National Forest.

As a result of her participation in the working group, Nikola has also established collaborations with Ecotrust and The Freshwater Trust to explore connections between upland forest management, water storage and source drinking water. She is working with these partners and RO staff to identify viable watersheds for potential payments for watershed services programs. This work is in early stages and will develop further in FY12.

Strategic Budget Objective 5.1.1 Resource Information

- In FY2011 the program made significant contributions to the climate change effort. Tom was acting regional climate change coordinator for eight months. During that time he facilitated the first regional round of climate change scorecard reporting, and worked with associate ecologist Nikola Smith and regional soil scientist Karen Bennett on a carbon accounting assessment for the Region. Nikola put a substantial amount of work into this, and learned valuable FVS modeling skills. This was completed in draft form. Subsequently it has been decided to defer to national estimates, and a new approach will be taken to the issue.

- We also welcomed and facilitated the transition to climate change coordinator Marc Kramer, who arrived in May 2011. We continue to work with Marc on these issues, notably coordination on mapping and involvement of ecologists in tech transfer. A number of field ecologists on the areas serve as Forest climate change coordinators. Nikola also puts a significant effort into developing ecosystem services assessment and implementation (See section below on 1.5.1 Restoring Watersheds).

Summary on 2011 Leadership Direction and Accomplishments

At the Regional level, the program contributed significantly to developing the climate change effort in the Region, building the Watershed Condition Framework, and providing the field work for whiteheaded woodpecker habitat monitoring. The interdisciplinary meeting in Bend, with silviculture, fuels, soils, range, and ecology participating, was a successful act of collaboration and communication. We checked the program course with the Forest staff officers on the program in March.

Projected Goals for FY12

In FY12 we are developing the Terrestrial Condition Framework, terrestrial counterpart to the Watershed Condition Framework. We will continue to support the climate change effort, particularly in the area of technology transfer. We will again provide the field effort for whiteheaded woodpecker habitat monitoring.

In FY12 data management will take up a significant amount of program time. We have initiated "data rescue" efforts to capture the legacies of ecologists Fred Hall, Jan Henderson, and Robin Lesher, with the goal of bringing plot and photo data into modern formats

In program administration we will continue to pay attention to the key issues facing the Region, and adjust as necessary. With changing times and personnel turnover, we will work with the Forests in the Eastern and Western ecology areas in Washington to reorganize the programs in those areas as necessary.

Nikola Smith: A primary goal for FY12 is to continue to develop materials for staff related to management of non-forested habitats for climate change. Nikola will build upon the habitat identification and mapping efforts of FY2011 and draft resource materials for managers in collaboration with the NW Oregon Ecology Group. These materials may include:

1. an outline of how to incorporate climate change considerations into management of non-forested types - what issues need to be addressed, what kind of information is needed, and what the implications of various management activities might be

2. discussion of how to display non-forested habitats spatially, including identification of mapping and attribute issues, and how to interpret these types in a landscape context

3. case study applications of the analytical framework for 1-2 types, like montane meadows or oak savannah/woodlands

4. recommendations to fill data gaps

This proposed list of products will be shared with other area ecology programs for feedback early in 2012.

Nikola will continue to support the above-mentioned projects, and will also conduct a scoping assessment of watersheds in Oregon and Washington that are particularly viable for payments for ecosystem services programs, based on ecological, social and economic factors. Her work will have a dual focus of supporting the development of payment incentives for private forest conservation as well as investigating the potential of decision-support tools for managing ecosystem services provided by NFS lands. Representatives from Clackamas Stewardship Partners (Mt. Hood) and Blue Mountain Forest Partners (Malheur) have expressed interest in collaborating to explore ways that

ecosystem service metrics could be applied to articulate the outcomes of NFS management. Nikola will also support the region's cooperative agreement with the Willamette Partnership and The Freshwater Trust to expand ecosystem service markets beyond the Willamette Basin.