

USDA Forest Service Pacific Northwest Region Ecology Program



Accomplishments for Fiscal Year 2009 (October 2008-September 2009)

Annual Report

USDA Forest Service Pacific Northwest Region Ecology Program

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Cover photo, taken by John Hutmacher, is of a rainbow over Crooked River National Grasslands.

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Ecology Program Purpose:

Applied science for better forest and range management.

Ecology Program objectives:

- Provide Science Expertise
- Monitoring Implementation
- Technology Transfer
- Troubleshooting
- Support to NEPA Process
- Managing and Providing Data

About the program:

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

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

Visit us at our new site 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 guides 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.

Team: Jan Henderson, Robin Lesher, and Chris Ringo

Projects

- Potential Natural Vegetation (PNV) Model and Mapping Project: We led a coordinated PNV mapping project for Region 6 with wall-to-wall coverage for Washington and Oregon. We provided products, data, and technical expertise from this mapping effort (including maps, spatial data on potential vegetation and environmental gradients, methodology, interpretation, training, and technical support) to various government and land management agencies, resource professionals and scientists throughout the Pacific Northwest. A wall-to-wall vegetation zone map at a 90-meter pixel resolution was completed for Oregon and Washington.
 - PNV Overview Manuscript: Submitted manuscript "Modeling potential natural vegetation of the Olympic Peninsula USA using boundary equations and newly developed environmental variables" to Ecological Society of America for possible publication as a "Concepts and Synthesis" paper in the journal Ecological Monographs. Manuscript presents an overview of modeling and mapping potential vegetation zones using a boundary equation approach, and presents the newly defined environmental variables "Precipitation at Sea Level", "Mean Annual Temperature at Sea level", "Fog Effect" and "Cold Air Drainage" effect, plus modifications to existing concepts for the variables of Topographic Moisture and Temperature Lapse Rate.
 - PNV Model Development: Vegetation Zones, Plant Association Groups, Environmental Gradient Models
 - Calibrated, refined and completed map displaying 12 vegetation zones for Washington State
 - Installed over 1600 check-plots in OR and WA for calibrating and refining vegzone map.
 - Calibrated, refined and completed map displaying 20 vegetation zones for Oregon State.
 - Completed three vegzone field checking trips focusing on southwest and eastern Oregon.

See map on following page: Potential Natural Vegetation Zones of Washington and Oregon.



- PNV Model Application and Data Development
 - Developed model architecture to address specific needs for modeling vegetation in Oregon, specifically refining the function for stratifying the landscape by geological regions (georegions), including Mt. Mazama ash deposits, pyroclastic flows and serpentine bedrock.
 - Developed NRCS soils-based model for a salt desert georegion based on soil taxonomy.
 - Incorporated layer of Pleistocene lake basins into the Cold Air Drainage Model.
 - Developed model for calculating Potential Evapotranspiration for incorporation into PNV model
 - Revised Oregon Ecoregion stratification and boundaries.
 - Assembled and processed regional and other agency datasets of ecoplots to use for building and calibrating vegzone model.
 - Downloaded, processed and incorporated additional weather station and SNOTEL data for Region 6 and adjacent areas.



Jan Henderson (Area 1) and Mike Simpson (Area 4) field checking the PNV model in a western juniper woodland of Central Oregon.

- Obtained and assembled the NLCD Landcover data for OR and WA
- Obtained and assembled the 25m ETM+ Landsat scenes for OR and WA
- Continued development and refinement of PNV Model PC Application, code update and development, including online help manual and documentation
- Developed tools for analysis and display of data layers and model outputs
- Provided PNV Model application support for model users



Tom Sensenig and Pat Hochhalter (Area 5) and Jan Henderson (Area 1) field checking the PNV Model in the Rogue River valley, Oregon.

- 2) Interagency Mapping and Assessment Project (IMAP) support: Provided updated vegetation zone and plant association group maps
- 3) Ecology Program Database and GIS
 - Data entry and maintenance of Western Washington Area Ecology database
 - Continued data recovery efforts for Olympic National Forest corrupted fire history GIS layer by reconstructing and/or restoring about 100 corrupted files
- 4) Cook Creek Cedar Theft (Olympic National Forest): Continued participation with USFS law enforcement personnel and U.S. Attorney's office on the Cook Creek

Cedar theft case on the Olympic National Forest. Henderson testified as an expert witness at the restitution hearing in U.S. District Court in Tacoma on May 12, 2009.

Consultation and support:

1) Cedar Huckleberry Technical Committee for Tulalip Tribes – Mount Baker-Snoqualmie National Forest Memorandum of Agreement (MOA)

Served on committee with representatives of Tulalip Tribes and Mount Baker-Snoqualmie National Forest to develop recommendations for implementation of provisions of the MOA, specifically those related to the gathering of botanical resources and the distribution, ecology and sustainable management of these resources to facilitate the exercise of treaty rights.

- 2) Vegetation Management
 - Provided ecoplot data to Forest Silviculturist, including species composition, stand structure and growth and yield data for the Beckler Thin Project Area, and South Fork Thin monitoring plots
 - Field consultation with Forest Silviculturist on alder ecology and management in Beckler Project area.
 - Provided list of native trees and shrubs for use in Washington State Department of Transportation highway project at Stevens Pass area to the Forest Landscape Architect
- 3) Forest Monitoring Report: Prepared report on monitoring activities of the Area Ecology Program for the Forest Annual Monitoring Report.
- 4) Other consultation and support
 - Fire history data for upper Suiattle area trail reconstruction project
 - Provided review and ecological description for Bedal boat launch site for Forest Landscape Architect

Cooperation and Technology Transfer

Ecology staff had contacts with resource professionals, scientists and academics from a variety of agencies (USFS, BLM, NPS, NRCS, Department of Natural Resources, PNW, USFWS, Oregon Natural Heritage Program, Washington Natural Heritage Program) and universities in the PNW (University of Washington, Oregon State University, University of Idaho). We responded to requests for technical expertise, knowledge and information

regarding PNV mapping, as well as a diverse set of ecological issues, questions and subject matter.

- Northwest Scientific Association 81st Annual Meeting: Henderson presented "Vegetation History of Western Washington" in the plenary session; Lesher presented "A Potential Habitat Model for Salal for the Olympic National Forest".
- 2) Olympic and Mt. Baker-Snoqualmie fire history data for talk at national fire conference.
- 3) Slides on species habitat modeling for presentation at national mycological conference.
- 4) Provided SW Oregon vegzone map to wildlife biologists working on West Coast Fisher strategy.
- 5) Provided vegzone grids of Oregon and Washington to wildlife biologist researcher at LaGrande PNW lab for input to a spatial model of elk nutritional resources.
- 6) Provided consultation, data and map products (vegzone and plant association group maps) to the National Park Service and Oregon Natural Heritage Program for the field sampling, classification and mapping project for the three National Parks in Washington State.
- 7) Consulted with University of Washington PhD student investigating native uses of huckleberries in Washington, including review of research proposal, and a site visit to the study area to address questions and provide ecological training in field sampling methods and protocols.
- 8) Cooperated with research scientist at University of Idaho studying genetics and distribution of Abies species in the west; provided information and specimens to aid in the research effort.
- 9) Provided data on high elevation plant species to participants in a national workshop to develop critical loads for nitrogen deposition in alpine and subalpine ecosystems.
- 10) Consulted with research forester at University of Idaho Intermountain Forest Tree Nutrition Cooperative regarding project to develop site type models of forest stand productivity and maximum density, and use of environmental gradients and potential vegetation. Provided Precipitation at Sea Level and Mean Annual Temperature at Sea Level grids to aid in spatial and ecological analysis, and draft manuscript on potential vegetation mapping and development of environmental variables.
- 11) Consultation with science teacher at Terrace Park Elementary School in Mountlake Terrace regarding curricula for environmental education and the use of Terrace Creek Park as a learning laboratory.

- 12) Addressed forest ecology questions on the Mt. Baker Ski Area for writer of Snowboard Canada magazine.
- 13) Lesher serves on the Board of Trustees and is Secretary for the Northwest Scientific Association, and was on the program committee for the 81st annual meeting held at University of Washington, Seattle in March 2009. The meeting theme was "The Pacific Northwest in a Changing Environment". Most of this was accomplished as a volunteer.

Program Goals FY2010 and beyond:

- 1) Complete manuscript of the PNV Vegetation Zone Model and Map for Washington State. Submit for publication as Northwest Science Special Issue.
- 2) Complete Plant Association Group analysis, map and publication for western Washington.
- Monitor and install ecology benchmark plots and thinning monitoring plots to document growth/mortality, changes in species composition and abundance and stand structure.
- 4) Publish papers on thinning monitoring; species habitat models; benchmarks for oldgrowth forest restoration; stand growth, development and succession for western Washington forests.
- 5) Western WA Ecology database develop Access database application--corporate and public version
- 6) Consultation on Area Forests
- 7) Develop species habitat models for species of interest
- 8) Mt. Baker-Snoqualmie National Forest Office Guide
- 9) Fire History maps and stand year of origin analysis for northwest Washington
- 10) Non-forest classification for Mt. Baker-Snoqualmie and Olympic National Forests
- 11) Maintain 20-year old remote temperature stations to document climate change.

Team: Rod Clausnitzer, Kelly Baraibar, Gunnar Carnwath, Bill Gaines, Richy Harrod, Pete Ohlson

Projects

The Area 2 Ecology Program was involved with projects during the 2009 field season that represent area priorities in vegetation, fire, and wildlife ecology. The accomplishments are reported in these three emphasis areas.

- 1) Vegetation Ecology
 - One of the priorities was to re-establish and monitor Range Condition and Trend clusters for the Tonasket Ranger District.
 - In addition, seven streams were identified on the Methow Valley Ranger District to assess the effects of range management on stream channels and streamside vegetation. Multiple Indicator Monitoring (MIM) protocol was used to establish implementation monitoring sites.
 - The Ecology Program was involved in a monitoring study of the effects of ungulate use on the fen meadows and, in particular, Carex gynocrates in the Upper Falls Creek on the Methow Valley Ranger District.
 - In the middle of the field season, the Okanogan-Wenatchee National Forest Resource Staff recruited the Ecology Program crew to support botanical and invasive plant surveys for the priority project, Travel Management Plan.
- 2) Condition and Trend Range Sampling, Okanogan-Wenatchee National Forest
 - The Area 2 Ecology Program re-sampled allotment key areas during the 2009 summer season. Sampling followed the Nested Frequency, Cover Frequency and Parker 3-Step methodologies. Data collection is compatible with the R6 Range protocols and Natural Resource Information System (NRIS)-Terra database. Allotments were selected based on interviews with forest personnel; the allotments sampled would need allotment NEPA in the next few years.
 - A total of 3 permanent clusters were re-sampled. Time was also spent on planning for logistics, organization, photo labeling and management, GPS correction and export to shapefile, and local Parker 3-Step database entry. All site and vegetation data and narratives, Cover Frequency, and Nested Frequency data were entered into NRIS. A Parker 3-Step analysis was performed on all three

clusters to assess vegetation status (rating) by the same yardstick that was used during the previous analyses.

	District	Cluster Name	Condition	Trend
Parker 3-Step analysis of range	Tonasket	Dugout C-1	Fair	Static
clusters sampled in 2009	Tonasket	Dugout C-2	Fair	Down
	Tonasket	Dugout C-5	Poor	Static

In addition, data that was previously migrated from the older NRIS Terra database to the newer database contains several spatial points that are not in the correct location. This data is currently being sorted and corrected.

- 3) Multiple Indicator Monitoring (MIM), Okanogan-Wenatchee National Forest
 - An Interdisciplinary Team selected seven stream reaches on the Methow Valley Ranger District to be monitored by Area 2 Ecology personnel. During the 2009 field season, seven designated monitoring areas were established and monitored. Data were entered and analyzed in the MIM Data Analysis Module. The table below contains the results of streams that were monitored.

Stream Name	Ecological Status
Ben Canyon Creek	Good
East Fork Buttermilk Creek	Good
Libby Creek	Good
Black Pine Creek	Fair
Hornet Draw Creek	Good
Little Bridge Creek	Good
Poorman Creek	Fair

Streams monitored on the Methow Valley Ranger District

- 4) Upper Falls Creek Carex gynocrates Monitoring Program
 - The Ecology Program was involved in establishing a 3 year monitoring study of the effects of ungulate use on the fen meadows and the TES sedge, *Carex gynocrates*. Three buck and pole exclosures were constructed using on site materials. One site showing very little cattle use was established as a control. Water samples were gathered from 5 sites during spring run-off and again during 3 other periods during the season to look at possible changes in water chemistry. Calcium and pH are indicators of fen health associated with cattle use. Eight transects were installed at each of the 4 sites (3 w/ exclosures and 1 control). The study design, field layout, data collection, and data entry was accomplished in collaboration with personnel on the Methow Valley RD. Three pictures depicting the fen and exclosures follow:



Exclosure to the right and transects outside the exclosure to the left.



Transect with sampling frame inside the exclosure at Site #2.



Transect tapes inside the exclosure at Site 2.

5) Botanical & Invasive Surveys for the Oka-Wen NFs Travel Management Plan

Two Districts on the Okanogan-Wenatchee NFs needed support to complete field surveys for the Travel Management Plan. These two districts also had the most miles of new proposals – approximately 100 miles of trails and roads to survey. Ecology crew personnel conducted rare plant and invasive plant surveys to meet the survey objectives for the 2009 field season. The Ecology Program was responsible for coordinating with the RA's on these districts to get information on routes to be surveyed, flagging of routes and getting GPS information back to RA's when illegal routes were discovered. These sites can be used to inform future management decisions regarding risk of invasives establishment and spread as a result of proposed recreation activities.

- 6) Fire Ecology
 - Completed progress report of Deer Point Fire Area snag plots (including data collected during summer 2008. This report will be updated periodically (every 2-3 years) to monitor snag decay rates of fire killed trees.
 - Prepared "A User's Guide to Thinning with Mastication Equipment"; posted on Forest website.
 - Visited all mastication sites and re-photographed plot photo points to visually assess changes in forest vegetation following treatments.

- Worked with Methow Valley RD personnel to re-vegetate shrub species in safety zone/wetland area that was created during the 2006 Tripod Fire. Established transects (Oct 2008) to monitor survival and growth and re-sampled those same transects (June 2009) for first year survival (85.9% overall survival). Prepared report for RD on survival rates by different species within this area.
- Completed post-treatment re-sample, data analysis and prepared report of FIREMON plots in the Burnt Valley project area of the Colville NF.
- Developed monitoring protocols to quantify in detail the surface fuel loads and understory and overstory forest conditions. Established and collected data from 90 of these permanent plots in project areas on multiple Ranger Districts. These plots will be re-measured following treatments that include various combinations of thinning and prescribed fire to assess the impact of those treatments.
- Completed re-sample of ponderosa pine transects that were initially established in 2007 following the 2006 Tripod Fire. Trees were assessed for fire damage to boles and crowns, mortality and current proportion of live crown recovery.
- Provided training to new employee on the Colville NF on general forest measurements, monitoring plot establishment procedures and fire ecology of inland northwest forests.
- Classified forest stand characteristics from aerial photographs of 360 random polygon locations on the Naches RD for elk habitat research classification project.
- Assisted National Forest and PNW Lab personnel in aerial photo interpretation and field reconnaissance of a large portion of the Naches RD.
- Collected field data on surface fuel loads and snag condition in past wildfire areas as part of a Joint Fire Science re-burn project to assess the impacts of salvage logging.
- Assisted PNW lab entomologist with permanent plot establishment and data collection in stands of whitebark pine to assess the distribution of that species and the occurrence of blister rust and mountain pine beetle damage. Also assisted with cone collection of mature cones and additional data on whitebark pine to be used as a potentially superior seed source for nursery stock.
- 7) Post-fire Salvage Harvest and Cavity Nesting Bird Monitoring

These funds were used to support a graduate student that is completing a Master's degree in Biology at Central Washington University. The funding this year was used to complete data analysis and begin writing of the manuscripts for publication. Draft manuscript should be submitted for publication in 2010. This information will be valuable in determining the long term impacts of post-fire timber harvest on snag fall

rates, cavity nesting birds, and shrub nesting birds. Currently there is a lack of longterm monitoring information on the effects of post-fire timber harvest on wildlife. Partners include the Wenatchee Forestry Sciences lab and Central Washington University.

8) Barred Owl Resource Selection Model Validation

A barred owl resource selection model was published in the Journal of Wildlife Management in 2009 based on a study of barred owls completed on the Okanogan-Wenatchee National Forest, Wenatchee River District. The Ecology Program funds, along with other funds obtained from the Regional Office, were used to extrapolate the resource selection model to the entire eastern-Cascades province and then barred owl surveys were conducted in the spring and early summer of 2009 to test the model. Surveys were conducted on the Entiat District, in the Icicle drainage on the Wenatchee River District, and on the Naches District. Preliminary results of the model validation are very encouraging and a final report is being prepared. This information will allow district managers to determine the probability of barred owl occupancy and evaluate the potential for vegetation management projects to affect the probability of barred owl occupancy. This is a key factor in the recovery of threatened northern spotted owl. Partners in this project included the Wenatchee Forestry Sciences lab and the Wenatchee Field Office of US Fish and Wildlife Service.

9) Climate Change and Habitat Connectivity

This effort involves a wide range of partners collectively referred to as the Washington Wildlife Habitat Connectivity Working Group (WWHCWG). Partners include the Washington Department of Fish and Wildlife, Washington Department of Transportation, Washington Biodiversity Council, University of Washington, University of Montana Western Transportation Institute, The Nature Conservancy, Conservation Northwest, US Fish and Wildlife Service, and US Forest Service. During this past fiscal year, efforts were focused on addressing the existing condition relative to habitat connectivity for a wide range of focal wildlife species. In addition, field data were collected to obtain genetic material from a subset of the focal species that can be used to validate our assessment of the current level of habitat connectivity. A report summarizing the current condition will be drafted by the end of 2010 and then work will begin on the evaluation of climate changes scenarios and possible implications for wildlife habitat connectivity. This information will be valuable as we address habitat connectivity and climate change in our forest plan revision process.

10) Effects of Thinning and Prescribe Fire on Large and Old Trees

The objective of this effort was to determine the effects that thinning and/or prescribed fire have on the mortality of large and old trees. To evaluate this, large trees were re-sampled within the Fire and Fire Surrogate Study units to determine mortality rates by each of the treatments. A total of 1860 trees were sampled within nine units to representing thin-only, burn-only, thin-burn, and control treatments. A

draft sampling protocol was also developed and will be finalized pending study results. Results of the monitoring will be analyzed and summarized in FY 2010. This study was also funded in part by the Regional Office as a result of concerns over the loss of big trees from fuels reduction treatments. Our results and monitoring protocol will be used across other parts of Region 6 where this issue is also controversial. Partners for this monitoring effort included Region 6 Wildlife Ecology Program and the Wenatchee Forestry Sciences lab.

11) Colville NF Snag Monitoring

This monitoring effort was supervised by Chris Loggers from the Colville National Forest. The objective was to implement a snag monitoring protocol developed and implemented on the Okanogan-Wenatchee a few years back to determine the effects of thinning and/or burning treatments on the retention or creation of snag habitat. Additional monitoring will occur to track the fate of the marked snags and to add more sample units with different treatments in 2010.

12) Effects of Competition and Environmental Factors on Climate-Growth Relationships: Implications for Forest Restoration and Management on the Colville National Forest

This project is an investigation of factors influencing the climatic sensitivity and vulnerability of *Pinus ponderosa* and *Psuedotsuga menziesii* on the Colville National Forest. Conclusions will help researchers better predict climate change-related responses for these two dominant conifers species as well as inform new management actions.

• Collected detailed individual-tree data and approximately 1300 tree cores from thirteen stands across the full elevational distribution of *Pinus ponderosa* and *Psuedotsuga menziesii* on the Colville National Forest.



Field sampling: Stand measurements & core collection

- Successfully completed all field work and data collection necessary to achieve the proposed project.
- Utilized external funding to acquire laboratory equipment and personnel necessary to mount, sand, cross-date, and measure all cores in partnership with the University of Montana.

Cooperation and Technology Transfer

- Climate Change and Habitat Connectivity: This effort involves a wide range of partners collectively referred to as the Washington Wildlife Habitat Connectivity Working Group. Partners include the Washington Department of Fish and Wildlife, Washington Department of Transportation, Washington Biodiversity Council, University of Washington, University of Montana Western Transportation Institute, The Nature Conservancy, Conservation Northwest, US Fish and Wildlife Service, and US Forest Service. Further information given above.
- Partners for Effects of Thinning and Prescribe Fire on Large and Old Trees monitoring effort included Region 6 Wildlife Ecology Program and the Wenatchee Forestry Sciences lab.
- Singleton, P.H., J.F. Lehmkuhl, W.L. Gaines, and S.A. Graham. 2010. Barred Owl Space Use and Habitat Selection in the Eastern Cascades, Washington. Journal of Wildlife Management 74(2):285-294
- Worked with a graduate student that is completing a Master's degree in Biology at Central Washington University. The funding this year was used to complete data analysis and begin writing of the manuscripts for publication on Post-fire Salvage Harvest and Cavity Nesting Bird Monitoring.

Program Goals FY2010 and beyond:

- Continue working on Washington Wildlife Habitat Connectivity Working Group on the Climate Change and Habitat Connectivity project.
- Follow-up monitoring on the Colville NF Snag Monitoring project.

Team: Sabine Mellmann-Brown, Jennifer Ferriel, Ken Stella

Projects

- 1) Ecology web pages: A region-wide overhaul of FS web pages to comply with regional direction for accessibility and using a more standardized format is in progress. Sabine will take over the webmaster duties when the overhaul on our web pages is complete.
- 2) Ecology Database: Data entry for the 2009 field season is in progress. Legacy slides will be scanned this winter. Student Temporary Employment Program student has been hired and started 11-16-09.
- 3) Ranger District Assistance
 - Three riparian restoration site visits on the Umatilla NF in conjunction with a white paper on lessons learned, to be written this winter.
 - Four site visits to the North Fork Burnt River riparian restoration project on the Wallowa-Whitman, Whitman Unit to look at and discuss revegetation efforts and potential fencing of aspen.
 - Six days of range monitoring for the Long Creek RD, Malheur NF.
 - Logan Fen visit to assess as possible new Research Natural Area proposal.



Sabine Mellmann-Brown, Area 3 Lead Ecologist, and Joe Rausch, Malheur NF Forest Botanist, examine a dwarf willow in Logan Fen.

- Site visit to Brock Allotment on Walla Walla RD, Umatilla NF.
- Three days of assisting in interpreting indicators of rangeland health in Hells Canyon National Recreation Area for the Westside Rangeland Analysis Environmental Impact Statement.
- Cusick Mountain limber pine visit.
- 4) Blue Mountains Forest Plan Revision Support: Vegetation Database Comparison Meeting.
- 5) Fire effects studies
 - Sampled permanent fire-effects monitoring plots for fires with dates ranging from 1990 to 2003. Malheur NF: 4 plots in 2 fires; Wallowa-Whitman NF: 14 plots in 2 fires.
 - Two weeks of monitoring the Egley Fire with Fred Hall (one week in May, one week in October).
- 6) Interagency Special Status and Sensitive Species Program (ISSSSP) projects
 - Updated Fungi Management Effects Bibliography. This is an online resource for information on mycorrhizal special status and sensitive species fungi (a subgroup of "Survey and Manage" species). The annotated bibliography entailed compiling the best available science for management effects and developing an annotated bibliography. The annotated bibliography is used for effects analysis in NEPA documents.
 - Survey for *Rubus bartonianus*, an ISSSSP endemic shrub of the Snake River Canyon. Presented a poster on our study at the 24th Idaho Rare Plant Conference. 11 days were spent inventorying known sites and expanding population areas. A preliminary report was compiled. We plan to develop a *R. bartonianus* habitat model this winter. Funding was secured for the second field season.
 - Four Days Assisting the Wallowa-Whitman botanist in collecting and identifying threatened and endangered *Carex* species in the Wallowas.
- 7) Research Natural Areas (RNA): Visited Indian Creek RNA and Pt. Prominence proposed-RNA regarding grazing issues and the potential expansion of the Eastside Allotment.
- 8) Exclosures: Funded maintenance work by Ranger District staff on long-term ecology monitoring exclosures in the Egley Fire area.

Personnel updates

Student Career Experience Program student (Ken Stella) was converted to an ecologist on the Malheur National Forest in October 2009. Ken (most recently) came from Flagstaff, AZ where he received a MS in Forest Ecology, from the School of Forestry, Northern Arizona University.

Sabine Mellmann-Brown joined the Area 3 Ecology program in June FY09 as our lead ecologist. Sabine comes from Bozeman MT, where she worked for Montana State University as a post-doc on a variety of vegetation and landscape ecology projects.

Cooperation and Technology Transfer

- 1) Swanson, et al. In press. "Aspen ecology and management in the Blue Mountains".
- Stella, K.A., C.S. Sieg, P.Z. Fulé. In Press. "Minimal effectiveness of native and non-native seeding following three high-severity wildfires" Submitted to International Journal of Wildland Fire.



Dr. Evan Larson with the OPB crew examining an old growth limber pine on Cusick Mountain. Crossdating revealed a minimum age of 868 years (Origin of inner ring AD 1141, distance to actual pith unknown).



Malheur NF employees, at Plant Association Training, examine *Potentilla gracilis*.

- 3) Training provided
 - Annual Tri-Forest range training session in Pendleton, March 2009. Two presentations by Area 3 Ecology: 1. Monitoring: How much is enough? 2. How to choose riparian monitoring locations and key species.
 - Umatilla and Wallowa-Whitman Plant Association guide training, Umatilla NF, Pendleton.
 - Introduction to the Ecology Web Site and Plant Association guide training, Malheur NF, John Day

Team: Gregg Riegel, Mike Simpson, Beth Johnson, Sara Prueitt Lovtang, Michael Mann

Projects

1) Administrative Studies Fire Ecology

Our program currently consists of several ongoing long-term studies. These studies include examination of fuel treatments effects on understory vegetation, repeated fire return interval, and of post-wildfire salvage logging.

Fire Ecology Plots Measured in 2009					
	Deschutes	Modoc	Total		
Alternative Fuels Treatments Study Plots (plot size =1.0 ha)					
Fall Burn	3		3		
Spring Burn	5		5		
Mow	2	4	6		
Thin & Burn		4	4		
Fire Return Interval Study Metolius Research Natural Area (RNA)					
5-Year Fall	3		3		
10-Year Fall	3		3		
10-Year Spring	3		3		
20-Year Fall	3		3		
Control	3		3		
Post-Wildfire Salvage Logging (plot size = 1.0 ha)					
Logged	3		3		
Not Logged	3		3		
Old Growth Ponderosa Pine Long Term Monitoring Pringle Falls RNA (plot siz					
= 1.0 ha)					
Burned	3		3		
Totals	34	8	42		

Fire Ecology Plots Measured in 2009

• Alternative Fuels Treatment Study:

A long-term study which began in 2000, the Alternative Fuels Treatment Study was designed to examine the ecological effects of mowing and thinning, as compared to the effects of prescribed burning in ponderosa pine/antelope bitterbrush (*Purshia tridentata*) plant associations on the Deschutes, Fremont-Winema, and Modoc National Forests. We currently have sixty four, 1.0 ha, permanent plots, with new plots added when requested by individual forests. Treatments include prescribed spring and fall burning, mowing, thinning, thinning and burning, and control. Following NEPA approval, treatment implementation

began in 2001. All plots were measured pre-treatment, and post-treatment measurements are made annually though year 5, and then will be on a five year interval through year 20. Matt Busse, Research Soil Microbial Ecologist, PSW, Davis, is a cooperator.



The difference between litter and duff depth between the two treatments was no longer statistically significant by the fifth year post-treatment



Bitterbrush cover has continued to increase on the control plots, but is only slowly recovering on the plots which were commercially thinned then burned

• Reintroducing Fire in Eastside Ponderosa Pine Forests: Repeated Fire Interval Study

We are examining long-term changes in understory composition, structure, and soil processes in units that are repeatedly burned within old growth ponderosa pine in Metolius Research Natural Area. This was the first and is the longest running repeated fire interval study in the northwest. One other study was conducted near Flagstaff, Arizona but these results cannot be extrapolated to ponderosa pine in Central OR. Three treatment time intervals 5, 10, and 20 years, and a control were selected based on the minimum, mean, and roughly the maximum intervals from Joyce Bork's dissertation (OSU, 1985) on Central Oregon fire history. The original burns were done in the spring from 1992 to 1994. We are examining the effect of season of burn by comparing a spring treatment vs. fall treatment within three replicate blocks that are reburned in the spring at a 10 year interval. All other treatments receive their reburn in the fall typically in late September through early October. This is a randomized block experimental design with five treatments and three replicates per treatment. Blocks range in size from 20 to 40 acres and each block has a 1.0 ha square plot where we conduct our measurements.

In June and July 2009 we conducted the 17th year remeasurement. All 15 plots were remeasured and one experimental unit was burned in late September 2009. Our cooperator, Research Forester Andy Youngblood, PNW, La Grande, is studying composition and structural changes within the overstory and downwood.



Perennial forb cover on control plots is slightly lower than on treated plots, but no other clear trends in forb cover have emerged following repeated prescribed fire



Katie Gast and Lauren Miller, COFMS fire effects monitors, taking weather observations during Metolius RNA prescribed fire. This unit is on a five year fire return interval.

• Post-Wildfire Salvage Logging Study

In 2003, the 18 Fire burned approximately 3810 acres of ponderosa pine 3.5 miles southeast of Bend, Oregon. Three of the Deschutes Alternative Fuels plots, a control, a burn, and a mow plot, were burned by this crown fire. These three plots were subsequently removed from the Alternative Fuels study, and became part of the new Post-Wildfire Salvage Logging Study. Three additional plots were installed, and each plot was assigned either salvage or non-salvage treatments. Salvage treatments occurred in 2004. All six plots were measured in 2009, providing us with a full five years of data since the logging occurred.



Shrub cover on logged plots is slightly lower than on plots which were not logged, but in both cases total shrub cover has already returned to pre-fire levels, and continues to increase. • Old Growth Ponderosa Pine Long Term Monitoring Pringle Falls RNA

Three long-term plots were treated with prescribed fire in 2006. These had been installed in 1982, and were remeasured in 2006 prior to treatment, and have since been remeasured annually.

Emily Heyerdahl, a Research Forester at the Missoula Fire Sciences Lab, and collaborating partner on the Long Term Monitoring study, collecting fire scar samples on the Ochoco National Forest



- 2) Support to Interagency Mapping and Assessment Project (IMAP)
 - Supported Forest Vegetation Simulator (FVS) calibration of Vegetation Dynamics Development Tool (VDDT) models for East Cascades with Amy Krommes
 - Continued to explore feasibility of IMAP products for use at the project scale.
- Potential Natural Vegetation Modeling for Central Oregon (Completed working draft of sub-series Maps for the North Klamath Province (Eco-Regions 20208, 20209, 20210, 10305)

This project, a cooperative effort with Jan Henderson and Robin Lesher (Area 1 Ecologists), is currently in progress. It builds on methods developed by Henderson and Lesher and applies them to Oregon east of the Cascades Mountains. A significant portion of this project included creating a spatial soils layer with the assistance of Peter Sussmann, Soil Scientist for Deschutes NF, for central and eastern Oregon from numerous existing data sources (SSURGO, TEUI, SRI, ESI, and STATSGO) and creating common soil attributes to use in the models. Work continues on the north half (Bend to the Columbia River from the Cascade Crest east to the John Day River).

- This work supports IMAP (defines area where specific VDDT models apply) and supports Pine Bark Beetle Risk Mapping Project (FHM Project).
- Implements New East Cascades Plant Association Classification (at the sub-series level)
- Draft Vegetation Zones (series level) and Plant association groups (sub-series level) of the south half of the area (Bend to the California Border from the Cascade Crest east to Plush) were delivered in September 2009.
- 4) National Riparian Technical Guide

This project began in spring of 2007 and is expect to be field tested during the field season of 2010. Project objective: 1) review and synthesize existing protocols and 2) produce a technical guide with a suite of protocols stratified by ecoregion that will be a consistent and scientifically credible approach for inventorying and monitoring of riparian areas on National Forest System lands.

5) Continued to work on cheatgrass study: Tested "distance to nearest road" and analyzed minimum and maximum temperatures and precipitation for the months of January, February, March, April, May, October, November and December. Revised draft document and preparing for submission to the journal <u>Ecological Indicators</u>.



- 6) Wrote and submitted grant application for Title II (Secure Rural Schools and Community Self-Determination Act of 2000) for the "Weed Monitoring and Seeding Trials After Wildland/Urban Interface Fuels Treatment" project. Coordinated with fuels managers and botanists on the BLM and Crooked River Grasslands to enlarge the scope of the proposed study.
- 7) NEPA Support for Forests in Area 4
 - Cascade Lakes Scenic Byway Interpretive and Corridor Management Plan

Represented the Ecology Program as a core member of the Cascade Lakes Scenic Byway Interdisciplinary Team. In FY09 we began the task of updating the Interpretive Plan and Corridor Management Plan. The last update was in 1996, and many of the goals in the 1996 plan had been accomplished, while others needed to be added to or reprioritized. The updated plan will reflect the changing demographics in the central Oregon area, as well as planning for the use of newer technologies such as websites and podcasts. We are also in the process of using grant money to develop 6 new interpretive signs, as prioritized by the Interpretive and Corridor Management Plan. The final draft of the Interpretive and Corridor Management Plan will be completed in FY2010.

• Firewood IDT, Bend-Ft. Rock

With continued beetle kill and high fire danger in portions of the RD of the Deschutes NF, and a growing demand from the local population for firewood collecting areas, two new areas were opened. Evaluated proposed impacts on a variety of wildlife species, for Forest Plan compliance. Monitoring of the project will continue into FY2010.

• Flank IDT, Bend-Ft. Rock RD

The proposed Flank project is designed to restore forest health and reduce the accumulation of fuels which has resulted from past timber projects and fire suppression efforts. Field work has included goshawk and log and snag surveys.

• North-South Arterial Trail Biological Evaluation (BE)

Wrote BE for wildlife species potentially affected by the creation of a new mountain bike trail west of Bend.

- 8) Other support to Forest Projects within Area 4
 - Developed Viable Ecosystems-GNN–FVS Tools with Leo Yanez for project analysis. These tools implement local landscape vegetation analyses on Ochoco, Deschutes, and Fremont-Winema NF's.

- Eastside Spotted Owl Habitat Analysis
 - Developed spatial queries of Size-Structure and Species Composition (Large Douglas-Fir) using the GNN Data
- Rim-Paunina Project: A watershed on the south end of Crescent Ranger District where the goal is to utilize forestry techniques to create and maintain a diversity of habitats closer to what historically occurred (Crescent RD, Deschutes NF).
 - Completed Landscape Ecology (HRV) Assessment using Viable Ecosystems tools with Joe Bowles.
- Pringle Falls Experimental Forest project: silvicultural and fuel treatments within the Lookout Mountain unit of the Pringle Falls Experimental Forest (Bend-Ft. Rock RD, Deschutes NF)
 - Completed Landscape Ecology Historical Range and Variability Assessment using Viable Ecosystems tools with Paul Brna

Consultation (funded by others):

1) Assessment of Region 6 Aerial Detection Survey (ADS) mountain pine beetle (MPB) mortality using CVS repeat measurements of individual tagged trees.

Conducted a formal region-wide assessment of ADS MPB mortality estimates in terms of spatial agreement and intensity of mortality with ground based sampling of lodgepole pine mortality.



Key findings: ADS significantly under-estimates the spatial extent of MPB mortality. Only 18% of plots with dominant and co-dominant tree mortality were mapped by ADS. Low spatial accuracy is attributable to failure to detect on-going mortality not spatial misalignment of the mapped polygons. High MPB mortality within the CVS plot re-measurement period increases the likelihood of detection. MPB mortality events prior to CVS plot establishment seems to inhibit aerial detection of subsequent MPB mortality and decrease the probability of inclusion in a ADS mortality polygon. Where ADS and CVS data sources both show mortality, ADS underestimates dominant and co-dominant tree mortality levels by a factor of 2-3 times. A journal article documenting the methods and results is planned.

 Calibration of Pine Bark Beetle Spatial Risk Maps for the State of Oregon. 20% 2008-2009.

Helped to develop a process for testing fine scale (30m) mountain pine beetle hazard predictions (risk maps) derived from retrospective Gradient Nearest Neighbor (GNN) imputations of ground based plot data. The GNN imputations were created with 1996 remote sensing data (TM) and 1993-1997 plot data (CVS plots) and represent the existing vegetation in 1996. We then applied multiple rule sets for mountain pine beetle hazard prediction to the existing vegetation dataset from 1996.

- Model rule sets:
 - National Insect & Disease Risk Map (NIDRM) non spatial rules applied spatially
 - Host Tree Weighted rules (currently based on the number of LPP>9")
 - Spillover attack (Host tree weighted rules calibrated by proximity to existing MPB attacks)
 - Site Quality (Spillover attack rules calibrated by site productivity): The hazard predictions derived from each rule set were then compared to actual mountain pine beetle activity from 1996-2008 based on cumulative ADS survey data and actual mortality on the ground based CVS plots between establishment (1993-1997) and re-measurement (1996-2007). Data analysis is still in progress. A journal article documenting the methods and results is planned.

Cooperation and Technology Transfer

- 1) Dryland Forest Landscape Working Group-US Fish and Wildlife Service
- 2) USDA-Forest Service Technical Assistance Trip Kingdom of Morocco. In Support to USAID/Morocco Technical Assistance on Grazing Management with Morocco's

High Commission on Forests, Water and Combating Desertification For USAID-Morocco's Office of Economic Growth- May 5-19, 2009

- 3) Trainings, presentations and lectures given
- Presentations and trainings were given by Mike Simpson on how to use GNN Data for the IMAP project: Winema-Fremont, Deschutes, and Ochoco National Forests
- Introduction to Fire Effects, course number RX310, Pacific Northwest Training Center. Gregg Riegel was guest lecturer for the class located at the Redmond Air Center February 9, 2009.
- Alternative Fuels Study Update for Fremont-Winema NF personnel. Johnson, E.J. and G.M. Riegel. January 12, 2009.
- Poster created by Mike Simpson at the 2009 National Forest Health Monitoring conference and a Formal presentation at the 2009 Western Forest Insects Work Conference.
- Poster presented by E. Johnson, and G. Riegel. Fire return interval study in a ponderosa pine forest in central Oregon. The California Association for Fire Ecology Pacific Coast Fire Conference: Changing Fire Regimes, Goals and Ecosystems, December 1-4, 2008.
- Presentation: E. Johnson and G. Riegel. Effects of fuel treatment alternatives on antelope bitterbrush (*Purshia tridentata*) population dynamics, understory composition, and overstory structure Johnson. The California Association for Fire Ecology Pacific Coast Fire Conference: Changing Fire Regimes, Goals and Ecosystems, December 1-4, 2008.
- Vasquez, E.A., G. Riegel, T.J. Svejcar. 2009. Litter Decomposition in a Sierra Nevada Riparian Meadow as a function of Plant Species, Distance from Stream Edge, and Grazing. Soc. For Range Manage, 62nd Annual Meeting, Feb. 8-12, Albuquerque, NM.
- 4) Publications in draft or in print
- Publication on "Estimating the Historical Range of Variability" using VDDT, submitted by Jim Merzenich, Mike Simpson, Tom DeMeo, and Miles Hemstrom as part of a GTR.
- Busse, M.D., and G.M. Riegel. 2009. Response of antelope bitterbrush to repeated prescribed burning in Central Oregon ponderosa pine forests. Forest Ecology and Management 257 (2009) 904–910.

- Busse, M.D., P.H. Cochran, W. E. Hopkins, W.H. Johnson, G.M. Riegel, G.O. Fiddler, A.W. Ratcliff, and C.J. Shestak. 2009. Developing resilient ponderosa pine forests with mechanical thinning and prescribed fire in Central Oregon's pumice region. Canadian J. of Forest Research 39:1171-1185.
- 5) The Ecoshare website was updated to include the IMAP project (http://ecoshare.info/imap/), and added and edited documents for the IMAP site.
- 6) National Inventory and Assessment of Rangelands; Implementation Strategy for Data Collection and Analysis, Policy Implications "2007 Oregon Pilot". November 2008.
- 7) Attended a four-day training "Restoration of Disturbed Sites with Native Plants: An Integrated Approach" in June.
- 8) Graduate Committee Member for the following students:

Shuffield, C. Reexamining the encroachment of lodgepole pine on ponderosa pine in the pumice zone of central Oregon M.S. Depart. of Forest Engineering, Resources and Management, OSU. Expected completion date, June 2010.

Hoban, I. Physiologic Response of Antelope Bitterbrush to Varying Resources Gradients. M.S. Dept of Forest, Range, and Watershed Stewardship, Colo. State Univ. Expected completion date, September 2010. Co Major Professor.

Personnel update

The Area 4 Ecology Program faced many challenges during 2009 when two long-term temporary employees' positions expired, and a third permanent-employee on a detail was in danger of sudden relocation. Several months of work were lost during the summer field-season. Significant time was spent in changing one empty GS-07 permanent position in the organizational charts into a GS-09, and then filling it. Further negotiations are in progress to convert two long-term temporary positions into 1.5 permanent positions. This will help alleviate time wasted in scrambling to solve staffing crises.

The Area 4 Ecology Program is grateful to the Student Temporary Employment Program student, Michael Mann, for taking so much responsibility during the 2009 field season.

Program Goals FY2010 and beyond:

 Grant awarded in 2009 by Joint Fire Sciences Program to develop <u>A Guide to Fuels</u> <u>Management in Riparian Areas of the Interior West</u>. Principal Investigator: Kathleen Dwire USFS Rocky Mt. Research Station. Co-Principal Investigators: Gregg Riegel, Sandra Ryan, Timothy Burton. 2) Oregon Rangeland Pilot: Riegel, who is one of the three members of the Range Technical Team, will be reviewing and preparing a final document in FY 2010. The overarching goal of the "Oregon Rangeland Pilot" is to formally test the feasibility of a strategic inventory of all private and public rangelands using USDA NRI's and USFS FIA's existing sampling designs for conducting a national assessment of rangelands. The secondary goal is the development of a data base, for inventory and future monitoring reports addressing the extent and amount of range indicators. The thirteen county area of Central Oregon was chosen for the pilot. Rangeland resource field sampling occurred in 2007, data analysis in 2008 and an external review was delivered in November 2008 to the Washington Office of USFS, NRCS, and BLM. External review was conducted by an oversight panel selected by the Ecological Society of America in the winter of 2009. Team: Tom Sensenig, Patricia Hochhalter

Projects

- 1) Monitoring and Field Studies Forest Level Work
 - Interdisciplinary participation on the Ashland Forest Resiliency Project, a fuels and forest health treatment proposal for the City of Ashland, Oregon's watershed, in collaboration with the City of Ashland and The Nature Conservancy
 - Research on fuel recovery dynamics on the almost 500,000 acre Biscuit Fire done in cooperation with Oregon State University (OSU), PNW, and Amy Nathanson, a current Student Career Experience Program student in the Ecology Program
 - Utilizing Area Ecology data (Plant Association and ecology plot data); prepared statistical analysis for site productivity for southwest Oregon
 - Prepared local Down Wood and Snag Analysis for the National Hazard Tree Removal Program.
 - Working with OSU and PNW, prepared LIDAR (light detecting and ranging) interpretive procedures utilized for ecological monitoring of the 2002 Biscuit Fire
 - Implemented a fire history study in Late Successional Reserves on Prospect Ranger District to aid in the understanding of how fire influenced the development and growth of old-growth forests
 - Completed comprehensive data processing of field collected records from the Biscuit and Tiller Fires for use in density and stocking analyses
 - Collaborated with Dr. Thomas Atzet to interpret and preserve valuable historic legacy ecological data from: 1965 Dick Waring, 1973 Bill Emmingham, 1975 David Milner, and 1965 – 1970 Siskiyou NF Air and Temperature data
 - Member of Forest Interdisciplinary (ID) Team for the Lower Rogue Vegetation Strategy – Gold Beach Ranger District
 - Forest-wide project scale mapping project



Aging old-growth stands on Lower Rogue, Gold Beach Ranger District, Oregon

- 2) Vegetation Classifications, Data Analysis, and Modeling
 - Interagency Mapping and Assessment Project (IMAP) FVS/VDDT verification process started, in cooperation with the Forest Silviculturist. VDDT (Vegetation Development Dynamic Tool) is a forest landscape model that simulates and compares the amount, age, and structure of vegetation types among varying future management scenarios. Our ecology program assisted PNW's Jim Merzenich and Allison Reger in the development of VDDT models for southwest Oregon's 16 potential vegetation types. This involved analyses of stand growth rates, disturbance probabilities (fire, insects, disease, and wind) and their effects on stand conditions, structures, and regeneration.
 - Potential Natural Vegetation (PNV) mapping and modeling review with Dr. Jan Henderson and Dr. Robin Lesher

Cooperation and Technology Transfer

- 1) Interagency Taskforces
- Participating member of the Northern Spotted Owl Recovery Plan Science Review Team

- Panelist on the Klamath Province Dry Forests Recovery Plan Science Team
- Prepared the ecology analysis section for the Rogue River-Siskiyou NF Forest Plan Amendment to incorporate Wildland Fire Use as a fire management tool
- Prepared responses to litigants in the Survey and Manage Species Environmental Impact Statement Lawsuit
- Thought about Climate Change
- Conducted field reviews of legacy pine plantations in preparation for the development of silvicultural prescriptions to enhance late-successional forest characteristics in the recently designated Cascade Siskiyou National Monument
- Participated on the regional Port-Orford-cedar (and root disease) Technical Review Team



Cascade Siskiyou National Monument pine plantation restoration in the newly designated Soda Mt. Wilderness

Review of Port Orford cedar disease resistance at the Dorena genetic laboratory



2) Collaboration

- Participating on the Fuel Reduction and Forest Health Multi-Party Monitoring Team in collaboration with TNC, Southern Oregon University, City of Ashland, the US Forest Service, and several Environmental Organizations
- In collaboration with multiple agencies and universities, published the "Influences of Climate, Fire, and Topography on Contemporary Age Structure Patterns of Douglasfir at 205 Old Forest Sites in Western Oregon" 2009. Poage, Nathan, Peter Weisberg, Peter Impara, John Tappeiner, Thomas Sensenig. Can. J. For. Res. 39:1518-1530.
- Preparing for publication "Long-term Stand Development Patterns in Old-Growth and Young Forests in Southwestern Oregon" with OSU's John Bailey and John Tappeiner
- 3) Outreach and Educational Development and Presentations: An important role of our ecology program is to assist in educational and professional development.
 - Participated on the teaching cadre for OSU Master Land Stewardship Course OSU Rogue Tree School, a "master gardener"-like program for woodland owners. Upon graduation participants will have prepared a long-term management plan for their property.
 - The Ecology program assisted the Ashland, OR. Parks and Recreation Department – North Mountain Park Nature Center, in the preparation of a field guide of the Vegetation History of the Bear Creek Watershed
 - Instructor in the OSU/Southern Oregon Small Woodland Association training program
 - Presentation: Coastal Ecosystem Ecology, Agness, OR
 - Presentation: The ecology of Lower Rogue River Vegetation, Curry County Fairgrounds
 - Presentation: Southern Oregon University's Tree School Program
 - Presentation: The geophysics of dry forest ecosystems at the TNC Dry Forests
 - Ecology Conference for State and County Land Managers
 - Instructor at the Interagency Silviculture Training, Oregon Caves National Monument
 - Presentation (field) for the University of Washington and Oregon State University Ecology Class – in conjunction with Jerry Franklin and Norm Johnson

Northwest Oregon Ecology Program (Area 6)

Mount Hood, Siuslaw, Willamette National Forests,

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

Team: Cindy McCain, Jane Kertis, Jeanne Rice, Robin Dobson, Richard Hardt, Nancy Sawtelle, Barbara Raible, Hugh Snook, Linda Geiser, Doug Glavich, Nancy Lankford, Cheryl Friesen, and Jenny Lippert

Projects

1) Successional Pathways/ IMAP

In a long-standing NWO ecology group project, ecologists and silviculturists have been describing the range of current stand conditions (structure and composition) and common successional trajectories for forests across northwest Oregon. This effort has become part of the regional Interagency Mapping and Assessment Process (IMAP) project to develop successional models and planning tools for assessing future management scenarios. The purpose of IMAP is to model the landscape cumulative effects of treatments, to predict future vegetation conditions and to model wildlife habitat. Using satellite imagery, FIA and environmental layers, the dataset uses GNN (gradient nearest neighbor) method to map current conditions useful for mid- to large-scale assessments. IMAP uses VDDT and Forest Vegetation Simulator (FVS) to develop state-and-transition models for each distinct ecosystem. Current ranges of tree density, size class distribution, species composition, and snag and down wood densities have been summarized for the 13 vegetation types found in northwest Oregon. Vegetation types vary from series level designations such as Sitka spruce to sub-series level types such as cool western hemlock. In FY09 we completed initial state and transition VDDT succession models for all the forested vegetation in NW Oregon.

We are now using the FVS to validate the VDDT model state and transition times and trajectories. Common trajectories include pathways under managed and natural disturbance regimes. Model validation and modification is on schedule for the end of FY10.

A draft of mapped initial conditions has been completed using attributes from the GNN coverage. Products due in FY10/11include: diagrams of common pathways, tables of ranges of structural and compositional attributes, and VDDT state and transition models. This information will feed into various efforts underway, such as Forest Service Forest Plan Revision, project plans, NEPA and silvicultural prescription documents. This information has already been used to refine the trajectory models for the pilot IMAP project in the Central Oregon Landscape Area (COLA), and is being used as a key component in a National Science Foundation grant with Oregon State University, the University of Oregon, and PNW Station.

Below is an example of the intermediate mountain hemlock model:



2) Landscape level deadwood assessment

The ecology program's objective was to provide the NW Oregon forests with summaries of existing deadwood conditions (using GNN) and reference deadwood conditions (using localized DecAid unharvested inventory data) to provide a basis for a forest-wide strategy for management of deadwood. In FY09, we analyzed updated imagery. This year we also incorporated recent large fires to better reflect large wood concentrations. We cooperated with the Regional Wildlife Biologist, forest and district level biologists to mesh data with DecAID-based analyses to bring landscape level coarse wood data into forest and project planning. Data revisions are ongoing. Preliminary examples were being circulated among NWO FS units for review. In FY10, the Mt. Hood NF plans to develop a forest-wide strategy; the Willamette NF biologist will develop templates and sample analysis for projects there. Products will be circulated among NF units as well as BLM units in Northwest Oregon.

 National Science Foundation Grant: The Interactions of Climate Change, Land Management Policies and Forest Succession on Fire Hazard and Ecosystem Trajectories in the Wildland-Urban interface

The NW Oregon Ecology group is working with scientists from University of Oregon, Oregon State University, PNW Research Station, and the R6 Regional Office to model interactions and feedbacks between human and biological systems under the influences of climate change and human population growth in the Willamette Valley and low foothills. We will be modifying the current potential vegetation types and VDDT modeling from the IMAP project and linking with climate change (MC1) and fire (FlamMap) models to predict vegetation change through time. This will be coupled with a human systems model that parameterizes people's likely responses to climate change, land use regulation and incentives, land markets, perceived fire hazard, land management costs, and aesthetic preferences. The project is in the first year of a four year cycle. We are just beginning to work out the specifics of the modeling, mapping initial conditions, and developing the climate change link to our IMAP products. This is a pilot project for the Region to develop a protocol to link our vegetation models to climate change projections.

4) Huckleberries—Tribal culturally significant species

Ecologist Jeanne Rice provided support to the districts on huckleberry restoration, revisiting existing photo monitoring plots and establishing new plots. She also supported ID team stand selection and incorporated the use of plant association guides. She will be working in FY10 with the PLASMA team to coordinate the Mt. Hood NF huckleberry management plan and timing to work with the Confederated Tribes of the Warm Springs.

5) Whitebark Pine

Developed the whitebark pine interpretative proposal for submission to the National program. Ecologist Doug Glavich participated in field data collection to record white bark pine blister rust conditions and complete plot species composition on Mt. Hood.

- 6) Special Habitats
 - Oak/pine existing and historic vegetation mapping: The objective is to map existing and historic oak and pine habitats across federal lands in NW Oregon and describe the range to stand types and ecological amplitude in which they are found. Oregon white oak, black oak, and ponderosa pine habitats have decreased dramatically from historical conditions throughout their range. This component of biodiversity provides habitat to over 200 wildlife species. The project can identify restoration opportunities for Forests and BLM Districts. The existing habitats are being mapped by NW Habitat Institute; historic mapping is being completed using GLO survey notes. In 2009, after consultation with the eastside districts and the Gorge, we contracted for completion of three orthoquads and four

townships on the eastside of Mt Hood NF for existing/historic habitat mapping. With completion of these contracts, ten paired map sets (existing and historic) is available for eastside Mt Hood and Columbia Gorge. In 2010, two more townships and one quad will be completed increasing our paired map sets to twelve. That leaves two more paired sets to finish mapping on. A white paper is planned for 2010 or 2011 to document this.



- Special Habitat GIS mapping: Building on existing/past efforts of Eugene BLM, Salem BLM, Willamette and Mt Hood NFs, the ecology program's objectives are to map special habitats as an important tool for biodiversity, habitat conservation, and monitoring climate change impacts, and to prepare for plan revision.
 - Mt. Hood NF: biologists' special habitat maps for 3 districts were recovered; we are still missing data from one district (Hood River)
 - Siuslaw NF: biologists, botanists, and ecologists worked out a strategy for assembling a special habitats GIS layer using existing information as a first draft of a Forest special habitats map and management database. Ecologists sampled a pilot group of high priority meadows to test field data collection methods. Priorities for assembling data: meadows in watersheds selected for FY10 planning, followed later by wetlands, dunes-related types, and historic conditions.
 - Willamette NF: the Forest completed aerial interpretation of portions of McKenzie River RD, long the biggest area of missing data on the Forest.



Invasive European beachgrass monitoring project

7) Local projects FY09

- Mutton Meadow fire monitoring, mixed conifer landscape planning,
- Environmental Management Systems EMS Unit representative,
- Mt Hood/Gifford Pinchot Plant Association workshop,
- Climate Change Forest liason,
- Mt. Hood NF Forest Plan Monitoring Report, focusing on key points on sustainability, EMS, RNAs and climate change;
- Challenge Cost Share review committee
- Research Natural Area strategic plan group;
- Siuslaw NF RNA monitoring;
- Heceta Areas of Critical Environmental Concern/FS invasive European beachgrass monitoring project;

- estuarine restoration monitoring (Siuslaw NF Drift Creek Alsea project);
- Willamette NF Special Habitats Management Guide revision;
- cooperated with Oregon Natural Heritage Information Center in analyzing riparian plant communities in the Willamette Valley.
- 8) Forest Interdisciplinary Teams (IDT):
 - Willamette NF—member of Jim's Creek IDT; oversight for the Rigdon dry forest project; Mutton Meadow spring vs. fall meadow monitoring of fire effects on understory native and non-native species as well as mortality and regeneration of Oregon white oak and pine
 - Siuslaw NF—Marys Peak Landscape Plan IDT; Salmon River Estuary Restoration IDT
 - Mt. Hood NF—forest wide deadwood strategy team

Consultation Cooperation and Technology Transfer

1) Torrey/Charlton RNA and Charlton Fire post-wildfire monitoring

- A paper summarizing post-1996 wildfire vegetation recovery in Torrey Lake Mire is in draft, and should be submitted for publication this fiscal year.
- A draft paper documenting snag and down wood patterns the first 10 post-fire years is scheduled for completion September 2010.
- 2) Annual Information sharing meeting (Area 6 Cheryl Friesen, lead)

The one day workshop explored available datasets, novel approaches for analysis, and technological visualization tools for exploring natural resources at the landscape level. Topics included a wide range of current efforts in the region that are pertinent to FS and BLM: IMAP and VDDT, BLM's Western Oregon Plan Revision—analytical surprises; Gradient Nearest Neighbor spatial coverages, LiDAR, FLAMMAP, and NETMAP.

3) Fire Regime Condition Class: Technology transfer sessions continue with the Willamette National Forest Fuels Group, the Middle Fork District and the Siuslaw National Forest fire group. We also worked with a fuels specialist on the Gifford Pinchot National Forest to conduct a Forest wide FRCC analysis. We reviewed and discussed appropriate interpretation and use in project planning, analysis and reporting. Ecologist Jeanne Rice assisted Regional Ecologist Tom DeMeo on field stops, stand history and instruction on the June 2009 FRCC workshop.



- 4) Oregon Oak Communities Fall Working Group: The NW Oregon Ecology group helped organize this one day meeting, highlighting ongoing and completed work on a landowner's property.
- 5) Analysis of fire effects in dry forest ecosystems: May '09 meeting. NW Oregon Ecology Group and the Central Cascades Adaptive Management Partnership (CCAMP) co-sponsored this information sharing meeting. The idea grew from Willamette NF's Middle Fork RD interest about burning and fire effects on dry site forests. The morning session outlined information about fire effects, species responses and fire history in these types, with an afternoon session of practitioners discussing what's worked and what hasn't worked.
- 6) Analysis and planning tools for landscape level fire planning: May '09 meeting. The training session was co-sponsored by the Ecology Program and CCAMP. This handson workshop focused on available fire behavior tools (FlamMap) to help fire specialists plan and implement fuels treatments at the landscape level.
- 7) Summer field workshop on montane and foothills meadow restoration: Two day workshop on Eugene BLM and Willamette NF. Presentations on restoration projects in a wide range of meadow types were followed by field trips to active meadow restoration sites in the Cascades.
- 8) Parks Creek IDT presentation, Willamette fuels group presentations
- 9) Plant Association Workshop—Gifford Pinchot NF: Ecologists provided a one day plant association training for new employees and a refresher for those that had the training before. The purpose was to show the utility of plant associations in the field and in landscape assessments. More than 30 people participated.

Program Goals FY2010 and beyond:

- Prepare for large scale forest planning: complete input necessary to run Interagency Mapping and Analysis (IMAP) scenarios for NW Oregon; test application of models in landscape planning projects
- Provide fire ecology information to our clients: produce GTR and journal article for post-fire studies at Warner Creek, Waldo Lake, as well as fire history of Willamette Valley foothills and report on Cascade Crest fire history; continue technology transfer and consultation with fire regime condition class (FRCC) analysis process and implementation.
- Provide information on special habitats: oak pine work, estuaries, alpine/subalpine meadows, Coast Range meadows, forest level mapping
- Train FS and BLM employees to understand and interpret plant communities in management for silviculture, wildlife, botany, and recreation. Broaden understanding of how potential natural vegetation models are integrated into planning and management models.
- Hold a conference on managing early seral habitats for NW Oregon
- Continue to provide support at the local and regional scales for FS and BLM

Staff: Tom DeMeo, Kim Mellen, Louisa Evers, Jim Alegria, Peg Watry

Administration

The ecology regional commitment was \$1.604 million in FY09, a 3.4% increase over the FY08 level, and 9% greater than the FY07 budget. Ecologists were also actively developing VDDT models and mapping for IMAP, and contributing to the migration of NRIS data to the central Kansas City server, which is now complete.

We are building our capacity for data analysis, GIS, and website needs at the Regional level. In FY09 Sara Lovtang joined us as a contractor, and has been assisting with adding material to the IMAP portion of our website (http://ecoshare.info). Sara has also been meeting some Central Oregon ecology program needs, such as preparing the riparian scorecard guide for publication. FY09 also saw a major metamorphosis in ecoshare. The site (www.reo.gov/ecoshare) was becoming untenable because of old software and a rapidly changing Forest Service web environment. After a lengthy process of working with the Regional Data Resource Management (DRM) unit to craft the best solution, it was decided to not house ecoshare on a Forest Service server. Late in the fiscal year, website manager Steffen Rasile was hired as a Tetra Tech contractor, and crafted the new site. The new ecoshare also encompasses IMAP (Regional vegetation mapping and monitoring), at least for now.

We were fortunate to add two ecologists to the cadre in FY09. Sabine Mellmann-Brown became the Northeast Oregon area ecologist in July (filling the position vacated by Charlie Johnson), and Ken Stella joined the group in a new position on the Malheur National Forest. Sabine came to us from the Nature Conservancy in Montana. Ken is considered part of the Northeast Oregon ecology team, and converted from a SCEP position.

Regionally, the vegetation zone layer of the Henderson potential natural vegetation layer was completed wall to wall for Oregon and Washington. Kudos to Jan Henderson, Robin Lesher, Chris Ringo, and others for this achievement. In FY10 we are striving to finish the plant association group (PAG) layer, now being completed by Miles Hemstrom's landscape assessment team, in cooperation with Mike Simpson and Sabine Mellman-Brown of the ecology program.

We are assisting the silviculturists in migrating to FSVeg Spatial, the agency's NRIS standard for local existing vegetation mapping. In FY09 we facilitated agreement on a standard polygon numbering system for the Region, and Forest began migrating their data. By the end of the fiscal year the Malheur NF had been migrated, and four other Forests were nearing completion.