# NORTHWEST OREGON ECOLOGY GROUP NEWSLETTER

Version 4.0
March 2005

The Northwest Oregon Ecology Group is an association of ecologists with a wide range of interests from the Mt. Hood, Siuslaw and Willamette National Forests, the Columbia River Gorge National Scenic Area, and the Eugene and Salem Bureau of Land Management Districts. The group works from local to regional scales to provide tools, assessments, and analyses for ecological issues for planning, managing and monitoring forest ecosystems in NW Oregon. Through their own efforts, and affiliation with ecologists with Oregon State University, University of Oregon, Oregon Department of Fish and Wildlife, and private consultants, they have developed products most resource managers use every day.

## Wetlands After Wild Fire

Cindy McCain, Ecologist, Siuslaw and Willamette National Forests

Torrey/Charlton Research Natural Area on the Middle Fork RD, Willamette NF, lies just north of Waldo Lake. The RNA contains a variety of wetlands and small lakes on the gently rolling high elevation plateau. In 1993, a set of transects crossing from forest through wetlands was established to monitor vegetation dynamics across the ecotone between the ecosystems. In 1996, the 10,000 acre Charlton Fire roared across the area.

The NW Oregon Ecology Group and partners have been monitoring the recovery of the wetlands. In the 8 years of data collection, we have documented the response of the wetlands. In the wet zones, we saw rapid recovery of the original species to pre-disturbance abundance. The margins have more woody species which are slower to return to their earlier cover. The forested ends of the transects are very slow to recover the understory.

The fire caused nearly complete mortality near the study wetlands. Lodgepole pine seedlings are sparse. Forest regeneration is slow in the severely burned old growth stand.

The biggest pulse in snag fall seems to have begun in 2003. Fine twigs are disappearing; bark is sloughing; tops are beginning to come down. The rebar marking the ends of some of the transects has been nearly buried in fallen branches. As more of the old stand drops out of the canopy, logs drop into the wetlands. This creates microsites for species requiring better drainage. The opening up of the surrounding stands also means that the temperature/snowpack conditions of the wetland will see ongoing changes.

This monitoring project at Torrey/Charlton RNA illustrates the great value of Research Natural Areas in focusing studies of critical examples of our ecosystems, and collecting data for understanding dynamics of these communities under natural conditions.

[Cindy McCain (NWO Ecology Group), Jenny Lippert (Willamette NF Forest Botanist), and Sarah Greene (USFS R6 RNA coordinator-Corvallis) have been the most constant investigators. Another major contributor is John Christy, Oregon Natural Heritage Information Center ecologist, wetland specialist, and moss expert.]

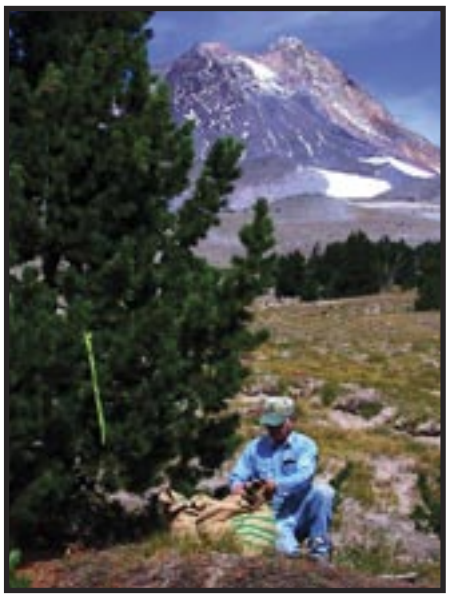
*1993*

*1996*

# Status of Whitebark Pine Populations in Oregon & Washington

Jeanne Rice, Ecologist, Mt. Hood National Forest

Whitebark pine serves several important ecological functions in upper subalpine ecosystems and determines the ability of many other species to exist in high elevation communities on the majority of National Forests in Region 6. Due to white pine blister rust, a non-native invasive pathogen, whitebark pine is declining in Oregon and Washington. In recent surveys, on average more than 25% of whitebark pine trees were infected, in some cases as high as 100%. Mortality averaged 27%. As a nonnative disease, white pine blister rust was recognized as a high priority concern. With 98% of all whitebark pine communities on public land, along with the National Park Service, the Forest Service bares primary responsibility for addressing rapid decline due to both blister rust and fire exclusion.



Cone collection on Mt Hood

In 2005, regional commitment funding was received to begin a 4-year interagency program to collect baseline information and develop conservation and restoration plans for whitebark pine stands in Oregon and Washington. This includes the completion of a distribution map, assessment of stand conditions especially in regards to white pine blister rust incidence and intensity, and determining the patterns of genetic variation across the landscape. Achieving a better understanding of the status of the whitebark pine stands on our local landscape will contribute to a unified approach to the development of conservation needs and restoration opportunities across the region.

## Accomplishment Schedule with continued funding:

**FY05:** Summary report of health assessments, species range map, identification of core attributes when surveys are done
**FY06:** Genetics assessment report
**FY07:** Conservation strategy
**FY08:** Restoration plan

## Cooperators to date:

North Cascade National Park
Olympic National Park
Olympic National Forest
Mt. Baker-Snoqualmie National Forest
Gifford Pinchot National Forest
Okanogan National Forest
Wenatchee National Forest
Colville National Forest
Mt. Hood National Forest
Willamette National Forest
Umatilla National Forest
Confederated Tribes of Warm Springs
Forest Health Protection

## Status:

From 2002 to 2004, a number of forests in Oregon and Washington made preliminary assessments of blister rust infection and mortality. Infection rates recorded on the Olympic, Mt.Baker-Snoqualmie and the Okanogan and Wenatchee National Forests ranged from 15% to 61% with an average of 28%. Mortality from all causes ranged from 16% to 41% with a mean of 21%.

On the Mt. Hood National Forest, whitebark pine occurs in the upper montane and subalpine habitats surrounding Mount Hood and patches of high elevation habitat to the east of the mountain. Blister rust infection on live trees ranged from 23% to 90%, with a mean of 62%. Overall mortality from various causes ranged 5-89% with a mean of 47%. Mountain pine beetle incidence was less than 1%.

On the Willamette National Forest, whitebark pine occurred primarily on high elevation habitats on the eastside of the Cascade Crest. Blister rust infection on live trees ranged from 5% to 100%, with a mean of 43%. Overall mortality from various causes ranged from 11-59% with a mean of 35%. Mountain pine beetle incidence was 11%.

On the Gifford Pinchot National Forest, white bark pine occurred on the flanks of Mt. Adams with additional patches near the Cascade Crest. Blister rust infection on live trees ranged from 10% to 100%, with a mean of 53%. Overall mortality from various causes ranged 0-29% with a mean of 8%. Mountain pine beetle incidence was 0%.

In 2003, cone collections were conducted on the Mt. Hood and Warm Springs and seed sent to the Dorena Genetic Resource Center for blister rust resistance testing and production of seedlings

In 2005, in collaboration with the Confederated Tribes of Warm Springs, the Mt. Hood and Willamette NF will complete a status report on health and distribution of local whitebark pine communities. Both the Mt. Hood NF and Willamette NF will participate in the regional efforts in the whitebark pine interagency conservation strategy and restoration plan.

Fall 2003 cone collection on Mt Hood

# Temporal and Spatial Variability of Historic Fire Frequency in the Southern Willamette Valley Foothills of Oregon

Danielle Robbins, Department of Forest Resources, Oregon State University

A crossdated fire history was reconstructed for a 1562 km$^2$ area in the southern Willamette foothills of Oregon, using fire scars and tree origin years from twelve sites. The purpose of this study was to determine fire frequency for each site and to quantify temporal and spatial variability of fire frequency. Fire frequency distributions were related to climate history and the patterns of human settlement, and compared with other regional fire histories.

Dendrochronological methods were used to assign calendar years to fire scars and pith dates. General Land Office maps and surveyor notes were used to determine site and study area level changes in vegetation and Euro-American land use patterns. Climatic influence on fire over time was determined using superposed epoch analysis.

Forty-three fire dates were reconstructed for the 290 year period from 1700 to 1990. The minimum and maximum fire intervals were two years and 191 years; the study area mean fire return interval was 49 years. Over two-thirds of all site level fire intervals were less than 40 years, and less than one-fifth were longer than 80 years.

Fire frequency differed between the east and west sides of the Willamette Valley. West side sites experienced more frequent fires on average than the east side sites: 57% of all west side site fire intervals were less than 20 years, while 68% of all east side site fire intervals were less than 40 years. Both human and vegetative factors were potentially influencing the fire regimes of each side of the valley. West side sites were within, or adjacent to, woodland forest cover types and were closer to earlier and more intensive Euro-American settlement.

Fire frequency throughout the study area did not change substantially over time. Fire occurred every decade or so, with occasional longer fire intervals, until after 1905, at which time fire occurred roughly every 15 to 20 years until 1979. Unlike other regional fire history studies, this study found no statistically significant differences in the number of fires by time periods of varying land use and climate. When the rule set for defining fire events was modified, fire frequency could be shown to be weakly significantly associated with these time periods. This indicates that methodology can appreciably influence the results of fire history reconstruction. Moreover, the sample size of trees dating from the 1700s was small, so the estimate of fire frequency for the 1700s is uncertain.

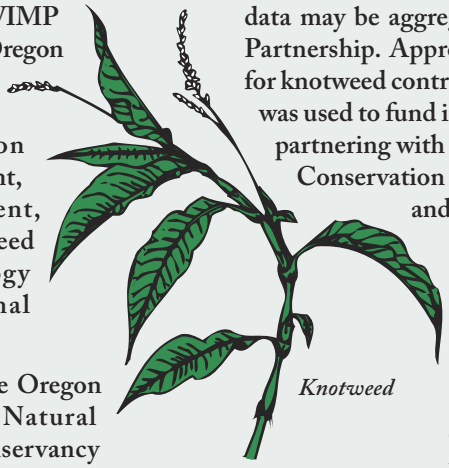
Fire frequency was not related to drought over the whole study period (1700-1990), but fire was more likely to occur three years following a drought year over the period from 1700 to 1849, whereas after 1850, fire was significantly associated with drought years. Fire occurrence was as expected (but not significantly so) during the period 1700 to 1800, slightly higher than expected (but not significantly) for the period 1800 to 1850, higher than expected (but not significantly) after 1850, and lower than expected (but not significantly) after 1925. Several hypotheses could explain these findings: (1) the relationship between wildfire and drought is different during cooler, wetter periods than warm, dry periods; (2) Native Americans influenced fire during the 1700-1849 period, obscuring the relationship between fire and drought; (3) European settlement of the Willamette Valley in the mid to late 1800s increased the occurrence of fire and enhanced the effects of a warming climate, and (4) fire suppression after 1920 resulted in a decrease in fire occurrence.

More sampling of older stumps in the Willamette Valley foothills would likely lend credibility to the record of fire frequency before 1800 and would increase the sample depth for use in the Superposed Epoch Analysis of the fire-drought relationship. Sampling along transects extending from the foothills into the Cascades and Coast Ranges would foster a better understanding of the spatial scope to which Native American burning influenced forests adjacent to the valley floor.

# Northwest Oregon Invasive Weed Management Partnership

Jennifer Lippert, Forest Botanist, Willamette National Forest

Many readers will have heard the acronym NOWIMP during the past couple of years. The Northwest Oregon Weed Management Partnership (NOWIMP) encompasses the whole of northwest Oregon and was developed to streamline work on regional weed issues such as data management, grant-writing for on the ground treatment, facilitating development of Cooperative Weed Management Areas (CWMAs), technology transfer and development of educational materials.



*Knotweed*

Members of NOWIMP are working with the Oregon State's Weed Control Program, Oregon Natural Heritage Info Center and The Nature Conservancy to develop baseline inventory and reporting criteria so that data may be aggregated to determine priority work within the Partnership. Approximately $150,000 in grants were obtained for knotweed control projects and in 2004 a portion of this money was used to fund inventory and control projects in 6 watersheds, partnering with both Watershed Councils and Soil and Water Conservation Districts. By 2004 five CWMAs had formed and developed Memoranda of Understanding for weed management and yearly business plans (priority actions, target species lists, etc.). As of March 2005 there are over 80 state, federal and county members. The Partnership also managed a grant that was responsible for putting together an inventory of available educational materials and development of a public school curriculum.

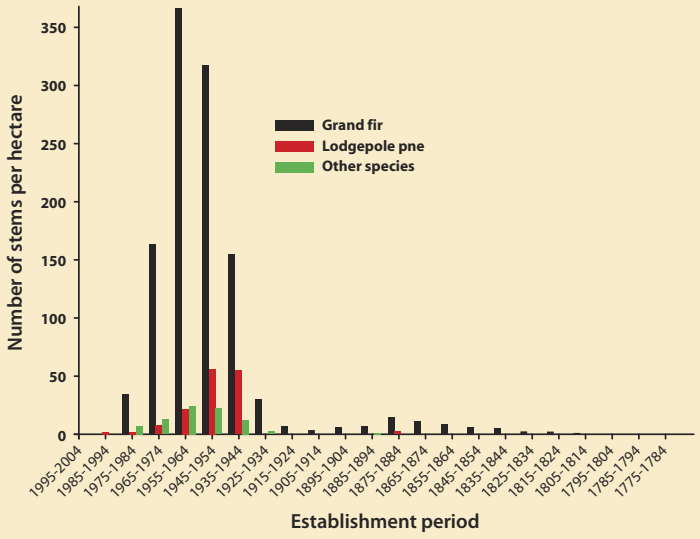
# Restoration of Montane Meadows in Western Oregon: Research and Adaptive Management at Bunchgrass Ridge

Charles B. Halpern, Research Professor, University of Washington
with Ryan Haugo, Nicole Lang, and Joe Antos from the University of WAshington,
and Fred Swanson from the USFS Pacific Northwest Research Station

Mountain meadows comprise a small portion of the largely forested western Cascade landscape, but serve many important ecological and societal functions. However, decades of fire suppression and changes in climate and/or grazing pressure have led to recent (and often dramatic) expansion of forest into meadow. Faced by gradual loss of these habitats, federal land managers have begun to experiment with prescribed fire as a potential tool for restoration. With funding from the Joint Fire Science Program we have initiated studies at Bunchgrass Ridge to improve our understanding of the ecology and dynamics of montane meadows and to guide strategies for their restoration and maintenance.

Bunchgrass Ridge forms a gently sloping plateau at ~4300 ft elevation in the western Cascade Range, adjacent to the Mt. Washington Wilderness. It was designated a Special Habitat Area in the 1990 Willamette NF Land and Resource Management Plan and was identified as a high-priority restoration project during the 1995 Upper McKenzie Watershed Analysis. Because it supports a large mosaic of meadow and forests of varying age, it provides an ideal setting for studying the process of conifer encroachment and for experimenting with restoration. Several studies are in progress:

1. Spatial and temporal patterns of conifer encroachment and associated changes in ground-layer vegetation. This research provides the historical and ecological context for subsequent studies that address the potential for restoration. In four 1-hectare (100 x 100 m) plots all trees >1.4 m tall have been spatially mapped, measured for diameter, and aged (from increment cores or basal sections). Detailed measurements of understory composition were taken in 10 x 10 m subplots within each plot. A composite age structure reveals two periods of forest expansion at Bunchgrass: a broad window of establishment between 1815 and 1905, and more



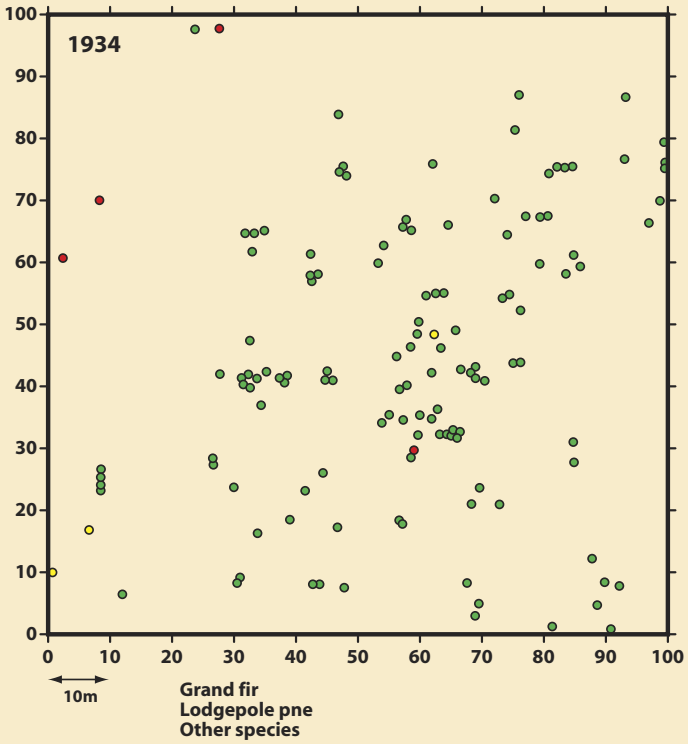

*Age structure of trees illustrating two distinct periods of encroachment*

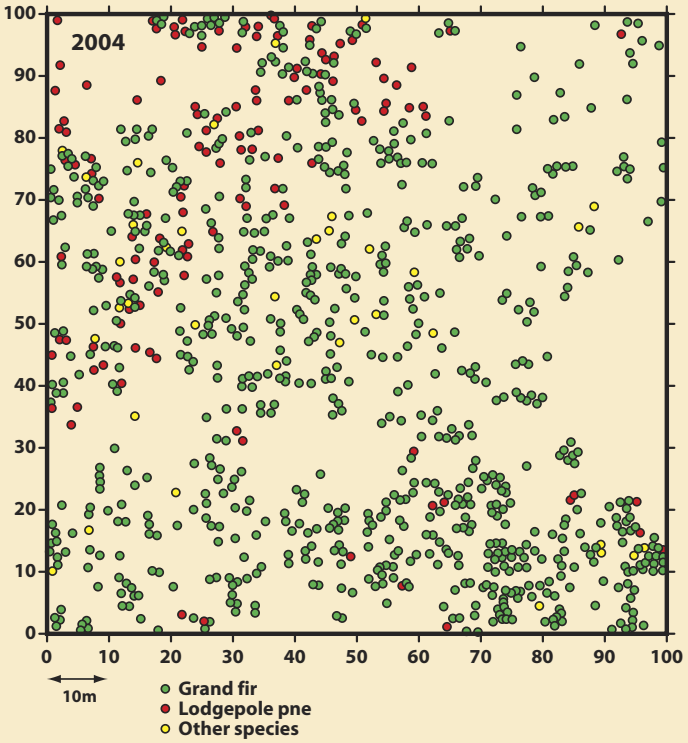
recent and massive recruitment between 1925 and 1985. During both periods, establishment of lodgepole pine preceded that of grand fir — a pattern that is clearly evident in the spatial clumping of grand fir around live and dead lodgepole pine. Future work will explore in detail the spatial and temporal patterns of encroachment and the associated changes in ground-layer vegetation.

2. Composition and dynamics of the soil seed bank and its potential role in meadow restoration. A second study explores the below-ground dynamics of this system. It poses the question: Does the composition of the soil seed bank change as meadows are replaced by forest, and by implication, can the seed bank serve as a source of propagules for meadow species if trees are removed or sites are burned? Soil samples were extracted from >200 subplots representing a gradient from open meadow to old forest. Samples were spread in germination flats in the greenhouse and seedling emergence has been monitored. A total of 47 taxa have been identified (compared with >130 species in the above-ground flora). Most germinants were early successional species, although the dominant sedge at Bunchgrass, Carex pensylvanica, was also well represented in the seed bank. Future analyses will explore relationships between seed bank composition and forest age, structure, and understory composition.

3. Vegetation responses to experimental restoration treatments. We are in the initial stages of a large, replicated experiment that examines vegetation responses to restoration treatments. Three replicates of each of three treatments will be applied to a total of nine 1-ha plots. Treatments include a control, complete overstory removal, and complete overstory removal plus prescribed burning of residual slash. These comparisons will allow us to test whether fire is necessary to achieve restoration goals or whether removal of the overstory is sufficient. Pre-treatment sampling of overstory structure and understory composition was completed in 2004. Tree removal was scheduled for winter 2005, but has been delayed because harvest requires a snowpack to reduce impacts to ground vegetation.

We have designed these studies to yield useful short-term products for scientists, managers, and the public, and to provide opportunities for long-term research and education. Participants include faculty and students from the University of Washington, Oregon State University, and University of Victoria, scientists from the USFS-PNW/Andrews LTER, and land managers from the USFS McKenzie River District. Our goal is to develop an ecological basis for restoration of meadows in the western Cascades, using Bunchgrass Ridge as a center for research, adaptive management, and outreach.




*Reconstruction of the density and spatial distribution of conifers in 1934 and 2004.*

# Workshop Success! Using Past Ecological Conditions In Resource Planning: Status of the Science and Application Experience

The Northwest Oregon Ecology Group co-sponsored this workshop on January 25, 2004, at LaSells Stewart Center, Corvallis, Oregon. Over 200 natural resource professionals from throughout the Pacific Northwest pre-registered, and over 400 were in the auditorium at its peak. There was tremendous interest in this topic.

Did you miss this Workshop? If so, there are two ways to access the information that was shared:

1. Cruise to OSU's Streaming Media Archive page:
   http://oregonstate.edu/media/archives.php
   At this site, you can watch video coverage of each speaker...or sit back and watch the whole conference! You'll need RealPlayer loaded on your computer before doing this. USFS employees: To load RealPlayer, go to "Start," "Programs," "Real," and "Realplayer." Select to upload the software, and you'll be ready to go. For other agencies, see your IT folks.
2. Cruise to the AMA Website
   http://www.edo.or.blm.gov/ccama/happening.htm
   At this site, you can view the powerpoint presentations provided by the speakers. There will also be additional papers provided at this site.

## HRV References

Bruce Marcot, Scientist with the USFS Pacific Northwest Research Laboratory, compiled a terrific bibliography of papers discussing the use of historic/ natural range of variability. You can download them from: www.edo.or.blm.gov/ccama/happening.htm

# Synthesizing Long-Term Studies: BLM Settlement Agreement Offers Opportunity and Challenge

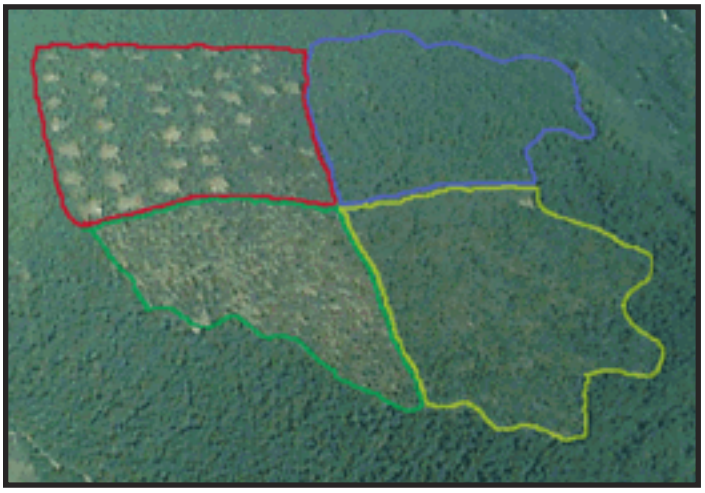
Cheryl Friesen, Science Liaison, Willamette National Forest and Central Cascades Adaptive Management Partnership
and Fred Swanson from the USFS Pacific Northwest Research Station

An opportunity to synthesize interim results from long-term studies presented itself in 2003, following a Settlement Agreement between the American Forest Resource Council (AFRC) and the Bureau of Land Management (BLM). The US Forest Service (USFS) and PNW Station are involved through the Central Cascades Adaptive Management Area (CCAMA). Our challenge is to synthesize information in two areas for use in the BLM's Plan Revision process:

1. The use of historic disturbance regimes in planning landscape management -- exemplified by the Blue River Landscape Plan and Study (and the Augusta Landscape Plan before that). This synthesis could provide science-based rational for minimizing extent of reserves, a challenge for BLM's plan revision.

*Central Cascades landscape: a challenge for using historic ranges of variability for future management.*

2. Three experiments on management of 30-50-year-old plantations (Young-Stand Thinning and Diversity Study (YSTD), the Uneven-Aged Management Study (UAMP), and the Density Management Study are relevant to the issue of providing old-growth attributes in managed forests, also a BLM issue.



*The Young Stand Study: testing alternative approaches to managing young stands.*

The time frame for this work is set in part by the desire to have relevant information available to BLM for use in their plan revision process. Therefore, we aim to begin delivering results before the end of this fiscal year, but some components of the work will extend into the next fiscal year.

The expected products from this work include one PNW General Technical Report each for the landscape and young stand management syntheses, journal articles, webpage documentation of all parts of the work, and one masters thesis (the social science part of the landscape work).

The tasks include the following:

## ALTERNATIVE APPROACHES TO LANDSCAPE MANAGEMENT

**Summarization of the steps involved with development and implementation of the Blue River Landscape Strategy, including adaptive management loops. This will include evaluation of successes, challenges, and barriers that influenced development and implementation of the project on-the-ground.

**Analysis of monitoring results and evaluation of initial management effects from implementation of the Blue River Landscape Strategy. This includes managing, analyzing, and interpreting the monitoring data collected to date on upland and riparian vegetation, stream temperature, channel morphology, and amphibians.

**Summarization of the Blue River Landscape Strategy approach to road and watershed management.

**Study the reaction to the Blue River Landscape Plan ideas and treatments by key public, agency personnel, and scientists.

** Evaluate the relevance of the concept of using an understanding of landscape dynamics for planning landscape management to other lands and ownerships in western Oregon and elsewhere in the NWFP area.

## ALTERNATIVE APPROACHES TO YOUNG STAND MANAGEMENT TO ACHIEVE LATE-SUCCESSIONAL CONDITIONS

**Assessment of the Uneven-aged Management Project, designed to evaluate ecological and economic trade-offs involved in converting young Douglas-fir plantations at mid-elevation in the central Oregon Cascades to a mixed species and uneven-aged condition.

**Synthesis of young stand studies, with the goal of reviewing what has been learned from thinning studies and make that information available in a format to facilitate use by forest managers. This will include summarizing the current status and findings of the Uneven-aged management project (UAMP), young stand thinning and diversity study (YSTDS), and Density management study (DMS).

# Successional Trajectories of an Historic Oak-pine-fir Savanna and Strategies For Restoration as a Function of Within-site Spatial Heterogeneity

Bart R. Johnson, Dept. of Landscape Architecture, University of Oregon; Karen Sonnenblick, Dept. of Biology, University of Oregon; Jenna Garmon, Environmental Studies Program, University of Oregon, Jane Kertis, Siuslaw National Forest; Jenny Lippert, Willamette National Forest, and Scott Bridgham, Dept. of Biology, University of Oregon

Oregon white oak savanna, once common in Oregon's Willamette Valley, has been reduced to less than 1% of its former extent. This loss has important implications for biodiversity conservation due to the large numbers of native plants and animals that depend on this habitat type. The 683-acre Jim's Creek stand has been identified by the USFS for restoration of oak-pine savanna due to its important ecological and cultural values. In particular, the site's historic mosaic of meadow, savanna, woodland and forest are threatened by the rapid encroachment of Douglas-fir due to fire suppression and potentially to the cessation of Native American burning following Euro-American settlement (circa 1850). This study was designed to provide sound scientific data and analysis to support restoration decision-making. We analyzed tree species composition along five 30-m wide belt transects over a total length of 3660 m. In each 60-m long transect segment, we recorded data on the location, environment, and condition of all oaks (live trees, snags and logs) and all conifers > 100 cm DBH. In addition, we sampled one 200-$m^2$ circular subplot per segment in which we recorded data on tree, shrub and ground layer composition, and site physiography. We used these data to develop a spatially explicit understanding of the site's historic vegetation structure in relation to site conditions, and to compare this to current conditions. Large presettlement trees appear to be evenly distributed among Oregon white oak, ponderosa pine and Douglas-fir. Historically, oaks were present in a wide variety of environmental conditions. Over the last 150 years, they have been increasingly restricted to harsher sites, principally the edge of meadows with shallow soils and exposed outcroppings on hot exposures. Nearly all living oaks suffer increasing competition and crown loss. Many large legacy oaks might stabilize and/or recover if released from competition soon, but will continue to decline rapidly without intervention. Large savanna-form ponderosa pine and Douglas-fir occur in low densities across the site, but are also concentrated in specific areas and habitats types; many are also in decline, apparently due to competition from younger trees. We used our results to develop several alternative restoration scenarios, and to examine the consequences of implementing the different silvicultural prescriptions. Our analysis focuses on several key, and sometimes competing, values for restoring spatially heterogenous savanna structure: protecting legacy savanna trees, restoring presettlement spatial patterns and habitat functions, maintaining important current habitat values, lowering fuel loads to protect against catastrophic wildfire, reducing the impacts of restoration treatments, and minimizing the costs of long-term management. For example, restoration strategies that focus on areas with living oaks and pines will not restore the habitat diversity of presettlement conditions due to the differential losses of oak and pine on more mesic habitats. More extensive strategies to recreate savanna in mesic areas that have been almost completely converted to conifer forest could add greater diversity and accelerate recovery, but also carry the cost of requiring more frequent interventions to inhibit conifer succession.

*Oak Savanna photo: Ed Alverson*

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The NW Oregon Ecology Group relies on a variety of professionals throughout the area to support their activities. The following ecologists and biologists also contribute to the program.

Linda Geiser, Lichenologist and Air Quality Specialist,
Siuslaw National Forest.
Specialty: Lichens.

Tom O'Neil, Ecologist,
Northwest Habitat Institute.
Specialties: Oak restoration, biodiversity data management.

John Christy, Ecologist,
Oregon Natural Heritage Information Center.
Specialties: Wetland ecology and mosses.

Martin Brown, Consultant.
Specialties: Statistics.

Fred Hall, Plant Ecologist.
Specialty: Special Habitats.

Walt Kastner, Silviculturist,
Siulsaw National Forest.
Specialty: Tree diseases.

Dave DeMoss, Silviculturist,
Eugene BLM.
Specialty: Forest Ecology.

John Cissel, Research Liason,
Western Oregon BLM.
Specialty: Landscape modeling.