

VII. MONITORING

Monitoring is critical to evaluating success in achieving late-successional structural and compositional characteristics across the landscape. The long term goal is to provide future managers, scientists, and citizens with better information and the opportunity to evaluate the effectiveness of different management approaches to achieving LSR objectives.

Many of the important issues about how to manage for older forest conditions will take at least 20 years to *BEGIN* to address. Although the response time is relatively short in terms of forest ecosystem development, it is much too long for human careers. We must set-up and implement our management activities so future natural resource managers can evaluate the effectiveness of the treatments we prescribe. The Monitoring and Evaluation Plan in the Northwest Forest Plan (ROD E:3-12) contains a general framework for the kinds of information to collect and the Research and Monitoring subgroup of the REO is developing more specific guidance. The *Monitoring* Chapter in the Northern Coast Range Adaptive Management Area Guide (USDI USDA 1997) suggests variables that could be monitored in order to address issues and questions specific to this assessment area. These issues include: late-successional forest, species of concern, riparian species and habitat, human communities and adaptive management. The Northern Coast Range AMA web site* lists ongoing and potential research and monitoring opportunities, some of which are described in the *Research and Learning* Chapter of the AMA Guide (*<http://www.fsl.orst.edu/coop/ama/ncama>).

Monitoring Questions and Evaluation Methods

The following questions should be considered for monitoring in this assessment area. The proposed evaluation methods further define some of the critical components which should be monitored to evaluate the questions over time.

Forest Composition and Structure

Questions: Is the amount of forest in late-successional habitat increasing in the LSRs? Are thinning prescriptions obtaining the desired results? How much CWD can we leave without incurring unacceptable levels of damage from disease, insects and fire?

Evaluation Methods: Monitor structure at the stand level such as number and quality of snags, coarse woody debris, etc. Determine if vegetation characteristics are being created/maintained at a landscape level by sampling at the stand level. Use data from the existing PRIME (Pacific Resource Inventory Monitoring and Evaluation) and CVS (Current Vegetation Survey) plots established within the AMA. Monitor insect populations and disease levels which have the potential to hinder the attainment of LSR objectives (i.e. - Douglas-fir and Sitka spruce bark beetles, and Swiss needle cast). The Hebo Restoration Study will provide data pertinent to several of these questions.

Interior Forest

Question: Is the amount of interior forest increasing? Are microclimates within the interior forest stabilizing? Interior forest habitat conditions and area may be increased by altering the structure of plantations next to or within existing older forest patches. Accelerating the development of these plantations to more nearly approximate the characteristics of the surrounding forest should stabilize microclimate changes at the perimeter and interior of older stands. These changes in humidity, temperature, light and wind have important implications to growth rates, species composition and organic matter decomposition rates (Concannon 1996, Chen 1991).

Evaluation Methods: Amounts of interior forest can be determined from aerial photographs. Evaluation of changes in microclimate would require field research. At this time, monitoring populations of wildlife and plant species which are most sensitive to these microclimates may be the most effective tool for answering microclimate questions.

Connectivity

Corridors connecting late-seral landscapes were identified in this assessment.

Questions: Are corridors functioning as intended? Are Riparian Reserves functioning as corridors between blocks of late-successional habitat?

Evaluation Methods: Tag, or use other methods for tracking, species with varying degrees of mobility. Continue of practice of banding owls and following up with annual surveys; where feasible, use radio-telemetry to track tagged owls.

Fish, Wildlife and Plant Species Composition and Trends:

Questions: Are the abundance and health of late-successional species populations increasing? Are some species missing that should be in the assessment area? Are key habitat components available for all late-successional species? Are habitat conditions for owls improving and are owl reproduction and survival rates increasing? Are "at risk" non-late-successional species being precluded? Are key habitat components missing that would help maintain the population viability of these species? Is microhabitat appropriate for animal species with small home ranges and plants?

Evaluation Methods: Survey to determine current species composition and population trends, and monitor repopulation of the assessment area by late-successional species. Particular focus should be given to listed and proposed species, federal species of concern, and survey and manage species. Evaluate habitat components by determining soil temperature and moisture, relative humidity, wind speed, micro-organisms, and specific CWD types and characteristics. Much of this habitat data could entail extensive research. Protocols are being developed for "survey and manage species". Lichens are being studied as an air quality monitoring tool. Stream surveys are conducted annually for fish and a study of amphibians in the South Fork of Schooner Creek is ongoing. Most of the existing spotted owl sites are monitored by federal and state research biologists or industrial forest owners. These efforts, along with marbled murrelet surveys, should be better coordinated to encompass more sites with a uniform survey effort. The impacts of disturbance on marbled murrelets are being monitored by Oregon Department of Forestry at occupied sites on state lands.

Special Forest Products:

Questions: Is the harvest of special forest products negatively impacting late-successional species and their habitats? Are the existing guidelines for harvest being followed?

Evaluation Methods: Study harvest levels and recovery rates to identify the effects of special forest product harvest on late-successional forest habitat. Continue the Hebo moss harvest study and use it to learn how to design other special forest product studies in the future, as opportunities arise. Evaluate firewood policy effects on LSR, considering the value of leaving CWD on the site to meet wildlife habitat needs and maintain soil productivity, and the potential that it could be used for structure in fish habitat improvement projects, versus removing it as fuelwood. Study the effectiveness of treatments performed under "Salvage Guideline d" (Chapter VI) to determine if such treatments reduce fuelwood theft in LSRs; if not, eliminate or modify them.

Special Habitats:

Question: Are special habitats being adequately maintained?

Evaluation methods: Conduct field surveys and monitor population abundance and trends. The Nature Conservancy monitors Oregon silverspot butterfly populations on their preserve and on National Forest System lands. The Forest Service maintains habitat for the butterfly on a yearly basis. Special habitat management often involves the reduction/elimination of noxious/invasive weed populations and the control of off-road vehicle use in maintained meadows or native dune-grass areas.

Noxious and Invasive Species:

Question: Is the abundance of noxious and invasive species decreasing?

Evaluation methods: Conduct field surveys using agency and county weed control experts. Monitor areas where biological controls have been released or where manual control occurs on a regular basis. Monitor forest understory for spread of holly and English ivy.

Roads:

Questions: What are the trends in density and condition of roads? Are LSR and Aquatic Conservation Strategy requirements being met (especially in Key Watersheds)?

Evaluation Methods: Continue to evaluate the Siuslaw Access and Travel Management guide (ATM) and the Salem District, BLM, Transportation Management Objectives (TMOs, currently being developed) to insure that they will meet long term LSR objectives. Use maps and aerial photos to determine and document locations of roads. Conduct field surveys to evaluate needs for road closure and monitor effectiveness of closure methods.

Aquatic Conservation Strategy:

Questions: Are the abundance and health of aquatic and riparian dependent species populations increasing? Are instream and riparian habitat restoration projects achieving their intended results?

Evaluation methods: Use field methods and surveys to monitor water quality, species populations and habitat quality. Use aerial photographs and satellite imagery to monitor changes in riparian vegetation.

Recreation:

Recreation can impact water quality, soil productivity, and sensitive, federally threatened and/or "survey and manage" species through disturbance or habitat modification.

Question: Are recreational opportunities and existing uses in the assessment area compatible with or preventing attainment of LSR objectives?

Evaluation Methods: Monitor campgrounds and well known dispersed campsites for potential impacts to water quality and sensitive species. Monitor hiking, livestock, mountain bike and OHV trails for soil compaction, impacts on water quality, introduction or spread of noxious or invasive plant species, and habitat modification (including impacts on plants, invertebrates, amphibians and small mammals).

Monitor noise disturbance and habitat impacts from OHV use, which may preclude or inhibit use of the LSR by late-seral forest associated species. Surveys could include the number and condition of trails, estimates of number of users, and daily and seasonal patterns of use. Monitor existing wildlife and plant populations and changes over time in population levels and/or demographics. Study should be made on the OHV trail classification system (open, limited, and closed) to determine if these classifications are compatible with the LSR allocation or if adjustments need to be made on a local or large scale basis.