Appendix E
Monitoring Plan

Monitoring Plan

Monitoring is the process of collecting information to evaluate if objectives and anticipated or assumed results of a management plan are being realized or if implementation is proceeding as planned. Three types of monitoring are considered in this monitoring plan: implementation, effectiveness and validation monitoring. Monitoring will provide information to determine if the standards and guidelines for a Late-Successional Reserve are being followed (implementation monitoring), verify if projects are achieving the desired results (effectiveness monitoring), and determine if underlying assumptions are sound (validation monitoring).

Along with the monitoring proposed in this plan additional monitoring would occur in accordance with the Medford District RMP Monitoring Plan (Appendix L) and the Monitoring and Evaluation Plan described in the NFP ROD (E 1-12).

Implementation Monitoring

Implementation monitoring ensures that decisions implemented comply with the appropriate decision document.

Implementation compliance generally answers the following questions:
a. Are actions being implemented in accordance with BLM's decision document(s)?
b. What, if anything, is preventing or impeding implementation in accordance with the decision?
c. Are priorities, if any, specified in the decision being followed?

Projects implemented would be monitored to assure compliance with the project design features (PDFs) as described in this EIS. They would also be monitored for consistency with Standards and Guidelines for Late-Successional Reserves as described in the RMP and NFP and with the South Cascades Late-Successional Reserve Assessment (LSRA). The LSR work group reviewed the proposed actions and found them to be consistent with objectives for managing LSRs.

NEPA requires some level of implementation monitoring be completed to ensure compliance with the decision. The following implementation monitoring is proposed for the proposed projects.

All Projects

Goals

- To confirm all contracts include project design features ensuring the project decision is implemented.
- To ensure all contracts are being implemented in accordance with their design and the project decision.

Objectives

- To review draft contract specifications prior to advertisement.
- To ensure provisions to safeguard the environment and public safety are being adhered to through contract monitoring.

Assumption

Implementation of decision and project design features would achieve results identified in EIS.

Purpose

- Determine if projects follow direction in decision.

Unit of Measure

- Review of contracts prior to advertisement.
- Written documentation of contract inspections.

Threshold

All PDFs are included in the contracts and implemented as designed.

Frequency of Monitoring

- Prior to each contract being advertised/negotiated.
- Daily/weekly inspections during operating time.

Estimated Annual Costs

- $40,000

Management Responsibility

- Team Leads or Project Lead
- Contract Administrators

Oak Woodland Restoration Projects

Goal

- To provide variation in successional stage development of the Oak Woodlands in the watershed.

Objectives

- To stagger implementation of oak woodland restoration projects.

Assumption

- Staggered implementation of oak woodland restoration projects will provide variation in successional stage development.
- Prior to implementation, all appropriate surveys have been completed and NEPA adequacy has been determined.

Purpose

- Determine when oak woodland restoration projects will be implemented.

Unit of Measure

- Percentage of total acres treated and in early successional stage.

Threshold

- One-third acres treated every five years.

Frequency of Monitoring

- Field visits every 3-5 years to determine which units are priorities for treatment. Selection of units would be based on density of shrubs and oaks, Douglas-fir, and incense cedar less than 8 inches in diameter.

Estimated Annual Costs

- $5,000 every 3 to 5 years

Management Responsibility

- Botanist
- Contracting Specialist

Fuels Management

Goal

- To monitor fuel build-up in FMZs and treated owl activity centers to determine when follow-up or maintenance treatments are needed.

Objectives

- To assist future wildfire suppression activities by maintaining FMZs.
- To maintain owl habitat in late-successional conditions by increasing resiliency of owl activity centers during future high intensity fire events through reduced fuel loadings.

Assumption

- Maintaining FMZs will provide anchor points for fire lines and burnout operations, and act as possible safety zones for firefighters.
- Maintaining reduced fuel loading in owl activity centers will increase resiliency of these sites during future high intensity fire events.

Purpose

- Determine when follow-up or maintenance treatments need to be implemented.

Unit of Measure

- Height to live canopy in feet used to determine crown fire potential. Fuel loadings by tonnage and size class or species composition will be used to determine changes in fuel models.

Threshold

- Threshold for canopy fire shall be reached when height to live crown is reduced (by regrowth of understory vegetation) to point where natural ground fuels will produce flame lengths and heat enough to initiate crown fire under typical summer weather conditions. Threshold for ground or live fuels will be reached when fuel loadings fall into the following fuel models: Timber 10, 11, and 12; Grass 3; Brush 4 and 5

Frequency of Monitoring

- 3-7 years post treatment depending on vegetation types: grasses at the shorter end of the scale and woody fuels at the longer end of the scale

Estimated Annual Costs

- $2000

Management Responsibility

- Fuels Specialist
- Wildlife Biologist
- Contracting Specialist

Reforestation

Goal

- To maintain desired stocking levels as described in the EIS.

Objectives

- To monitor stocking levels in reforested areas to determine if replanting or vegetation control is needed.

Assumption

- Replanting will occur when stocking falls below 100 conifer trees per acre

- Competing brush would be removed around all seedlings, if stocking is <250 trees per acre, and around ½ the seedlings, if stocking is >250 trees per acre.

Purpose

- Determine if replanting and vegetation control is needed.

Unit of Measure

- Trees per acre
- Density of brush competition

Threshold

- Replant if stocking falls below 100 trees per acre.
- Brush around all trees, if stocking falls below 250 trees per acre, and around ½ the trees if stocking is above 250 trees per acre.

Frequency of Monitoring

- Surveys at Years 1, 3, and 5

Estimated Annual Costs

- $20,000 each year the surveys are conducted.

Management Responsibility

- Silviculturalist
- Contracting Specialist

Effectiveness Monitoring

Effectiveness monitoring measures the effectiveness or success of decisions. It determines if decisions are achieving intended environmental objectives.

Effectiveness monitoring generally answers the following questions:
a. Are the intended environmental objectives or management prescriptions still correct or valid?
b. Are the terms, conditions, and mitigation measures still needed to achieve environmental objectives?

Effectiveness monitoring will continue existing monitoring in the Elk Creek Watershed including: water temperature, northern spotted owl, and neotropical bird monitoring. Additionally, monitoring of salvage effects on erosion, bank loss, and sedimentation will occur along with monitoring described in the Water Quality Restoration Plan. Monitoring of effectiveness is not required under NEPA. Completion of the proposed effectiveness monitoring is dependent on availability of funding and personnel.

Soils

Goals

- To assess salvage-caused erosion, bank loss, and sedimentation.
- To evaluate mass wasting along roads.
- To assess upland mass wasting.

Objectives

- To survey changes in stream bank conditions due to salvage.
- To initiate mitigation measures, as needed.
- To monitor erosion along roads to evaluate and adjust road restoration plans.
- To validate mass wasting analyses along uplands.

Assumption

Most sediment comes from stream bank erosion (Gartner 2002).

Purpose

- Determine if post-fire salvage increases bank erosion.
- Determine if Project Design Features (PDF) adequately prevent detrimental soil disturbance.
- Compare sedimentation rates of private vs. public salvage, relative to control.
- Determine if fire has a substantial effect on the incidence of mass wasting along roads and adjust road restoration priorities.
- Evaluate the effects of fire on upland mass wasting.

Unit of Measure

- Turbidity (conducted daily by the United States Geological Survey [USGS] on Elk Creek).
- Direct observation of salvage operations.
- Paired-basin sedimentation study (conducted by Oregon State University).
- Number and volume (cubic yard) of landslides along roads.
- Number of upland landslides.

Threshold

- Measurable increase in turbidity.

Frequency of Monitoring

- Continual daily monitoring of turbidity by USGS; summarized yearly for 5 years.
- Direct observation of salvage operations when salvage is occurring.
- Two-year study conducted by Oregon State University.
- Annual monitoring for 3 years of landslides along roads and in uplands.

Estimated Annual Costs

- $1,000 (daily turbidity monitoring).
- No additional costs (salvage operations).
- Funding requested through Oregon State University grant; no additional costs for the BLM (study).
- $2,000 (landslides along roads).
- $2,000 (upland landslides).

Management Responsibility

- Soil Scientist and/or Hydrologist (daily turbidity monitoring)
- Sale Administrator (salvage operations)
- Oregon State University (study)
- Area engineers (landslides along roads)
- Soil Scientist/Hydrologist (upland landslides)

Water Quality (see Water Quality Restoration Plan, Appendix I, FEIS)

Goal

- To assess the capability of streams to withstand 30-year interval storm events.
- To measure temperature changes in water quality limited streams.

Objectives

- To monitor the recovery of riparian areas, stream channels, and aquatic habitat.
- To monitor long-term temperature recovery, better understand the natural variability, and track potential project effects.

Assumption

- Adequate vegetation channel form and large woody debris will dissipate stream energy associated with high water flows.
- Passive and active restoration will affect stream temperature by altering shade, channel form, and stream flow.

Purpose

- To monitor vegetation/shade development over streams
- To monitor sedimentation resulting from roads (see soils)
- To monitor proper stream drainage and routing.

Unit of Measure

- Aerial photo interpretation, field checking of riparian vegetation.
- Miles of road decommissioned, improved, renovated, or maintained

Threshold

- Properly Functioning Condition (PFC) of streams.

Frequency of Monitoring

- Review select reaches every 5-10 years.
- Complete PFC surveys for select streams.
- Review yearly road work.

Estimated Annual Costs

- $5,000

Management Responsibility

- Hydrologist

Neotropical and Resident Land Birds

Goal

- To determine if there is a change in bird species present in the watershed over time.
- To track changes in species detected in the watershed as the forest recovers from the fire and as actions proceed.

Objectives

- To maintain a list of species present within the watershed.

Assumption

- Bird species present in the watershed will change over time as the forest recovers from the fire.

Purpose of Monitoring

- To monitor the bird species present in the watershed.

Unit of Measure

- Number of routes in the watershed (1)

Frequency of Monitoring

- Repeat in 5 years

Estimated Costs
- $2000 (cost of survey - 3 visits)

Management Responsibility
- Wildlife biologist

Spotted Owl

Goal
- To continue monitoring of historic owl sites within and adjacent to the burn area.

Objectives
- To monitor owl demographic performance as a measure of recovery of suitable owl habitat as an indicator of quality of late seral/old growth (LSOG) condition.
- To monitor contract seasonal restriction dates to minimize human disturbance during the nesting season.
- To monitor whether restoration projects benefit or harm owl demographic performance.

Assumption
- More spotted owl pairs will be present and producing young as LSOG condition improves.

Purpose
- To determine if owls are still present, or are recolonizing abandoned sites, and are they producing young.
- Are mitigating measures such as seasonal restrictions being followed, that enhance the potential for owl breeding.

Unit of Measure
- Number of historic owl sites monitored for occupancy and productivity.

Threshold
A minimum of 15 historic sites will be monitored. Pre-burn, there were 13 active and 5 inactive sites within the burn, and another 5 active adjacent to the burn.

Frequency of Monitoring
- Sites will be checked annually for five years, from 2003 through 2007.
- Vacant sites will be surveyed three times a year to demonstrate non-occupancy.
- Owls detected will be color banded to enable monitoring of individuals over time, without having to recapture them annually.
- Fieldwork would occur in April through August, with an annual summary report completed by December 1.

Estimated Annual Costs
- $12,000

Management Responsibility
- Wildlife biologist

Validation Monitoring

Validation monitoring evaluates the validity of a decision. It can be used to determine if a decision continues to be the correct or appropriate decision over time.

Validation monitoring typically answers the following questions:
a. Are the intended environmental objectives or management prescriptions still correct or valid?
b. Are the terms, conditions, and mitigation measures still needed to achieve environmental objectives?

Validation monitoring includes research designed to test critical assumptions of the Standards and Guidelines from the Northwest Forest Plan and produce results important for habitat development. This research will also help fill knowledge gaps relating to Late-Successional Reserves habitat development.

1. See research project, *Evaluation of the Influences of Salvage and Salvage Intensity on Wildlife,* in Appendix B.
2. See research project, *Vegetation Dynamics and Fire Hazard in Experimental Mixed-species Restoration Plantings in Southwestern Oregon,* in Appendix B.