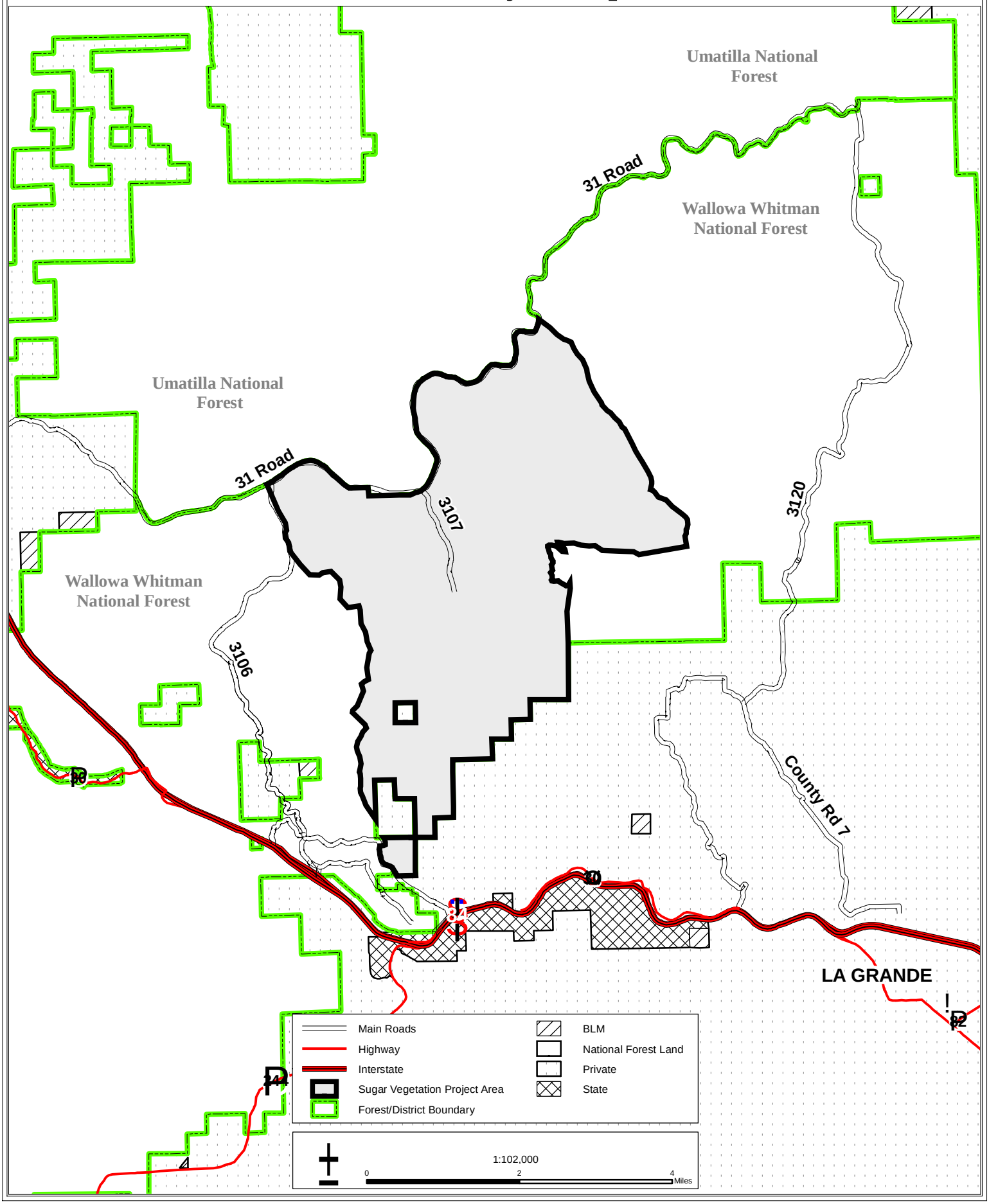
# SUGAR VEGETATION MANAGEMENT PROJECT

# ENVIRONMENTAL ASSESSMENT

**La Grande Ranger District**
**Wallowa-Whitman National Forest**
**November 2008**

# SUGAR VEGETATION PROJECT AREA
## Vicinity Map



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# SUGAR
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## Chapter I: Purpose of and Need for Action

### A. Introduction

The purpose of this Environmental Assessment (EA) is to evaluate the environmental impacts of proposed activities designed to restore and enhance ecosystems and reduce fire danger within the Sugar Vegetation Management project area.

### B. Background

The 10,621 acre Sugar analysis area (Grande Ronde River-Five Points Creek Watershed) consists primarily of the National Forest system lands beginning at Drumhill Ridge in the northeast, southwest to Walker Ridge, and across Five Points Creek to Three Cabin Ridge to the east and south. The project area borders the Umatilla National Forest to the north. Approximately 1,029 acres of the Perry/Hilgard Wildland Urban Interface (WUI) are located within the Sugar project area. This includes National Forest System lands south of Road 3106-355, east of Road 3106-100, and north of the private land boundary.

Past management activities, aggressive fire suppression, drought, and insect and disease activity in the past contributed to the decline of forest and watershed conditions in this area over the last 20 years.

**Insects:** The Sugar area had major levels of budworm and associated beetles that caused grand fir and Douglas-fir mortality. Spruce budworm is currently at endemic (vs. epidemic) levels in the project area. Much of the current defoliation from budworm is tree top mortality and a reduction of live crown. Douglas-fir bark beetle populations increased during the 1980's and caused mortality in the Douglas-fir. The Douglas-fir beetle is still active in the area. Mountain Pine Beetle and Western Pine Beetle populations are generally at endemic levels with small clumps of trees being killed. Trees killed by insects provide nesting and foraging substrate that are used by many species of wildlife. The woodpeckers and other birds that use these dead trees (snags) play an important role in maintaining forest pest insects at endemic levels.

The degree of damage from insects is variable and depends upon factors such as species composition, tree size, tree vigor, and occurrence of root/bole decays. Overstocked stand conditions increase the risk of further tree mortality. A full analysis of the implications of insect epidemics, drought and past management activities can be found in "Blue Mountains, Forest Health Report: New Perspectives in Forest Health" (1991) .

**Diseases:** Tree diseases cause reduced growth rates, mortality, defect and decay. Incidence and severity of diseases in the Sugar area are a combination of vegetation, successional stage, and disturbance (Schmitt, 1994). A major disease in the area is dwarf mistletoe. Infected trees can have a reduction in growth, topkill, premature mortality, predisposition to other biotic agents and predisposition to crown fire (Schmitt, 1996). Mistletoe brooms also provide important structures for many species of wildlife. Forest grouse, raptors, squirrels, song birds and several species of small mammals use mistletoe brooms for nesting, foraging, or both.

The landscape in the Sugar project area is currently outside of the desired range of variability for late and old forest structure, as well as desired levels for snags, down woody material, and big game security habitat. Analysis indicates that long-term restoration needs exist within the area.

Analysis of the existing condition for the Grande Ronde River-Five Points Creek Watershed Analysis (2006) and field reconnaissance completed for this project during the summer of 2007 indicated that the project area includes a considerable number of stands where natural disturbance patterns are out of balance with historic regimes. As a result, these over-stocked stands with high fuel loads are at an increased risk for insect infestation, disease and loss to wildfire. Stocking control, prescribed burning, and mechanical fuels reduction work would address these conditions by reintroducing disturbance to the landscape, reducing stresses to trees, and increasing vigor and growth rates of remaining trees.

## C. Purpose and Need

**Forest Health**

In 1999, the Wallowa-Whitman Forest Leadership Team established a watershed restoration strategy with the overall goal to achieve Forest Plan direction and maintain or improve the baseline condition and health of all watersheds across the forest. The watershed restoration strategy was developed to assist in prioritization of restoration needs, aide in cumulative effects analyses, and display how projects are to improve or maintain baseline conditions over time.

The Prioritization of Watershed Restoration Process (POWR) is based upon the concept of "stressors and indicators."

> **Stressors** are effectors that push the ecosystem to the outer limits of the Historical Range of Variability (HRV). Ecosystems with high stressor values are more likely to experience large-scale re-adjustments from catastrophic events or disturbances.
>
> **Indicators** are values that provide an indication of relative ecosystem function or condition. Low indicator values are often associated with a system that is under stress.

Five stressors were selected to represent the primary effectors on watersheds. The stressors selected are fire risk, forest insects and diseases, wildlife security, noxious weeds, and roads. Four indicators were selected to evaluate ecosystem condition. These are aquatic (fish habitat), vegetation (HRV and structural stage departure), wildlife habitat, and hydrologic function.

**Table 1 - The Grande Ronde River-5 Points Creek Watershed Rankings**

| Stressors | Indicators |
|---|---|
| **Fire** – Moderate | **Aquatics** – High |
| **Insects and disease** – High | **Vegetation** – Moderate |
| **Road/Wildlife Security** – Moderate | **Terrestrial Wildlife Habitat** - Moderate |
| **Noxious weeds** - Moderate | **Hydrologic Function** - Moderate |
| **Road/Stream Connectivity** - Moderate | |

Given these ratings and the emphasis being placed on this area due to its location adjacent to private lands, an important roadless area, and an important watershed for threatened and endangered fisheries, a need was identified in the forested stands across the project area (including within riparian habitat conservation areas) to be proactive in providing for long-term forest resilience and reduce the likelihood and severity of future insect infestations and/or wildfires, and the loss of trees to dwarf mistletoe. There is a need to reduce tree densities of all sizes (commercial and pre-commercial) in overstocked stands, including riparian habitat conservations areas. Thinning, improvement cuts, and precommercial thinning in these stands would reduce competition, provide growing space for healthy

trees to increase diameter growth, and increase riparian area shading and large wood recruitment potential. Thinning could also reduce the risk of damaging insect infestations, which are evident in overstocked stands. Without treatment these overstocked stands would be at risk to future loss from insect infestations and wildfires (1990 W-W Forest Plan, Forest Management Goals for Protection, pg. 4-3).

PACFISH direction allows for treatment within riparian habitat conservation areas (RHCAs) with silvicultural practices as long as Riparian Management Objectives (RMOs) are met, a site specific evaluation of the RHCAs has been conducted, or a watershed assessment has been completed. Site specific analysis was conducted by the District Silviculturalist and fisheries and watershed personnel in the fall of 2007. Site specific analysis includes: silvicultural reconnaissance to evaluate stand condition (including RHCAs); stream class verification; analysis of RHCA ground cover; and verification of vegetation and woody material in intermittent non-fishbearing stream channels. Site specific analysis also includes woody material surveys in stream channels across the planning area. The Lower Five Points Creek subwatershed is covered in the Grande Ronde River-Five Points Creek Watershed Assessment (2006). Chapter V of the Watershed Assessment (Management Opportunities) identifies management needs in the subwatershed. These are fuels reduction (high priority), prescribed fire (moderate priority), reduce stocking on overstocked stands (moderate priority), reduce insect and disease on stand health (high priority), and RHCA treatments (high priority) to maintain and enhance Riparian Management Objectives and Riparian Goals). The site specific project area reconnaissance described above concurred with this finding and identified a need for treatment within a number of RHCAs to enhance their health and improve their resistence to loss from insects, disease, and extensive mortality in the event of a wildfire.

Also at risk for wildfire is the adjacent Perry/Hilgard WUI. The Union County community wildfire protection plan (CWPP) was prepared in compliance with the Nation Fire Plan, the 10-year Comprehensive Strategy, and the Healthy Forest Restoration Act. One of the goals of the Union County CWPP was to identify, prioritize and reduce hazardous fuels in the WUI areas and coordinate risk reduction strategies across the landscape. The Perry/Hilgard WUI has been identified in the Union County community wildfire planning process. This project would reduce hazardous fuels on public lands adjacent to the communities Perry and Hilgard.

There is a need to develop forest structure toward historic ranges (Regional Forester Forest Plan Amendment #2). Structural stages in the Sugar area are disproportionately at younger understory reinitiation stages, when compared to historic conditions. This is due to mortality from insect damage and past logging practices. Landscapes that reflect the Historic Range of Variation (HRV) generally meet connectivity and dispersal needs of wildlife species associated with different structural stages. Old growth dependent species could particularly benefit from development of Late and Old Structure (LOS). Salvage/sanitation cuts in understory reinitiation and thinning in understory reinitiation and stem exclusion stands would accelerate development of LOS structure. Without treatment, a greater departure from HRV is expected.

Reconnaissance of the LOS stands within the project area also revealed that single stratum large trees common (SSLT) LOS is severely deficient within the project area while multi-stratum large trees common is more abundant, although still within or below historic levels (Regional Forester Forest Plan Amendment #2). However, many of these MSLT acres in dry biophysical environments were historically SSLT but due to the years of fire exclusion within the area, shade tolerant trees have encroached and changed the nature of these stands. There is an opportunity to return some of these dry biophysical environment stands to SSLT to better reflect what these sites would historically have represented on the landscape. Treatment in these stands by mechanical means would require a non-significant amendment to the Wallowa-Whitman National Forest Plan, which is described in the proposed action below. Without treatment SSLT would continue to be deficient in the project area.

A preliminary analysis of big game cover indicates a surplus of cover relative to the Forest Plan standards and guidelines. One of the objectives of this project is to ensure that cover for big game exists now and into the future that will provide options for deer and elk to ameliorate effects of heat in

the summer, cold and snow in the winter, and escape predators. Many of the stands proposed for treatment in the Sugar project are minimally meeting the definition of marginal thermal cover. Left untreated, these stands will decrease in cover quality as the live crown ratio of overstory trees declines. These stands would degrade from marginal thermal cover to forage within ten years. There is a need to treat these stands to arrest that degradation of cover and improve the stands' ability to function as cover in the future.

Within the project area there is a need to continue to reintroduce fire as a disturbance and to include objectives to maintain diversity and sustainable seral tree species, to reduce overstocking, and to maintain the preferred fuel loadings and stand structures. A secondary objective is to enhance forage for livestock and wildlife by reducing the dead grasses and mature shrubs and promote sprouting. Fire exclusion has resulted in an increase in an overstocked understory, exhibiting poor vigor and susceptibility to insects and diseases. Fuel reduction and fire reintroduction in these drier plant associations would reduce encroaching fir and overstocked pine, as well as providing for safe areas for firefighters to fight fire from in the event of a wildfire. Fire reintroduction would help restore the area to historic conditions relative to fire regime, condition class, and amount of understory. Fire would also create gaps that would regenerate with ponderosa pine and Douglas-fir in areas that are not fully stocked. Without fire, tree health and vigor would decline, and ladder fuels would continue to increase the risk of damaging crown fires and insect outbreaks.

These restoration efforts would reduce the risk of fire, insects, and disease (Integrated Scientific Assessment for Ecosystem Management in the Interior Columbia Basin - ISAEM - p. 113) and meet the goals and objectives of the W-W Forest Plan as amended. There is a need to maintain preferred seral species of ponderosa pine, Douglas-fir, and western larch. These are fire tolerant species that have developed historically under frequently reoccurring ground fires. Sustainability and diversity in the warm, dry grand fir and pine associated biophysical group is expected to increase with reoccurring ground fires.

In conjunction with the above restoration efforts, there is a need to address climate change to improve forest conditions and promote long term sustainability of ecosystems by managing densities and species better adapted to current and future climates. According to the Intergovernmental Panel on Climate Change there has been a clear pattern of temperature increases and long term trends in precipitation changes (Kimball, 2007). The panel concludes that disturbances from pests, diseases and fire are projected to have increasing impacts on forests.

**Access Management**
Roads are identified in the table above as a moderate level stressor in this watershed. Analysis of the open road densities within the project area identified discreet areas with open road densities that are above Forest Plan guidelines for resource and habitat protection (1990 W-W Forest Plan, pgs. 4-56 and 4-60). The majority of these areas are well below one square mile in size, with a small section of road pushing the open road density above the recommended guideline. These occurrences are considered anomalies that are not inconsistent with the intent of LRMP standards and guidelines. There is a need to ensure that post sale open road densities remain low within the project area to continue to provide for big game security habitat. Without this consideration, big game security habitat could be compromised affecting big game distribution, herd performance and survival.

**Public Safety**
In addition to the above access management plan, there is a need to provide for public safety (and comply with Regional Direction R6 supplement to FSM 7733) along the roads within the project area by treating (falling/removal) of roadside danger trees throughout the project area. A danger tree is a standing tree that presents a hazard to people due to exposure and conditions such as, but not limited to, deterioration or physical damage to the root system, trunk, stem, or limbs and the direction of lean of the tree would allow that tree to reach the roadway if it fell (FSH 6709.11, Glossary).

**Economics**
The Forest Plan (page 4-3) also identifies a goal that National Forest System lands will provide wood

fiber to satisfy National needs and benefit local economies consistent with multiple resource and environmental objectives, environmental constraints, and economic efficiency. The products and income generated by this project could contribute to family wage earners and local industries which in turn support other local businesses, hospitals, and services contributing to the overall economic vitality of the County. The need to produce products from this project would not only support the local mills, but when added to the wood products being removed from other private and corporate lands, it could contribute to the overall viability and sustainability of local mills and businesses.

**Other Rehabilitation/Enhancement Work**
Railroad logging in the early 1900s removed large streamside conifers that would have been recruited to the Five Points Creek stream channel providing structure for pool formation, and habitat diversity and complexity. To increase habitat diversity and complexity and enhance steelhead spawning and rearing habitat, there is a need to add large wood to Five Points Creek.

Field reconnaissance for this project identified several populations of noxious weeds along roads within the project area. To prevent the spread of these non-desirable species during project activities, known sites (primarily located along haul routes) there is a need to pre-treat within these areas. There is also an opportunity to convert areas with a heavy tarweed component or areas that have been historically overgrazed to a native bunchgrass species by seeding.

Aspen stands contribute to habitat diversity within the Sugarloaf mountain area. To protect this stand of aspen from ungulate browsing an exclosure fence was erected around it several years ago. There is a need to maintain this fence over the next five years and monitor the recovery of the aspen within it. Eventually the fence would be removed along with encroaching seedlings and saplings, small conifer trees (<7") to provide for a habitat where the aspen can flourish and increase diversity within the area.

## D. Proposed Action

In order to meet the purpose and need described above the following actions are proposed for the Sugar Vegetation Management project area by the La Grande Ranger District. It proposes a variety of vegetation management treatment procedures for stands identified as needing fuels or density reduction. The proposed treatments are prescribed to address needs within the project area for the next 10+ years. Refer to maps and tables for site-specific activities, locations and definitions in the appendices.

**Vegetation Management/Fuels Reduction**

The proposed action called for a combination of vegetation management techniques in order to improve stand health and reduce fuel loadings within the area. Objectives in all units would be to: a) reduce stand densities in overstocked stands and ladder fuels; b) enhance forage; c) create defensible fuel profile zones in strategic areas to aid in fire suppression efforts and minimize natural resource impacts in the event of a wildfire; d) reintroduce fire as a disturbance factor on historical fire return intervals to reduce fir encroachment; e) promote healthy fire resistant stands at a landscape scale; f) promote large tree characteristics and provide for structural diversity.

These objectives would be achieved in the Proposed Action through a combination of commercial and precommercial timber harvest, slashbusting, lopping and scattering thinning slash, pruning, hand piling, broadcast burning, and grapple piling.

Riparian habitat conservation area vegetation also in need of management to reduce overstocking would receive stand density reduction treatments outside of no activity buffers to maintain and enhance riparian values. Treatments within these areas would generally match the treatments prescribed for in the adjacent units.

Danger trees (standing trees that present a hazard to people due to conditions such as, but not

limited to, deterioration or physical damage to the root system, trunk, stem, or limbs and the direction of the lean of the tree would allow that tree to reach the roadway if it fell) would be cut along all haul roads.

Where treatments result in commercial products, they would be removed by tractor, helicopter, and skyline yarding systems. No construction of new specified roads is required for this project. Some temporary road construction is proposed to facilitate material removal systems however the roads would be obliterated at the completion of removal activities. Road 3106-100 would be reconstructed by installing drainage dips and spot rocking and armoring low areas that are currently collecting water. Blading and shaping would occur on the remainder of the road segment.

**Forest Plan Amendments**

As a part of the Sugar project, the Wallowa-Whitman National Forest Land and Resource Management Plan (Forest Plan) would be amended to allow for improvement of Late Old Structure stands and enhancement of marginal cover stands within big game winter range. Refer to descriptions in Chapter 2 for specifics.

**Rehabilitation Work:**

- **Large Wood Placement -** To increase habitat diversity and complexity and enhance steelhead spawning and rearing habitat, large wood would be added to Five Points Creek.
- **Invasive Species Treatments –** To prevent the spread of non-desirable species known sites (primarily located along haul routes) will be pre-treated through a combination of hand pulling and possible herbicide application (upon completion of the Wallowa-Whitman National Forest Invasive Plant EIS).
- **Forage Enhancement -** To enhance forage in areas with a heavy tarweed component or areas that have been historically overgrazed, seeding with native bunchgass species would occur on some of the flat ridges north of the Five Points Creek drainage.
- **Sugarloaf Mountain Aspen** - The existing ungulate exclosure fence would be maintained over the next five years. Once monitoring indicates the aspen can survive some ungulate browsing pressure, the fence would be dismantled and materials removed from the site. To prevent encroachment from seedlings and saplings, non-commercial sized conifers within the aspen stand would be cut, piled and burned.

## E. Decisions to be Made

The Forest Supervisor of the Wallowa-Whitman National Forest is the official responsible for deciding the type and extent of management activities in the Sugar analysis area. The responsible official can decide on several courses of action ranging from no action, to one of many possible combinations for treating the area, while deferring treatment of others.

The decision will also determine if the proposed action or alternatives to the proposed action might cause significant effects requiring analysis in an Environmental Impact Statement.

Decision points to be chosen from in this document include the following:

1. Determine whether to implement one of the action alternatives described in this document to meet the purpose and need of this proposal or to select the no action alternative and defer management activities described in this analysis.

2. Specific points to be decided under each of the alternatives include but are not limited to:

    - In which stands will management be initiated and to what intensity to achieve fuel reduction goals?

- In which stands and to what level should stocking and stand composition management be conducted to provide for long term vegetative health needs?
- What are the total access needs (roads, trails, corridors) of the project area during and after project implementation?
- What type of logging system is suitable to the needs of the objective in this project?
- What type of aquatic restoration projects should be accomplished within the project area?
- How much prescribed burning and what prescriptions should be re-introduced into the project area?
- Should vegetation be managed in areas where it is not economically feasible?
- Should management activities occur within riparian habitat conservation areas?
- What type of long-term old growth network should be managed for in this area?
- Should the project complete a non-significant Forest Plan Amendment for LOS and cover treatments?
- Should restoration work occur within the project area for forage and stream enhancement, invasive species treatment, and aspen protection/enhancement?

## F. Desired Condition

### *Vegetative Structures and Health*

The desired future vegetative condition is to have a mosaic of structural stages across the Sugar project area within the historical range of variation. The tree stocking and species composition will be consistent with historical disturbance patterns with consideration for the future effects of climate change and managed at levels to reduce the risks of epidemic insect and disease outbreaks.

The stands will be of different ages and dispersed to provide a mixture of forage and thermal cover areas for big-game, and late-seral structures for old-growth dependent species. Large diameter (greater than 20 inches) down woody debris and standing snags will be more evident. Small diameter standing and down woody debris will be managed at levels to provide for soil productivity and decrease the risk of high-intensity fires.

LOS stands are connected by forest habitat that facilitates movement and interchange of genetic material between LOS associated species (wildlife, plants, and invertebrates) inhabiting distant habitat patches. The need for corridors will be obsolete since the forest matrix between LOS patches will provide the connective function. It is desirable for structural stages to be consistent with historical disturbance patterns, in terms of species composition and stocking levels.

It is desired to maintain tree stocking at acceptable levels and species composition within the historic ranges that are sustainable and ecologically appropriate for the site. Sustainability suggests stocking levels and species composition less prone to high intensity fires, and epidemic insect and disease outbreaks.

### *Riparian Habitat Conservation Areas*

It is desired to maintain water quality to a degree that provides for stable and productive riparian and aquatic ecosystems. Riparian management objectives and properly functioning conditions help determine the degree to which high water quality and riparian habitat is maintained.

### *Fire Return Intervals and Regimes*

The desired future condition class within fire regimes 1, 2, and 3 within project area is condition class one. Fire return intervals within the analysis area were primarily low and mixed severity, and played an important role in shaping and maintaining the vegetative communities and wildlife habitat. Maintaining these low and mixed severity fire regimes over time will minimize the loss of Late and Old Structure and wildlife habitat for the vast majority of species that evolved within the historic fire

regimes. Preferred fuel loadings are based on retaining adequate duff and coarse woody debris (CWD) to minimize soil exposure and maintain a healthy soil profile.

***Wildlife Habitat***

Stands are of different sizes and ages, dispersed to provide a mixture of forage and sustainable security cover for big game. Motorized access is managed to provide reasonable access while providing areas of low disturbance for big game security habitat. Large diameter (greater than 20 inches) down woody debris and snags are evident and exist in densities to support reproductive populations of dependant species. Down woody material exists at levels providing for the needs of wildlife species dependant on this habitat component. LOS is within the historic range of variation and is well connected to facilitate movement of wildlife species between distant LOS patches. Unique and sensitive habitats occur in context with surrounding vegetation that allows for their use by associated wildlife species. Wildlife nests and den sites contain the structural and security characteristics necessary for successful reproduction and rearing of young to dispersal age.

## G. Project Area Description

The Sugar analysis area is in the geographical province of the Blue Mountains, including sections within T.1S R.36-37E and 2S, R. 36-37E, Willamette Meridian. The 10,621 acre project planning area is also the cumulative effects analysis area within the Grande Ronde River-Five Points Creek Watershed.

The Sugar project analysis area stretches from Drumhill Ridge in the northeast, southwest to Walker Ridge, and across Five Points Creek to Three Cabin Ridge to the east and south. The project area borders the Umatilla National Forest to the north, and includes National Forest System lands south of Road 3106-355, east of Road 3106-100, and north of the private land boundary. This area is approximately 8 miles north and east of La Grande, Oregon.

***Sub-basin Description***

The Sugar project area lies within the Grande Ronde River subbasin which is part of the larger Snake River Basin, a tributary of the Columbia River basin. One of the primary reasons the Interior Columbia Basin Ecosystem Management Project (ICBEMP) was initiated was to develop management strategies using a comprehensive, “big picture” approach, and disclose interrelated actions and cumulative effects using scientific methods. With completion and release of the Integrated Scientific Assessment and the FEIS, new information became available which was considered during the development of this project.

The preferred alternative in the FEIS for the Interior Columbia Basin Ecosystem Management Project (ICBEMP) identifies this as a High Restoration Priority subbasin for landscape, economic, tribal, and aquatic components.

The intent of landscape restoration is to repattern vegetation patches and succession/disturbance regimes and to restore watershed and streams to a condition more consistent with landform, climate, and biological and physical characteristics of the ecosystem. Restored ecosystems would be more resilient to disturbances, more predictable, and would provide the range of habitats needed by aquatic and terrestrial specials. Scarce habitats would be conserved in the short term while expanding these habitats through restoration in the long term.

Landscape restoration also includes Old Forest Habitat as a priority. The intent of restoration for these habitats is to focus on the vegetation cover types and structural stages that have declined substantially in geographic extent from the historical to the current period where they historically existed. Restoration would increase the geographic extent and connectivity of these source habitats

and over time provide a framework for well-connected networks of source habitat for terrestrial species.

Aquatic restoration would reestablish watershed functions, processes, and structures, including natural diversity. The intent of management for watershed restoration would be to recognize the variability of natural systems while securing existing habitats that support the strongest populations of wide-ranging aquatic species and the highest native diversity and integrity, extend favorable conditions into adjacent watersheds to create a larger or more contiguous network of suitable and productive habitats, and restore hydrologic processes to ensure favorable water quality conditions for aquatic, riparian, and municipal uses.

The social-economic-tribal restoration component highlights areas where restoration activities directly influence human community economic, social, and cultural needs. Design and implementation of restoration activities should promote workforce participation, serve demands for commodity production at various levels, encourage intergovernmental collaboration, and consider tribal needs and interests.

***Forest Plan Management Direction***

This environmental assessment is tiered to the Final Environmental Impact Statement (FEIS) for the Wallowa-Whitman National Forest Land and Resource Management Plan, as amended. Major Plan amendments relevant to this project include:

- *EA on Continuation of the Interim Management Direction Establishing Riparian, Ecosystem, and wildlife Standards for Timber Sales, as signed on May 20, 1994,* which provides additional standards and guidelines (USDA, 1994, and commonly known as the Screens);
- *Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California*, as signed in 1995, which provides additional standards and guidelines (USDA, 1995, and commonly known as PACFISH)

The Forest Plan, as amended, includes management goals and objectives and standards and guidelines, both forest-wide and specific to land allocations. With the exception of the Screens LOS guidelines and the cover requirements in Management Area 3 proposed for amendment in this project, all proposed activities in this project are consistent with the management guidance and direction provided in the Forest Plan.

The project area is allocated under the Wallowa-Whitman National Forest Plan Forest and its Environmental Impact Statements (as amended) to the following management areas (refer to map in Appendix A). All applicable management direction specific to the following management areas apply to this project area:

MA1 – (1,920 acres). Emphasizes wood fiber production on suitable timberlands while providing relatively high levels of forage and recreational opportunities.

MA1(W) – (1,071 acres). Big game winter range that has been allocated to MA1. Emphasizes wood fiber production as described above but will meet the post sale road management objectives in the same manner as lands allocated to MA3.

MA3/3A – (7,266 acres). These management areas provide a broad array of forest uses and outputs with emphasis on timber production. However, timber management is designed to provide near-optimum cover and forage conditions on big game winter (MA3) and selected summer ranges (MA3A).

MA15 – (344 acres). These areas are intended to maintain habitat diversity, preserve aesthetic values, and to provide old growth habitat for wildlife. Evidence of human activities may be present but does not significantly alter the other characteristics and would be a subordinate factor in a description of such a stand.

MA17 – (20 acres). Areas currently in use or proposed for the transport of gas, oil, or electricity. The existing corridor is designated to facilitate authorization of future utility rights-of-way. Use will be compatible with other uses of the Forest including consideration of visual objectives.

## H. Key Issues

This section identifies the issues associated with the proposed action. In addition, concerns related to the proposed decision are also discussed. The interdisciplinary team of Forest Service resource specialists developed this list of issues with input from public scoping. The issues and concerns are the basis for subsequent steps of the analysis in formulating alternatives or developing constraints and mitigation measures.

### Issues

The following preliminary issues have been identified by the Forest Service Planning Team:

- Improvement of Long Term Forest Health Conditions
- Deficient in LOS and Entire Area Outside HRV
- Big Game Security Habitat Deficiency
- Area Outside of Historic Fire Return Intervals
- Economic Feasibility

Key issues were identified and subsequently used to develop a range of alternatives. The following section describes the key issues identified for this analysis and the key indicators used to evaluate each key issue. In all cases, other measurable aspects may be tracked throughout the analysis, however, they are supportive in nature and not considered key to the decision making process.

### Issue: Improvement of Long Term Forest Health Conditions

***Past management activities and exclusion of fire has led to an increase in stocking levels, fuel loadings, and understory in approximately 37% of the forested stands within the project area. These stands are not growing to their site potential and if left untreated in the proposed action, the stand development could remain retarded and increase the risk of loss from insect mortality and wildfire.***

Forested acres within the project area fall into the following three different biophysical environments: the cool grand fir group, the warmer grand fir group, and the Douglas-fir/ponderosa pine groups. Of these groups the cool grand fir group sites are the most productive in the Blue Mountains. The degree of damage from insects within them is variable and depends upon factors such as species composition, tree size, tree vigor and occurrence of root/bole decays. There is a mix of tree species of all sizes within these stands. There are 2,731 acres of the cool grand fir type in the planning area. Mortality and fuel loadings are moderate to high. Successful regeneration is related to mortality levels and past disturbance. Of the 2,731 acres of this group, approximately 37% exhibit overstocked conditions, poor live crown ratios and/or poor understory stocking and the structural stages in this group consist primarily of multi-storied late and old and understory reinitiation.

The warmer grand fir group sites are moderate in productivity. Past activities and fire exclusion have led to an increase in stocking, fuel loadings and an increase in shade tolerant understory trees. Historically, many of these stands were dominated by shade intolerant species maintained by fire. There are 2,113 acres of this type in the planning area. Dwarf mistletoes exist in some stands and

spread is likely to continue. Approximately 28% of the acres within this group are overstocked with poor live crown ratios and structural stages consisting of stand initiation and understory reinitiation. These stands are outside of the historic range of variation as natural disturbance regimes would have created stands primarily dominated by large seral species with groups of seedling and saplings underneath them.

Douglas-fir and ponderosa pine groups are also moderate in productivity. Past activities and fire exclusion have led to an increase in stocking, fuel loadings and an increase in shade tolerant understory trees. There are 2,495 acres of this type in the planning area of which 44% are overstocked exhibiting poor live crown ratios. These overstocked stands are in a low vigor condition and are susceptible to Douglas-fir bark beetle and pine beetle attacks. There are currently endemic populations of beetles, with an increase in mortality occurring in some stands and the potential exists for increased beetle populations and subsequent tree mortality. Dwarf mistletoes exist in some stands and spread is likely to continue. The structural stages in this group consist mostly of multi-storied late and old and understory reinitiation. Historically many of these sites would have been maintained as park like component of the landscape however, they are outside this range of natural variability due to years of fire suppression activities.

The degree of tree mortality from insects and diseases is variable and depends upon factors such as species composition, tree size, tree vigor, and occurrence of root/bole decays. Overstocked stand conditions increase the risk of further loss of tree species. A full analysis of the implications of insect epidemics, drought and past management activities can be found in "Blue Mountains, Forest Health Report: New Perspectives in Forest Health" (1991).

*Public feedback from the Proposed Action varied from support of commercial timber harvest within the area as a tool to meet project objectives to support of thinning only prescriptions with diameter limits and prioritizing treatment of dense young stands over medium and large trees. A forest that is self-sustaining in terms of ecosystem function would contribute to reducing the global climate changes now being experienced. The public pointed out that roading and logging as proposed in the Proposed Action is not likely to help limit negative impacts to climate change.*

**Key Indicators:**

- Acres of stand density reduction

## Issue: Deficient in LOS and Entire Project Area Outside HRV

***The Sugar analysis area is deficient in LOS and below the historic range of variability (HRV) for this type of structure in nearly all biophysical environments, particularly in single stratum large trees common (SSLT) structures. Analysis of the project area shows that some of the multi-stratum large trees common (MSLT) areas are in biophysical environments that should be or were historically SSLT. While there is an opportunity to treat these areas and convert them to SSLT, there is concern with the treatment of any old growth in the proposed action.***

An analysis of the historical range of variability (HRV) was done to assess how current forest conditions compared to what ecologists believe existed during the pre-settlement era (Sugar Analysis File). Approximately 10,600 acres were assessed to determine the amount and distribution of LOS habitat. This is an appropriate scale to analyze HRV and is meaningful in terms of landscape patterns as they relate to the distribution of wildlife habitat. HRV is important to wildlife populations because the distribution, quality and quantity of habitat largely determine the potential for a wildlife species to exist at viable levels. As habitat was converted, fragmented, and opened to motorized access, many species were reduced in number and others were precluded from portions of their geographic range altogether.

The following abbreviations are used when referring to biophysical groups within the analysis area:

**Table 2 - Biophysical Groups Definitions**

| Biogroup | Definition |
|---|---|
| G4 | Cool Grand fir |
| G5 | Warm Grand fir |
| G6 | Warm/Moist Douglas-fir |
| G7 | Warm/Dry Doug-fir-Ponderosa Pine |
| G8 | Hot/Dry Ponderosa Pine |

The following table compares existing old growth acres to the HRV in the analysis area.

**Table 3 - Single-stratum, large trees common (SSLT) and Multi-stratum, large trees common (MSLT): Existing and Historic Range of Variation**

| Bio-group | Total Acres in Biogroup | SSLT (existing) (% of biogroup) | SSLT HRV (% of biogroup) | MSLT (existing) (% of biogroup) | MSLT HRV (% of biogroup) |
|---|---|---|---|---|---|
| G4 | 3,086 | N/A | N/A | 17% | 30-60% |
| G5 | 2,382 | 0% | 15-55% | 13% | 5-25% |
| G6 | 560 | 9% | 15-55% | 19% | 10-30% |
| G7 | 2,238 | 1% | 15-55% | 13% | 5-25% |
| G8 | 261 | 12% | 20-70% | 13% | 2-15% |

Approximately 16% of the forested area in this analysis area is in a late/old condition (SSLT and MSLT combined. The historical range of variation (HRV) ranges from 2-70% depending on biophysical environment. The table above illustrates some large deficiencies in multi-stratum late/old structure (MSLT) for G4, and single stratum (SSLT) in all bio groups present. G6 (560 acres) and G8 (261 acres) are poorly represented in the analysis area, so conclusions drawn from HRV values are limited. The greatest opportunities to move stands toward SSLT structure exist in biogroups G5 and G7, and less so in G6 and G8. Opportunities to move stands toward MSLT structure exist in biogroup G4 where understory reinitiation (UR) stands can have stocking levels reduced to accelerate them toward LOS.

LOS habitat is not well connected in portions of the analysis area, with many patches isolated by more than a mile from the next closest patch. However, LOS stands within and immediately adjacent to the Five Points Creek canyon and its tributaries are fairly well connected. The most abundant structural stage available to provide some level of connectivity between LOS patches is UR and multi-stratum stands with large trees uncommon (MSLTU).

*Some of the public input on the Proposed Action related to LOS did not support the restoration of MSLT to SSLT because they felt that this action was not meeting the intent of Screens and they called for either no treatment at all in LOS or no net loss of LOS. Other public input supported the treatment within these stand structures and felt that the forest plan amendment for this treatment was appropriate.*

**Key Indicators:**

- Acres of understory reinitiation accelerated toward Single Stratum and Multi-Stratum Large Trees (SSLT and MSLT)
- Acres of MSLT restored to SSLT (all biogroups)
- Acres of treatments within connective corridors.

## Issue: Big Game Security Habitat Deficiency

***Security habitat for big game is deficient due to disturbance from motorized access and conversion of cover stands from past logging. Treatments proposed in the proposed action have the potential to negatively affect existing cover and big game security habitat.***

Over 8,000 acres of this area is winter range (Management Area 3 in the LRMP). The winter range is situated along the south and west boundaries of the analysis area, at lower elevations. The remainder of the area is transitional and summer range. Much of the winter range adjacent to this analysis area has been compromised by human developments including Interstate 84, railroad and utility corridors, a landfill, farming, and rural housing. These developments contribute to conflicts with elk on winter range.

An analysis of elk habitat, Habitat Effectiveness Index (HEI) was conducted for the area using a model developed by Thomas et al. (1988) and a revised summer range model by Leckenby (1988) and is summarized in the following table.

**Table 4 - Habitat Effectiveness Summary using two road analysis methods.**

| Habitat Effectiveness Variable | Habitat Effectiveness Value | Minimum Standard in LRMP |
|---|---|---|
| HE cover | 0.76 | ≥30% of forested acres in a cover condition |
| HE size and spacing | 0.87 | |
| HE roads, density | 0.50 | MA-1= 2.5mi/mi$^2$ MA-3= 1.5mi/mi$^2$ |
| HE roads, distance bands | 0.36 | |
| **HE total (road density)** | **0.69** | MA-1= >0.50 MA-3= average 0.74 |
| **HE total (distance bands)** | **0.68** | |

An HEI value of 0.69 (which uses road density for the roads variable) was calculated for the entire analysis area (MA 1 and MA 3), and does not include a forage variable. Considering the fact that motorized access occurs on closed roads and cross country, the overall HEI value is likely lower than what the model indicates because these uses are not reflected in the HEI values. The potential for disturbance is much less during the winter when snow limits access into the area and the majority of elk are on winter ranges. Disturbance is highest during hunting seasons.

Forested stands with relatively closed canopies function as thermal and security cover, providing a visual barrier from predators and reducing the difference between an animal's body temperature and ambient air temperature. Cover exists on 53% of the analysis area, 27% satisfactory and 25% marginal, resulting in a cover quality value of 0.76. The HEc (cover) value only reflects the amount of satisfactory cover relative to marginal cover, and does not relate to abundance of cover across the landscape. The quantity of cover is factored into the size and spacing variable. A mosaic of forage and cover patches is desirable on elk ranges. Size and spacing of cover is optimal (HEI value of 1.0) when all satisfactory cover is within 600 feet of forage, and all forage areas are within 600 feet of satisfactory cover. The HEs (size and spacing) is 0.87, which indicates a high degree of cover and forage interspersion.

Excessive open road densities have deleterious effects on habitat effectiveness by taking habitat out of production (1 mile = 4 acres of land), reducing the effectiveness of cover and increasing disturbance to elk. The HE roads value is 0.50 when calculated using the traditional road density method, and 0.36 when using a distance band roads analysis that considers all roads available to

motorized traffic. The assumption that all roads without promulgated closures are equal in their effects to elk over-estimates the effects of roads. Some roads that are closed with earthen barricades are actually functioning as closed roads, many others continue to receive use by motorized vehicles and function as open roads. In the absence of actual road use data, the above approach is used with the recognition that the actual HEr (roads) is likely somewhere between 0.36 and 0.50 which is below the minimum standards set by the Forest Plan of between 0.5 and 0.74 for management areas 1 and 3.

Unregulated use of off highway vehicles likely has a deleterious effect on elk distribution in this area, particularly during hunting seasons. Impacts of off highway vehicle use on closed roads and cross country travel are not considered in the HEI analysis. As a result, the HEr variable (by either the density or distance band method) cannot be considered an accurate measure of habitat effectiveness for elk. The Three Cabin Ridge area was planned for year-round closure in the Green Pelican Environmental Assessment to mitigate the relocation of a new road that accesses the ridge. A gate was installed, but it is repeatedly vandalized or new routes pioneered around it. This has led to conflicts between forest users, damage to soils, and likely displacement of elk. These effects are from both full sized and off highway vehicles. The Camp One area and associated user made trails is another area that has experienced negative effects from off highway vehicles. This area is used by motorcycles and ATVs. Damage has occurred to stream banks of Five Points Creek, noxious weeds continue to be spread along this user made trail network, and past stream restoration projects have been damaged by ATVs and motorcycles. These localized effects combine with the effects from disturbance to lower the quality of elk habitat.

*Feedback on the Proposed Action from a local environmental organization was primarily focused on critical elk summer range within the area and the impacts this project could have on it particularly when road densities are above forest plan guidelines and the area is minimally meeting marginal thermal cover. No other participants in the proposed action scoping process mentioned big game habitat as an issue.*

**Key indicators:**

- Acres of Satisfactory thermal cover converted to Marginal cover or forage
- Acres of Marginal thermal cover converted to Forage
- Percent of analysis area further than 0.90 km (moderate quality security habitat) from a motorized route.

## Issue: Fire Return Intervals, Risks, and Regimes

***The Sugar project area is outside of the historic fire return intervals and could experience higher levels of risk to loss from wildfire, and is experiencing condition class changes farther from their historic ranges in many frequent fire regimes. The project area is immediately adjacent to and encompasses a small portion of the Hilgard/Perry Wildland Urban Interface (WUI). Treatment of fuels mechanically in the proposed action raises the concern over the potential for short-term increases in fuel loadings/fire hazard due to logging slash and the drying effects of increased light reaching the forest floor in treated stands.***

Fire exclusion policies since the turn of the century have resulted in vegetation changes. Grand fir at high densities has developed in fire adapted plant communities. As densities increase, more ground and ladder fuels exist, increasing the probability of high intensity fires (W-W Land and Resource Management Plan, 1990).

Historically fire was a dominant disturbance process in the Blue Mountains. Low intensity fires crept through the drier forests and grasslands every 7 to 35 years. Moister sites experience fire every 40 to 150 years. The results were a mosaic of vegetation patterns from hot, intense fires, and light ground fires. While there is no historic data of what fuel levels were in the Blue Mountains, it is evident that fuel levels were lower and maintained by fire as a natural disturbance process. Fire regimes are a predetermined frequency cycle for fire return intervals within a particular vegetation profile and described in the table below.

**Table 5 – Fire Regime Groups with Historical Frequencies**

| Fire Regime Group | Vegetation Types | Historical Frequency (Fire Return Interval) | Historical Severity |
|---|---|---|---|
| 1 | **Includes lower and mid-elevation forested plant associations -** All ponderosa pine types; Dry-Douglas fir/ pine grass; and grand fir/grass. | 0 – 35 years | Low severity. Large stand replacing fires can occur under certain weather conditions, but are very rare (200+ years). |
| 2 | **Includes low and mid elevation grassland plant associations** - True grasslands; juniper/grass; juniper/big sage; Mt big sage/grass; and Mt shrub/grass. | 0 – 35 years<br>▪ True grasslands and savannahs with FRI (fire return intervals) of less than 10 years.<br>▪ Mesic sagebrush communities with FRI of 25 – 35 years and occasionally up to 50 years.<br>▪ Mountain shrub communities with FRI | Stand replacing. |
| 3 | **Consists of forest plant associations found at mid elevation, more mesic sites than fire regime 1**<br><br>3a - Mixed conifer<br><br>3b - Dry western hemlock; mesic grand fir;<br><br>3c - white bark pine below 45 degrees latitude; cool, mesic grand fir and Douglas-fir | **35 – 100+ years**<br><br>3a - < 50 years<br><br>3b - 50 - 100 years<br><br>3c - 100 - 200 years | **Mixed Severity**<br><br>3a - Low severity tends to dominate.<br>3b - Mixed severity<br><br>3c - High severity tends to dominate. |
| 4 | Forested species found at mid to | 35 – 100+ years | Stand replacing |

**Table 5 – Fire Regime Groups with Historical Frequencies**

| Fire Regime Group | Vegetation Types | Historical Frequency (Fire Return Interval) | Historical Severity |
|---|---|---|---|
| | high elevation – Lodge pole, sub alpine fir, spruce | | |
| | 4a - Lodge pole pine above ponderosa pine; aspen embedded in dry grand fir ; | 4a - 35 – 100+ years | 4a - stand replacing |
| | 4b - Sub alpine fir; white bark pine above 45 degrees latitude; and mountain hemlock; | 4b - 100 + years | 4b - stand replacing, patchy arrangement |
| | 4c - Spruce-fir; western larch; western white pine. | 4c - 100 – 200 years | 4c - stand replacing |
| 5 | Black sagebrush; salt desert scrub; alpine communities; sub alpine heath | Greater than 200 years | Stand replacing, or no fire |

Fuel conditions are an important factor in wildland fire behavior. Heavy fuels, lying under a dense canopy of tree crowns, create optimum conditions for stand replacement fire events, and further loss of LOS. Higher levels (over 10 tons per acre) of 0-3" fuels increase the potential for intense, lethal fire behavior.

The following tables display acres for each of the condition classes (defined in the table on page 17) found in the Sugar Analysis area, by fire regime.

**Table 6 – Acres for Condition Classes**

| Fire Regime | Acres Of Condition Class 3 | Acres Of Condition Class 2 | Acres of Condition Class 1 | Total Acres By Fire Regime |
|---|---|---|---|---|
| **1** | 3,087 | 296 | 0 | 3,383 |
| **2** | 0 | 2,283 | 159 | 2,442 |
| **3** | 3,558 | 635 | 6 | 4,199 |
| **4** | 0 | 0 | 104 | 104 |
| **5** | 0 | 0 | 166 | 166 |
| **Not Rated** | | | | 393 |
| **TOTAL** | 6,645 | 3,214 | 435 | 10,687 |

The following pictures are examples of stands in a condition class 3 and 2 within the analysis area followed by a table defining these condition classes.

Condition Class 3

Condition Class 2

**Table 7 – Condition Class Descriptions**

| Condition Class | Description |
|---|---|
| 1 | Fire regimes are within or near historical ranges, and the risk of losing key ecosystem components is low. Vegetation conditions in terms of species composition and structural stage are in tact and functioning within the historical range. |
| 2 | Fire regimes have been moderately altered from their historical range. The risk of losing key ecosystem components is moderate. Fire frequencies have departed from historical frequencies by one or more interval returns (increased or decreased). This results in moderate changes to one or more of the following: Fire size, Intensity and Severity, and Landscape patterns. Vegetation conditions in terms of species composition and structural stage have been moderately altered from historical conditions. |
| 3 | Fire regimes have significantly altered from their historical range. The risk of losing key ecosystem components is high. Fire frequencies have departed from historical frequencies by multiple return intervals. This results in dramatic changes to one or more of the following: Fire size, Intensity and Severity, and Landscape patterns. Vegetation conditions in terms of species composition and structural stage have been significantly altered from historical conditions. |

Current Condition classes represented within the Sugar project area are the result of both natural and human activities. The analysis area overall has a deficit in late and old structure; and a surplus of Stand Initiation (SI) and Understory Re-initiation (UR). Past timber harvest activities and fire exclusion have contributed to these conditions. Approximately 92% of the project area is within condition classes 2 or 3 (moderate to high departure from their historic ranges). High and moderate departures for the analysis area are primarily experienced in fire regime groups 1-3, with a stand structural stage of under story re-initiation. These are generally overstocked, have a ladder fuel component of shade tolerant fir, and /or have heavy concentrations of standing dead and down fuels.

High and moderate departures are also common in stand initiation structural stage in fire regimes 1 and 3. Within the next 10 to 15 years these stands are at risk of developing into a suppressed condition with a higher risk to insects, disease, and stand replacing fire due to high levels of crown bulk densities.

*Feedback on the Proposed Action indicated support for the use of prescribed fire, especially in fire adapted ecosystems, however there was mixed or no support for the use of mechanical fuels reduction (timber harvest) as a pre-treatment or fuels reduction treatment. The question of carbon emission levels from mechanical treatments versus using prescribed fire only was raised. They suggested that fuel reduction focus on the removal of small diameter trees using a diameter limit and retaining overstory. There was concern over the potential to increase fuel hazards in the area from logging slash and drying of the site from increased exposure to sun and wind. The effectiveness of thinning as a fuels reduction tool was also a question posed by the commenter.*

**Key Indicators:**

- Acres treated within fire regimes 1 and 3 of high departure from historical fire return intervals
- Acres treated within fire regimes of moderate departure from historical fire return intervals
- Fire Behavior Potential – measured in fire type (Crown or Surface), Flame length (feet), and Rate of Fire spread (chains per hour)

### Issue: Marginal Economic Feasibility

***The costs associated with density/fuel reduction work removing smaller diameter live trees can be quite high while the economic return is low making economic feasibility a concern. One of the goals of the Wallowa-Whitman Forest plan is to provide for the production of wood products to satisfy National needs and benefit local economies by producing an efficient timber sale offering.***

A concern related to management using timber harvest as a tool is to accomplish the harvest in a cost efficient manner while protecting resource values. Factors which relate to cost efficiency include silvicultural prescriptions, stands selected for treatment, size of harvest units, size of material to be removed and degree of merchantability, miles of road needed in relation to selected stands, road standards, yarding systems, and fuel treatment measures. In a few areas, access is complicated by lack of existing roads, existence of poor quality roads, expensive removal systems such as helicopter. All of these factors have the potential to increase the cost involved with accomplishing management in this area.

In order to meet the need within this project area for desired stand health and structure as well as reduced fuel loadings treatments are calling for the removal of small diameter materials. The costs associated with density/fuel reduction work removing smaller diameter live trees can be quite high while the economic return is low. This mix of non-saw and sawlog material could possibly produce a deficit or marginal timber sale.

One of the goals of the Wallowa-Whitman Forest plan is to provide for the production of wood products to satisfy National needs and benefit local economies consistent with natural resource objectives, environmental constraints, and economic efficiency. There is an opportunity through project design to meet the purpose and need within the project area and produce an efficient timber sale offering.

Economic efficiency and benefits to the local economy will be evaluated by determining the income to the local area and jobs produced as well as the timber sale viability of each alternative. Viability is measured by comparing the costs of removing timber and accomplishing required reforestation, against the timbers value on the open market. An economic analysis program called TEAECON will be used to evaluate the timber sale viability of each alternative. The advertised rate indicates the timber sales viability. An advertised rate (expressed in $$ per CCF) that displays a positive figure and does not need to be adjusted to cover essential reforestation costs indicates a viable timber sale alternative.

*Several of the public comments related to the proposed action indicated support for an economically feasible project with an analysis that clearly displays the viability of the sale and the impacts to the tax payers.*

**Key indicators:**

- Predicted High Bid in dollars/CCF
- Present Net Worth in dollars
- Payments to Counties in dollars
- Number of Jobs

## H. Other Issues

Some issues, concerns, and opportunities raised during the scoping process were not considered to be significant in relation to the proposed action. They are, however, considered important in achieving the goals and objectives of the proposed action and in meeting the intent of its purpose and need and are covered in this section.

Unless otherwise noted in the following narratives, the issues, concerns, and opportunities outlined below will be addressed in Chapter II, under Management Direction Common to All Action Alternatives, Management Requirements, Constraints, and Mitigation Measures, and/or in management direction for each action alternative. Potential environmental consequences will be disclosed in Chapter III. In general, all issues brought up during scoping for this project have been described in this section and were covered as described above.

Public comments raised the issue of a 6,700 acre uninventoried Roadless area they defined within the project area. This issue was considered by the ID Team but it was found to be highly dissected by existing roads and harvest units which effectively broke it into smaller parcels of non-contiguous areas. Therefore, it will not be discussed further as this project will have no effect on the small parcels of unroaded area adjacent to the Mt. Emily Inventoried Roadless Area.

**1. Indian Treaty Rights and Trust Responsibilities**

The Forest Service manages ceded tribal lands under trust responsibilities as described in tribal treaties. Forest Service policy includes the establishment and maintenance of government-to-government relationships with the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) for the purpose of building stable, long-term relationships, which result in positive, mutually understood, and beneficial solutions to common situations.

Consultation between the La Grande Ranger District and the CTUIR Tribe for this project should maintain the trust responsibilities established through public law and treaties and provide for mutual understanding of resource management objectives.

**2. Water Quality, Fisheries, and Riparian Habitat**

The Sugar project area is primarily located within the Lower Five Points Creek subwatershed (170601040403) within the Grande Ronde River-Five Points Creek Watershed (1706010404). A small portion of the project is located in the East Meacham Creek subwatershed (170701030202) within the Meacham Creek Watershed. Within the project area there is approximately 10 miles of Class I streams, 0.7 miles of Class III streams, and nearly 40 miles of Class IV streams. Five Points Creek, Little John Day Creek, and an unnamed tributary to Five Points Creek referred to as Nunamaker Creek (originates at Nunamaker Spring) are the Class I streams within the project area. Five Points Creek comprises approximately 7.5 miles of Class I stream, the Little John Day comprises approximately 0.8 miles of Class I stream, and Nunamaker Creek comprises approximately 1.8 miles of Class I stream.

**Instream Habitat –** Both Five Points Creek and Little John Day Creek are well below the Riparian Management Objective (RMO) for pools/mile. In the early 1900's, railroad grades were constructed up the valley bottom of Five Points Creek, Little John Day Creek, and Nunamaker Creek. Railroad logging removed streamside conifers needed for channel structure and pool formation. In addition, the railroad grades, especially in the fishbearing portion of Little John Day Creek, have altered the channel and valley morphology by constricting and straightening portions of the streams further reducing pool formation.

Two temperature monitoring sites are located on Five Points Creek (one at the mouth of Five Points below the analysis area and one within the analysis area). Maximum weekly average temperatures for 2001 through 2007 average approximately 74.6 degrees (Five Points within the project area) and 78.6 degrees below the project area). The Oregon Department of Environmental Quality (ODEQ) water quality standards for temperature are based on the maximum 7-day running average. Temperature standards were developed based on temperature requirements of salmonids during different seasons and life stages. The temperature standard applicable to streams within the Sugar project area is that water bodies must not be warmer than 12°C/55°F for bull trout rearing fish use even though bull trout are not present in the Five Points Creek system.

Field reconnaissance found a high degree of stable banks in Little John Day Creek and Five Points

Creek. The general exception is where stream/hillslope or stream/railroad grade interactions were occurring. Five Points Creek exceeded the Width to Depth Ratio standard of <10. No width to depth data was available for Little John Day Creek. Both streams surveyed exceeded the standard of >20 pieces per mile for large woody debris.

**Riparian Vegetation –** Outside of of several areas identified during field reconnaissance where overstory trees within the RHCA are overstocked, riparian vegetation is generally in good condition except where historic railroad grades have prevented or slowed the establishment of riparian vegetation. RHCAs within the analysis area typically have heavy ground cover and abundant large wood except where railroad logging has resulted in decreased levels of large wood.

**Water Quality -** The Oregon Department of Environmental Quality (ODEQ) water quality standards for temperature are based on the maximum 7-day running average. Temperature standards were developed based on temperature requirements of salmonids during different seasons and life stages. The temperature standard applicable to streams within the Sugar project area is that water bodies must not be warmer than 12°C/55°F for bull trout rearing fish use even though bull trout are not present in the Five Points Creek system.

A TMDL Water Quality Management Plan (WQMP) has been developed for the Upper Grande Ronde Basin, and was approved By EPA in May of 2000. With the approval of a TMDL the ODEQ 303 (d) list no longer applies. Once the TMDL is developed and approved all management activities on federal lands managed by the USDA Forest Service will continue to follow standards and guidelines (S&Gs) as listed in PACFISH, the Wallowa-Whitman N.F. Forest Plan, and Best Management Practices (BMPs) as defined in the Implementation Plan for 208 (Water Pollution Control Act, PL 92-500, as amended). Additionally, specific SMU Constraints and Mitigation Measures are identified in the Wallowa-Whitman Watershed Management Handbook, which is used when various situations are encountered during project layout.

Roads provide a substantial source of sediment and a mechanism for delivering sediment to the stream systems. The amount varies by density, location and condition of roads. One sediment producing road was found (3100131 road), which crosses a small class IV stream. The class IV stream travels down the road surface causing erosion. The approaches are also showing signs of erosion and puddling. This road crossing is approximately 1.0 miles from the nearest fishbearing stream, which is Five Points Creek.

There are approximately 46.5 miles of FS open roads and 15.1 miles of FS closed roads in the Lower Five Points Creek subwatershed. The Lower Five Points Creek subwatershed has an open road density of 2.2 miles per square mile of subwatershed, and open and closed road density of 2.9 miles per square mile of subwatershed. Open and closed roads in the Sugar project area are primarily located on ridgetops and in the uplands. Those roads that do cross RHCAs are in good condition with adequate road surface, proper drainage, and intact functioning culverts. Approaches to streams are relatively flat. Overall, no open or closed draw bottom roads were found during field reconnaissance. *Temporary road construction was identified in the public comments as a concern for water quality and resource protection.*

**Fisheries** - There is approximately 10.1 miles of fish bearing stream within the project area. This includes approximately 7.5 miles of Five Points Creek, 0.8 miles of Little John Day Creek, and 1.8 miles of Nunamaker Creek. Five Points Creek within the project area is: spawning and rearing habitat and designated critical habitat for Snake River summer steelhead (*Oncorhynchus mykiss*), listed as threatened on August 11, 1997; and spawning and rearing habitat for redband trout (*O. mykiss gibbsi*), which are on the Regional Forester's Sensitive Species List. Little John Day Creek is rearing habitat and designated critical habitat for summer steelhead, and spawning and rearing habitat for redband trout. Nunamaker Creek is considered spawning and rearing habitat for summer steelhead and is designated critical habitat for that species. Nunamker Creek is perennial in the lower 0.3 miles of stream. Above that point the stream is intermittent and is typically dry by the end of June. Five Points Creek and Little John Day Creek are known fishbearing streams.

This project must be designed in such a way that there will be a very low probability that there will be an adverse effect on fish species in the project area. There must not be a measurable increase in stream sediment delivery in this subwatershed and efforts should be made to reduce the existing sources of non-natural sediment. Large woody material must not be removed from stream channels. New roads that cross-streams or enter RHCAs should not be constructed unless absolutely necessary.

*One public comment mentioned that this project area is important habitat for anadromous fish species and that best available science should be used to analyze the impacts of this project on fish. Two other commenters expressed support of riparian treatments, however one indicated that there should be no yarding corridors, roads or negative impacts to water quality and aquatic habitat.*

**3. Soil Quality and Productivity**

Most soils in the project area have developed from two parent materials: basalt/andesitic basalt and volcanic ash. Prior to 6,850 years before present (BP), soils were developing primarily in basalt residuum, colluvium and alluvium. About 6,850 BP, approximately 2 feet of Mt Mazama ash was deposited over the basalt-derived soils. During the past 6,850 years, differential natural erosion rates within the project area produced many different soils, ranging from thin, rocky, residual basalt-derived soils on ridgetops with no remaining ash cap, to deep volcanic ash deposits over residual colluvial basalt-derived soils on toeslopes. Soils within the project area occur on eight landtype associations mapped in the project area. Seven of these landtypes have substantial influence from volcanic ash.

Surveys within each stand proposed for treatment in the Sugar project area indicate that all of the units are below the 20% detrimental soil condition (DSC) threshold set in the Forest Plan. Soil disturbance (DSCs) in proposed silviculture and prescribed fire units currently range from 0% to 13.4%, with most units below 7%. Non-commercial silvicultural treatment units had detrimental soil conditions less than 9%. Therefore, DSCs in all units are below the 20% affected-area threshold as required by Region and Forest Plan standards.

To ensure protection of long-term soil productivity, Region 6 has established soil quality standards and guidelines (USFS 1998) for compaction, puddling, displacement, burning, erosion and mass wasting. Soil management efforts should concentrate on controlling erosion (surface erosion and mass movement), minimizing damage to the soil (compaction, displacement, puddling, severe burning), and minimizing road building and other developments, which remove land from the productive base.

**4. Air Quality and Smoke Management**

The Sugar project area is located near the following smoke sensitive communities/areas: Union, La Grande, Baker City, Cove, Highway 203, and the Eagle Cap Wilderness (Class I Airshed). The prevailing wind during fire season is out of the southwest. The City of La Grande is monitored by the Oregon Department of Environmental Quality for federal air quality standard compliance. The concern is to maintain air quality standards for this class I airshed and the City of La Grande.

Wildfire events in the Sugar analysis area that escape initial attack have the potential to spread onto private lands and the adjacent inventoried roadless area in the 5 Points drainage.

The analysis area has a high risk of affecting air quality because of its location. Prescribed burning should be carefully coordinated with the Department of Environmental Quality to prevent smoke related problems.

**5. Noxious Weeds**

The introduction and proliferation of noxious weeds through project activities is a concern. The analysis for vegetation management is conducted in accordance with the 1990 Forest Plan Standards and Guidelines and the Integrated Noxious Weed Management Plan - Wallowa Whitman National Forest (INWMP, 1992). Management activities will give consideration and evaluation of prevention strategies

during the planning process (INWMP, Chapter V. Prevention Strategies, Section B) and Regional Forester's Forest Plan Amendment #5, *Pacific Northwest Region Invasive Plant Program Preventing and Managing Invasive Plants FEIS* (April 2005) along with its Record of Decision (*ROD*).

There are 19 known noxious weed locations for six noxious weed species within the Sugar Planning area. Diffuse knapweed, spotted knapweed, Canada thistle, hound's tongue, Sulfur cinquefoil, and St. John's wort are the weed species represented within these infestations (refer to the GIS Noxious Weed layer for locations). These species are rated as high priority weeds because they are invasive, persistent, and prolific reproducers. They displace desirable vegetation, and presently occur in infestations at scales that are feasible to treat. Project design and activities must take these populations into consideration to ensure that they are not spread further throughout the project area. *Public comments supported proactive steps to avoid the spread of noxious weeds.*

**6. Range and Livestock Management**

The project area includes the Five Points Cattle and Horse and the Spring Mountain Sheep grazing allotments on the La Grande Ranger District. These allotments are grazed by cattle, horses, or sheep and are administered by the La Grande District. It is important that activities associated with this project do not impact pasture rotations or compromise the integrity of range improvements necessary for management of rangeland resources on the allotments. Improvements and trails must be restored to their original condition to facilitate movement of livestock within the pastures, gates must be closed, and problems coordinated with the Rangeland Managers to ensure immediate resolution.

*Public comments indicated that impacts from grazing must be analyzed as a part of the cumulative effects from this project on natural resources.*

**7. Cultural Resources**

Public law requires federal agencies to identify and protect natural, cultural, historical, and archeological resources and sites and to consult with interested parties on the effect of proposed actions.

Cultural sites located within and adjacent to the analysis area should be protected throughout project implementation to prevent damage to these resources.

**8. Management Indicator Species (MIS) and Proposed, Endangered, Threatened, and Sensitive Species (PETS) - Wildlife and Plants**

The management indicator species (MIS) of the Wallowa-Whitman National Forest and the habitat or habitat component that they represent are shown in the table below. All the species in this table are known or suspected to inhabit the analysis area or in areas adjacent to the project area. In the case of the marten, pileated woodpecker and associated species, the nearby headwaters of Five Points Creek and relatively large tracts of habitat to the north in the Meacham drainage likely support a source population of these species, however, within the project area there are few, if any examples of habitat that could support reproductive pairs of American marten and other species requiring contiguous cover with an old growth component.

**Table 8 - Management Indicator Species.**

| SPECIES | HABITAT |
|---|---|
| Pileated woodpecker (*Dryocopus pileatus*) | Old growth and mature forests |
| Primary cavity excavators * | Snags |
| Northern goshawk (*Accipiter gentiles*) | Old growth and mature forest |
| Rocky Mountain elk (*Cervus elaphus*) | Cover/forage |
| American marten (*Martes americana*) | Old growth and mature forest |

* northern flicker (*Colaptes auratus*), Lewis' woodpecker (*Melanerpes lewis*), yellow-bellied sapsucker (*Sphyrapicus varius*), Williamson's sapsucker (*Sphyrapicus thyroideus*), red-naped sapsucker (*Sphyrapicus nuchalis*), hairy woodpecker (*Picoides villosus*), downy woodpecker (*Picoides pubescens*), white-headed woodpecker (*Picoides albolarvatus*), Northern three-toed woodpecker (*Picoides tridactylus*), black-backed woodpecker (*Picoides arcticus*), mountain chickadee (*Parus gambeli*), black-capped chickadee (*Parus atricapillus*), white-breasted nuthatch (*Sitta carolinensis*), red-breasted nuthatch (*Sitta Canadensis*), and pygmy nuthatch (*Sitta pygmaea*).

Management indicator species (MIS) serve as indicators of the effects of management activities by representing a broad range of other indigenous wildlife species. The management indicator species that may be impacted by this project include: the primary cavity excavators (including pileated woodpecker), elk, American marten, and northern goshawk.

Northern goshawk surveys were completed and did not produce any new sites. The known site of this species and the 5 other known raptor nest sites within the project area will be protected and post-fledging areas identified where appropriate. *Public comments recommended the protection and avoidance of raptor nests during project activities.*

PETS species and their habitat must be considered and protected during all proposed activities. Suitable habitat and wildlife PETS species known or suspected to occur within or immediately adjacent to the analysis area have been identified in the Sugar Biological Evaluation and Biological Assessment documents in the analysis file.

Sensitive plant species are known to occur within the analysis area. A list of these plants, and their location is provided in the Botany report, residing in the project analysis file. Project design and monitoring criteria should provide for protection of known sites. No known location or habitat for any Threatened or Endangered plant species exists within the project area. There is habitat and potential for the occurrence of R-6 Sensitive plant species within the project area. Surveys have been conducted at the appropriate time of year to determine species occurrence within the project area.

**9. Prescribed Burning and Big Game/Migratory Birds**

Experience on the district indicates the greatest potential for impacting new born calves and deer fawns occurs during post sale slash treatment activities in the spring season. Calving and fawning typically occurs in elevations less than 4,000 feet, areas of low disturbance, gentle topography, and near water sources. The majority of calves and fawns are born between May 15 and June 15.

In 1990, the National Fish and Wildlife Foundation proposed an initiative for the conservation of migratory land birds that breed in North America and winter in neotropical countries. Recent analyses of local and regional bird population counts, radar migration data, and capture data from banding stations show that forest-dwelling bird species, many of which are neotropical migrants, have experienced population declines in many areas of North America (Finch 1991). Factors contributing to population declines include forest fragmentation on the breeding grounds, deforestation of wintering habitats, pesticide poisoning, or the cumulative effects of habitat changes.

**10. Access and Travel Management (A&TM)**

The road system in the Sugar analysis area is now serving three major users. The most frequent use of the road system is for recreational purposes. Access to private lands, which is also directly associated with recreational use of the area, is a major contributor to road use. Another major road user of the Sugar analysis area is by resource managers and their project personnel monitoring and carrying out activities associated with management of their resources. The La Grande District has a District Access and Travel Management Plan (A&TM) which is a reflection of previous decisions focused on managing a road network appropriate for access and upkeep on the District and maintaining forest road densities to within Forest Plan guidelines. Access and travel management implementation has been on-going over the years within the Sugar project area; and as such, has been fully implemented. Monitoring indicates

that some of the closures have not been completely effective due the method of closure, topography and the location of the closure device, however, the overall plan for the area is appropriate.

In the East Meacham Creek subwatershed, project area boundaries which stop at Forest boundaries, remove large portions of the subwatershed from this analysis resulting in several with a very small number of acres being analyzed within each management area (0.05 to 0.82 square miles for a total of 0.97 square miles of project area). In these situations, road densities are skewed due to the inappropriate scale of the analysis area for an evaluation of this type (WWNF Forest Plan, page 4-35). Therefore, this portion of the project area was considered by the ID Team, however, because the existing road management plan is appropriate and no new road construction is proposed within that less than one square mile of project area, this subwatershed was removed from the calculations and will not be analyzed further in this EA for access management.

Transportation system management is important because in addition to big game disturbance, roads can be a source of sediment, intercept groundwater flow, increase the drainage network, reduce large shade-producing trees, and confine stream channels preventing lateral stream movement.

Project activities should be directed to maintain the planned road density levels, improve closures where possible, and not exceed road density level guidelines established by the Forest Plan. *Open road densities and compliance with Forest Plan guidelines was identified by one commenter as an important issue and they mentioned that some roads needed to be closed to all vehicles to protect natural resources within the project area. Another commenter indicated that fewer roads should be build and fewer roads should be re-opened in the project area.*

**Table 9 – Road Densities**

| SWS | Management Areas | Project Area (sq. mi) | Open Road Density (mi./sq. mi.) | Forest Plan Road Density Guideline |
|---|---|---|---|---|
| Lower 5 Points Creek | 1 | 3.57 | 2.05 | 2.5 |
| | 1W | 1.63 | 1.6 | 1.5 |
| | 3 | 12.7 | 0.89 | 1.5 |
| | 17 | 0.23 | 0.85 | N/A |

**11. Safety**

Standing dead trees near areas of concentrated public use, such as recreation sites or main traveled roads, represent a public safety hazard. Log haul on high recreation use roads could create conflicts with public users and a potential safety hazard.

Aerially yarded logs over road open to vehicular traffic with either skyline or helicopter creates a concern for public safety.

**12. Water Rights**

The Wallowa-Whitman National Forest has reserved water rights within the Sugar area with a priority date of 1906. Concerns relating to water rights include how much water can be used during project implementation for uses such as road construction and reconstruction and at what time of year can the water resources be used.

**13. Standing and Down Woody Materials**

Firewood cutters have severely reduced the larch and Douglas-fir snag component along all open roads and in areas where roads have been created by firewood cutters. In addition, during the elk and deer hunting season, dispersed campers use dead trees for firewood; ponderosa pine and western larch snags are the preferred species. In general, snags and down woody material are not distributed

uniformly throughout the analysis area. Ponderosa pine stands are often snag and down woody material deficient.

**14. Recreation and Visuals**

No developed recreation facilities exist within the project area, recreation is primarily focused on day trip activities such as snowmobile riding, firewood gathering, hiking, hunting, mushroom and huckleberry picking during the summer months. The highest use in this area is experienced during the big game hunting seasons when hunters occupy many of the dispersed campsites and heavily use the roads within the area. This project needs to maintain an appropriate level of recreation opportunities for the users within this area.

Many users of the area desire the roaded natural experience. They desire natural appearing settings, few encounters with other people and low level of administrative control. Others enjoy the unroaded settings within the adjacent Mt. Emily inventoried roadless area and the 5 Points Creek Wild and Scenic Study River with no recreational facilities and the primitive recreational experience. Many people value the ecological integrity of the area and desire the area to be impacted only by natural processes. It is important to recognize the values of all constituents and manage with all aspects in mind.

The 5 Points Creek Wild and Scenic Study River is located within the project area. The outstandingly remarkable values of scenery and fisheries need to be maintained or enhanced by activities within this project.

## I. Summary of Scoping Process

The Sugar Vegetation Management project was published in the Wallowa-Whitman Schedule of Proposed Actions (SOPA), a quarterly publication, in April 2008 and has appeared in each quarterly SOPA since then. The SOPA is available on the forest website at www.fs.fed.us/r6/w-w/projects/. It is also mailed to approximately 100 government offices, elected officials, and individuals.

A detailed description of the proposed action was mailed on February 8, 2008 to approximately 100 forest users and concerned publics soliciting comments and concerns related to this project. Three letters of response were received from interested parties and one phone call, which are part of the Issues identified in this Chapter and are located within the Public Comments section of the EA. In addition to the direct mailing of the Proposed Action, a news release was published in the Observer newspaper soliciting comments on the Proposed Action.

An informational meeting was held on February 27, 2008 with Hells Canyon Preservation Council to discuss the Proposed Action, answer questions, and listen to their concerns/issues with the project.

A brief overview of the project and regular project updates have been presented to the Union County Community Forest Restoration Board as a part of District program of work for 2007-2009. Members also received a copy of the Proposed Action.

Scoping and consultation for the project was initiated and is ongoing with the CTUIR and ODF&W.

This project has been submitted to The State Historical Preservation Officer (SHPO) for review.

An analysis file for this project is available for public review at the La Grande Ranger District. The analysis file includes specialist's reports, data specific to the project, public notifications and their responses, meeting notes, and miscellaneous documentation.

# Chapter II: Alternatives, Including the Proposed Action

## A. Introduction

This section describes a reasonable range of alternatives as they address the purpose and need for action and as they respond to the issues.

## B. Alternative Development Process

The National Environmental Policy Act (NEPA) directs the Forest Service to use an interdisciplinary approach which will ensure the integrated use of natural and social sciences and the environmental design arts [NEPA, section 102(2)(A)].

An ID team developed alternatives based on the purpose and need of the project and the key issues and other concerns identified in Chapter 1 of this assessment. Forest Service management objectives are incorporated into alternatives by following standards and guidelines of the Wallowa-Whitman National Forest Plan as amended.

## C. Alternatives Considered, but Eliminated from Detailed Study

The following alternative options were considered during the development of this analysis but were eliminated from detailed study as described below.

**Alternative A - No Use of Shelterwood, Overstory Removal, or Sanitation harvest prescriptions:**

An alternative, which would not use shelterwood, overstory removal, or sanitation harvest prescriptions was recommended by one commenter because they felt it was based on an exclusively commercial view of forest management. Prescriptions chosen for each stand are based on the site specific requirements for each stand to maximize stand health, vigor, and growth to achieve the desired future condition for vegetation within the project area. The stands chosen for these prescriptions are at the highest risk for mortality from insects, disease, and wildfire should one occur within the stand due to their poor health and existing levels of insect and disease activity. Because removal of these prescriptions from the tool box was not science based and an arbitrary recommendation it was considered but eliminated from detailed study.

**Alternative B - No treatment of LOS Stands/Retain all Trees with Old-growth Characteristics:**

No treatment in any stands with structure classified as LOS (1,700 acres) within the project area was considered in the range of alternatives for this project. Deferring treatment of the LOS stands within this project area would mean considering only 73% of the need within the project area. Of the stands that would be dropped, all of them are rated as high priority stands for treatment due to overstocking, high fuel loadings, and risk from insects and diseases.

Many of these stands are within the burn blocks established in this project area for prescribed fire, the lack of mechanical pre-treatment within several of the burn blocks would reduce the prescribed burning opportunities and increase the potential for tree mortality within the burn blocks.

This alternative was eliminated from detailed study because it did not meet the purpose and need to manage the stands toward the historic range of forest structures within the project area, specifically restoring SSLT structures in stands that have developed MSLT structure due to fire exclusion. It would also not improve long term forest health in stands rated as a high priority for treatment based on the stand health and vigor. Elimination of these acres would not meet the

purpose and need of increasing stand vigor, forest health, and promoting seral structures which reflect historic disturbance types and levels.

**Alternative C – Cut and Remove Trees Greater than 21 inches dbh Where Appropriate:**

Removal of trees greater than 21 inches dbh was not considered necessary to meet the purpose and need identified for the Sugar project area. Removal of mistletoe trees less than 21" dbh where needed to protect developing understories was considered adequate within this project area and therefore, trees greater than 21" dbh will be left on site to provide for structure, future down wood needs, and the needs of wildlife species dependant on large tree habitat.

**Alternative D – Focus Fuels Reduction within ½ mile of the Perry/Hilgard WUI:**

The Proposed Action did focus on fuel reduction treatments within ½ mile of the Perry/Hilgard WUI with the majority of the FFU treatments (refer to prescription description in the next section) being concentrated in that area. The fuel reduction benefits realized by mechanical harvest treatments not only meet the stocking level goals within the area but also provide for strategic fuel reduction areas along private land interface areas along the southeast boundary of the project area along with an area along the boundary of the Mt. Emily Inventoried Roadless Area to the east of the project area. This area of reduced fuel loadings is extremely important to provide for the safe initial and extended attack of fires coming from the roadless area or headed toward the roadless area. Concentrating fuel reduction only within a half mile of the Perry/Hilgard WUI would not meet the purpose and need of this project related to managing stocking levels nor for the fuel reduction needs of the landscape. It is important to consider fuel reduction over a larger area in order to provide for firefighter safety and strategic locations from with to protect private lands and important natural resources.

**Alternative E – Close and Decommission More Roads within the Project Area:**

As described on page 22 under the Access and Travel Management issue, open road densities within the project area generally meet Forest Plan guidelines and provide an appropriate level of access into the area. No specific roads or rationale for further closures was given by any of the commenters. Because the Forest is currently going through the NEPA process for the Forest-wide Travel Management Plan which will designate open motorized routes within this project area, the decision has been made by the Forest Supervisor to not consider additional site specific road closures before the completion of that project unless the area is above Forest Plan guidelines or has severe resource damage occurring which must be addressed before 2010. Neither of these circumstances are currently occurring within the project area, therefore, additional road closures and decommissioning were not considered in this analysis. At the conclusion of this project the area will be returned to the current open road network and all remaining roads (if opened for this project) will be closed back down.

**Alternative F – No Commercial Harvest in Uninventoried Roadless Area**

Public comments raised the issue of a 6,700 acre uninventoried roadless area they defined within the project area. Of the 6,700 acres, most is dissected by roads and past harvest units, within only one smaller parcel of approximately 1,000 in size (dissected by four roads and cut off from the remainder of the identified area by a road) being contiguous to the Mt. Emily Inventoried Roadless Area. Approximately 400 acres of the 1,000 acre piece consists of several areas that are nearly surrounded by roads with the distances to the roads ranging from 100 to 500 feet. Most of the treatment within the remaining area is primarily non-commercial (precommercial thinning of past harvest units) or nearly surrounded by past harvest treatments and roads. In general, the area under consideration is steep, primarily open scablands and was defined by the commenter immediately adjacent to all of the roads bisecting the area. At the farthest points from any road, a small percentage (approximately 5%) of the remaining 600 acres remains within a half mile of open the roads within the area and incorporates past harvest units. This

area would not provide the characteristics identified for a roadless recreational experience and was therefore not considered further in this analysis.

## D. Alternatives Considered in Detail

### Elements Common To the Action Alternatives

#### 1) Silvicultural Treatment Prescriptions/Objectives

**Prescriptions/objectives:**

The following describes the treatment objectives, methods and anticipated outcomes for the vegetation management to be accomplished within the project area.

**Stocking Levels for Forested Stands –** Stand density ranges have been developed for each conifer plant association (PAs). Ponderosa pine PAs are different from Douglas-fir PAs. The range is based, in part, on the growing capacity (or site potential) of each plant association. Tree densities would be reduced to various levels along the range of basal area, depending on management objectives. A stand can be managed to the upper management zone, which would be the high end of this range and prevents development of a suppressed crown class. Or it can be managed to the lower management zone, which would be the lower end of this range allowing a substantial portion of a site's resources to be allocated to tree growth.

**Upper Management Zone** (UMZ) – For the Sugar project area the UMZ will be the level of tree stocking that maintains the maximum amount of sustainable tree cover. This level avoids development of suppressed trees and precludes significant amounts of density-related tree mortality.

**Lower Management Zone** (LMZ) – The lower limit of full site occupancy where a significant portion of site resources can be allocated as tree growth.

**Treatment Priority Ratings:**

**High Priority** – Stands were rated as a high priority for treatment if they were overstocked with basal areas near or above the UMZ. These stands are at higher risk to insect and disease infestations, as well as fire caused mortality in the event of a wildfire in the area.

**Low Priority** – While these stands are still a priority for treatment, they are considered of lower priority because their existing density is already near the LMZ and while they would benefit from a treatment they could hold for the next 5-10 years without treatment with minor long term negative effects.

**Connective Corridor Units:**

The goal within these units would be to maintain and enhance their cover and connectivity qualities such as medium to large trees as a common occurrence, canopy closure within the top 1/3 of site potential, and no less than 400 feet at the narrowest point.

Stocking levels would be managed to the upper management zones for basal area except where tree quality and crown conditions are such that the upper management zone is unattainable, in those areas, 20% of the stand would be in untreated clumps. Trees with down to 20% live crown would be retained where needed to meet the higher basal area objectives. All snags would be retained. Down logs would be retained at the following levels:

200 lineal feet per acre
Minimum lengths of logs 20 feet or largest available
Minimum of 12" small end diameter logs or largest available

**Prescriptions:**

**Sanitation harvest** (HSA) prescription is designed to remove dead, damaged, or susceptible trees to prevent the spread of pests or pathogens.

**Thinning harvest** (HTH) prescription is designed to stimulate the growth of the trees that remain.

**Shelterwood harvest** (HSH) prescriptions in which a stand of trees is removed through a series of cuttings designed to establish a new layer. Due to site conditions, overstory trees are retained to provide some shade or protection for the regenerating stand beneath it. Once established, the overstory trees can be removed as described in and HOR below.

**Improvement harvest** (HIM) prescription cutting made in stands for the purpose of improving the composition and quality by removing trees of undesirable species, form or condition from the main canopy.

**Overstory removal harvest** (HOR) cutting that removes older trees that overtop a more desirable younger stand.

**Precommercial thinning** (SPC) cutting or removal by slashbuster of selected trees in a young stand to stimulate the growth of the trees that will remain on the site.

***Post-harvest follow-up:***

Units would be monitored following harvest activity for site preparation, regeneration, or stand improvement needs. Reforestation work would be accomplished on sites that are below recommended stocking levels (180 – 300 trees per acre depending on the site) through planting or natural regeneration.

**2) <u>Riparian Habitat Conservation Areas (RHCAs)</u>**

**Riparian treatment units** (refer to specific units under each alternative description) would be treated as follows within the riparian habitat conservation area. Precommercial thinning units would have no activity buffers of 25 feet along class IV streams and 50 feet on class III streams. Harvest and fire/fuels units (FFUs) would have no activity buffers of 30 feet along (class IV) intermittent non-fish bearing stream channels and wetlands less than one acre; 50 feet adjacent to (class III) perennial non-fish bearing stream channels and wetlands greater than one acre; and 100 feet adjacent to (class I) perennial fish bearing streams. Stand density reduction treatments would occur outside of these no activity buffers within the RHCA to maintain and enhance riparian values and would generally match the treatments prescribed for in the adjacent units as coordinated between the Project Silviculturist and Fisheries Biologist. Treatments within these units Follow-up treatment would also generally match the treatments prescribed in the adjacent unit and could include use of precommercial thinning and prescribed fire to reduce residual fine fuels. Skyline yarding across the no activity areas (100' and 30' defined above) within the RHCAs would require full suspension.

The expected result is accelerated recovery of riparian vegetation conditions - enhanced forage and resistance to fire. Improvements in vegetative conditions are expected to increase the number of high quality pieces of large woody material acting on the channels and floodplains in the future.

With the exception of those units treated as described above, all other treatment units in the action alternatives would incorporate the default PACFISH RHCA no-cut buffer guidelines (refer to the

Riparian section of the Management Requirements, Constraints and Mitigation Measures portion of this Chapter).

**3) Fuels Reduction**

The natural fuels reduction areas were selected based upon several criteria including; access, biophysical group, topography, existing fuel conditions and potential fire behavior (refer to prescribed fire maps in the appendices for unit locations). Treatments within these areas would consist of a combination of mechanical harvest/removal and prescribed burning.

Objectives in all units would be to: a) reduce stand densities in overstocked stands and ladder fuels; b) enhance forage; c) create defensible fuel profile zones in strategic areas to aid in fire suppression efforts and minimize natural resource impacts in the event of a wildfire; d) reintroduce fire as a disturbance factor on historical fire return intervals to reduce fir encroachment; e) promote healthy fire resistant stands at a landscape scale; f) promote large tree characteristics and provide for structural diversity.

**General Mechanical Prescriptions:**

Associated with harvest units the following activities would occur:

1. Treatments would reduce overstocking of trees >7" dbh to recommended stocking levels per biophysical group.
2. 2-8 snags (depending on type of site) per acre >12" dbh and at least 35 feet tall would be retained while snags >5" dbh in excess of recommended snag levels would be removed.
3. Down wood would be retained at 120-140 lineal feet of down wood composed of pieces at least 12" diameter on the small end and at least 20 feet long. All other materials >3" in diameter could be reduced to 25 tons or less per acre.

**Fire/Fuels Units (FFU) –** These non-harvest units (refer to alternative descriptions for unit numbers and acres) would receive a mechanical fuels reduction treatment designed to increase the effectiveness of the proposed prescribed burning. The following treatments may occur within the proposed FFU unit boundaries:

- Thinning/cleaning of trees less than 9" d.b.h.
- Mastication (slash-busting ) on slopes less than 30%
- Lopping and scattering thinning slash
- Pruning on leave trees greater than 7" d.b.h.
- Hand piling of thinning slash and excess natural fuels
- Grapple piling of thinning slash on slopes less than 30%

**Prescribed Burn Units -** Prescribed burning would occur when weather and fuel conditions are appropriate to meet the objectives and prescription for each unit. No more than a total of 10% of the available forage would be burned per year within the project area. Burning would be accomplished over the next 10 years. Existing plantations and thinning areas would be avoided during burn layout and implementation. Control lines would include roads, natural barriers and brush removal rather than bare mineral soil line construction where possible.

**General Prescribed Fire Prescriptions:**

a. Fires would generally be low intensity (2-4 foot flame lengths with occasional torching).
b. Fuel loading goals would be as described in the following table:

**Table 1 - Fuel Size Class**

| Fuel Size Class | Desired Tons/Ac | Lineal Feet |
|---|---|---|
| 0-3" Diameter | < 3 | |
| 3-9" Diameter | 3 | |
| 12" Plus Diameter | 5-15 | 120-140 |

c. Trees ≤ 5" dbh that are mistletoe infected, suppressed, or encroaching on fire regime 1 areas could be eliminated.

With the exception of the RHCA treatment units described under the Modified RHCA section above, all other treatment units calling for the use of prescribed fire would not permit direct ignition within 150' of any Class I and III stream channels and 50' of Class IV stream channels. Low intensity fire would be allowed to back into all RHCAs. Reducing these fuels will enhance forage habitat and increase overstory growth rates by making nutrients readily available after burning is completed.

The following Conditions are present in each burn block within the Sugar analysis area. Each Condition is analyzed following mechanical treatments and application of prescribed burning to provide an estimate of how much of each would actually be burned following these treatments since it is not the intent nor is it possible to have the entire area burned during prescribed burning activities.

**Condition A (Fire Regime 3/Condition Class 3):** Non-harvest mechanical pretreatment would be a combination of thinning, cleaning, and piling to treat ladder fuels and down woody material to facilitate the use of prescribed fire. The prescribed burning would include jackpot burning/under burning or pile burning to further reduce fuels. The result would be a mosaic pattern of burned and unburned areas. Approximately 50% or less of the burn block containing this condition could actually be burned.

**Condition B (Fire Regime 1/Condition Class 3):** A combination of commercial and noncommercial thinning would be used to mechanically pre-treat fuels to facilitate the use of prescribed fire. On these drier sites, burning could likely result in random patches of burned and unburned areas with approximately 75% of the area being burned.

**Condition C (Fire Regime 3/Condition Class 3):** Harvest treatments are designed to promote tree growth, discourage competition, reduce fuels in the form of litter, duff, and decadent grasses, thin suppressed thick clumps of regeneration, and enhance forage conditions. Canopy closure within these conditions would moderate fire behavior contributing to patchy burn patterns leading to greater than 50 % surface fuel consumption.

**Condition D (Fire Regime 3/Condition Class 1):** These areas contain units that were precommercially cleaned and thinned within the last ten years. Therefore, burning would generally only occur around the edges of the thinned areas and would be very light in the cleaned areas resulting in <5% of the area burned.

**Condition E (Fire Regime 1/Condition Class 2):** Following a light mechanical cleaning of this understory, a low intensity under burn would be run through the area to reduce surface and ladder fuels. Approximately 50% of the area could be burned.

**Condition F (Areas of sparse vegetation on ridge tops or south facing slopes):** These areas consist of very sparse heavily grazed grasses with a small shrub component. No mechanical treatments or minimal burning would be prescribed within these areas.

**4) Sugarloaf Mountain Aspen Restoration**

The existing ungulate exclosure fence would be maintained over the next five years. Once monitoring indicates the aspen can survive some ungulate browsing pressure, the fence would be dismantled and materials removed from the site. To prevent encroachment from seedlings and saplings, non-commercial sized conifers within the aspen stand would be cut, piled and burned. This hand work would be conducted with chainsaws; no heavy equipment would be used. The site would be accessed by foot or ATVs.

### 5) Access and Travel Management – Roads Analysis

Travelways across the entire project area were analyzed in the Sugar Project Roads Analysis to determine how best to manage access to meet resource needs and long-term objectives. Management recommendations from the Roads Analysis were carried forward into this project and analyzed at a site specific level to develop a long-term Access and Travel Management Plan for the project area.

The road management plan objectives for this project area will primarily reflect the current District Access and Travel Management Plan (See maps in Appendices A and B). An open road network has been identified as well as a closed road network which will be maintained for fire suppression, permittee administrative needs, and future management options.

All roads within the project area have specific Road Management Objectives related to use, maintenance level and criteria, safety, service levels, drainage and erosion control methods. These management objectives were reviewed by the team for any adjustments which may have been required to resolve resource issues and budgetary restrictions where appropriate. Road Management Objectives would remain as they are currently established for all of the roads.

The roads used for log removal by the project and not identified as open in the long term road system will be closed upon completion of log removal activities.

### 6) Forest Plan Amendments

As a part of the Sugar project, the Wallowa-Whitman National Forest Land and Resource Management Plan (Forest Plan) would be amended to include changes to the following section outlined below.

**Section 1: Treatment in Old-growth Below HRV – Forest Plan Amendment**

Stand density treatments throughout the project area have been designed to improve tree health and enhance long-term old growth characteristics. Forest Plan standards restrict harvest treatment in LOS that is below HRV. An HRV analysis of LOS, by biophysical grouping has been completed for this project area and as described above indicates deficiencies in both SSLT and MSLT old growth, with SSLT being nearly non-existent. MSLT structure is more prevalent in the project area. Some stands which were historically SSLT have developed into MSLT due to fire exclusion.

In order to restore these stands to their historic structure, enhance the health of the stands, and reduce ladder fuels in LOS stands in the project area, the following modification is made to the Wallowa-Whitman National Forest Land and Resource Management Plan, Regional Forester Amendment #2, for the Sugar Vegetation Management Project Planning Area.

> **Current Direction:** d. Scenario A If either one or both of the late and old structural (LOS) stages falls below HRV in a particular biophysical environment within a watershed, then there should be no net loss of LOS from that biophysical environment. Do not allow timber sale harvest activities to occur within LOS stages that are BELOW HRV.
>
> **Amended Direction:** d. Scenario A If either one or both of the late and old structural (LOS) stages falls below HRV in a particular biophysical environment within a watershed, then there should be no net loss of LOS from that biophysical environment. However, timber sale harvest activities may occur within LOS stages that are below HRV, if doing so would better meet LOS objectives by moving the landscape towards HRV, and provide LOS for the habitat needs of associated wildlife species (Regional Forester's 2430 Letter, "Guidance for Implementing Eastside Screens", dated June 11, 2003).

Treatments include commercial thinning of trees under 21 inches, reducing levels of standing and down material, thinning and cleaning of small diameter trees, pile and burn, and prescribed burning. Treatments under this amendment would not result in a net loss of old growth, but the amendment would provide for treatments that would maintain old growth habitat as defined by Forest standards and definitions. Old growth habitat is measured by levels of down wood, snags, number of canopy layers and large trees (See Regional Forester's amendment #2 –screens- and Wallowa-Whitman National Forest Recommended Definitions for New Structure Stages per Amendment #2, November 9, 1995).

Trees $\geq$ 21 inches d.b.h. would not be cut. Treatments would assist in maintaining the sustainability of single-strata structures, and would move multi-strata stands towards single-strata stands while maintaining adequate levels of down logs and snags.

**7) Snags**

With the exception of an occasional snag removed for safety or construction clearing, no snags $\geq$12 inches dbh would be removed with this project.

Protect existing standing large snags (>12 inches, DBH) during firing operations through avoidance or fuels distribution requirements (FDR) as practical. If large trees are killed through project implementation they will be left for wildlife snags, unless they pose a safety hazard to roads, the public, or project personnel.

**8) Roadside Hazard Trees -**

Danger trees (standing trees that present a hazard to people due to conditions such as, but not limited to, deterioration or physical damage to the root system, trunk, stem, or limbs and the direction of the lean of the tree would allow that tree to reach the roadway if it fell) would be cut along all haul roads (approximately 15 trees/mi). If the trees are within no-activity RHCA buffers as described previously or needed to meet down wood requirements they would be cut and left on site. If they are outside of those areas or not required to be retained for other resource needs and are of commercial value, they may be removed with this timber sale.

**9) Rehabilitation Work:**

**Large Wood Placement -** To increase habitat diversity and complexity and enhance steelhead spawning and rearing habitat, large wood would be added to Five Points Creek. This would occur on approximately 20 selected sites within a four-mile reach (Camp One to the forest boundary) of Five Points Creek. Downed trees approximately 50 feet in length, and 24 inches in diameter, would be transported by helicopter from nearby ridgetops to Five Points Creek.

**Invasive Species Treatments –** To prevent the spread of non-desirable species such as hounds tongue and diffuse knapweed, known sites (primarily located along haul routes) will be pre-treated through a combination of hand pulling and possible herbicide application (as previously approved by PNW Region 6 (U.S. Forest Service) and Wallowa-Whitman National Forest). In addition, any burn piles associated with harvest or thinning activities would be monitored for invasive species and treated by re-seeding with desirable native grass/forb species.

**Forage Enhancement -** To enhance forage in areas with a heavy tarweed component or areas that have been historically overgrazed, seeding with native bunchgass species (i.e. Sandberg's bluegrass/Pose and bluebunch wheatgrass/PSSP6) would occur on some of the flat ridges north of the Five Points Creek drainage, and in areas on Y and Walker ridges.

# Alternative Descriptions

## A) Alternative 1 - No Action

This alternative constitutes the "No Action" required by NEPA. Timber harvest and other management activities identified in the Sugar Vegetation Management analysis would be deferred. This alternative forms the baseline for comparison of the action alternatives.

## B) Alternative 2 – Proposed Action [Refer to map and data tables in Appendix B]

***Alternative theme***

Alternative two was designed to address the purpose and need through maximizing vegetation management treatment within the project area to enhance stand condition and vigor, reduce fuel loadings, enhance LOS stand structures, and provide for long term cover quality. In addition to the vegetative management and enhancement projects described under the Common Elements section and the alternative description below, access and travel management in terms of re-closing roads at the completion of the project and obliterating temporary roads to maintain/enhance wildlife, fisheries, recreation, and hydrology resources would occur. In alternative 2, nearly all of the stands (both high and low priority) identified as needing density management or fuel reduction would be treated.

Alternative two is driven by the following key issues: 1) Improvement of long term forest health conditions; 2) Deficiency in LOS and departure from HRV; 3) Big game security habitat; and 4) Return of fire intervals.

**Vegetation Management:**

**Fuels Reduction:**

Mechanical fuels prescriptions and prescribed fire prescriptions will be as described under the Common Elements section above.

**Fire/Fuels Units (FFU) –** Approximately 317 acres of Fires/Fuels Units would be included in this alternative. These non harvest units would receive a mechanical fuels reduction treatment designed to increase the effectiveness of the proposed prescribed burning.

**Table 2 – Alt 2, Fire/Fuel Units**

| Fire/Fuels Unit (FFU) | Acres |
|---|---|
| 500 | 25 |
| 501 | 7 |
| 502 | 18 |
| 503 | 125 |
| 504 | 14 |
| 505 | 11 |
| 506 | 14 |
| 507 | 103 |
| **Totals** | **317** |

**Prescribed Burn Units -** Prescribed burning would occur as described in the Common Elements section above when weather and fuel conditions are appropriate to meet the objectives and prescription for each unit. Because the burning would occur in a diverse mosaic pattern due to fuels,

topography, weather, and site conditions, the following table provides for an estimate of approximate acres which may actually be burned within each burn block.

**Table 3 – Alt 2, Prescribed Burn Blocks**

| Prescribed Burn Block Unit Number | Burn Block Acres | Approx. Actual Burn Acres |
|---|---|---|
| 601 | 725 | 250 |
| 602 | 2707 | 1300 |
| 603 | 2186 | 800 |
| 604 | 1270 | 600 |
| 605 | 1382 | 700 |
| 606 | 2226 | 500 |
| 607 | 125 | 50 |
| **Totals** | **10621** | **4200** |

**Timber Harvest:**

Timber harvest treatments would occur on approximately 1,715 acres of in the Sugar project area. Treatments include stand density management through commercial thinning (HTH), shelterwood (HSH), improvement cuts (HIM), overstory removal (HOR), sanitation harvest (HSA), fuels reduction with no commercial removal (FFU), and pile burning. These treatments are proposed to reduce stocking densities, remove diseased and poor growing trees, and promote stands with multi/single story large tree characteristics. Shelterwoods on 85 acres would remove poor growing, less vigorous trees while maintaining most of the larger component (trees larger than 18 inches dbh). The larger overstory component would remain and planting would ensure a healthy, viable understory of seral species. These stands are currently not LOS, however, treatment would accelerate them toward becoming Multi-stratum large tree (MSLT) structure stands over time. Their current condition precludes the use of intermediate treatment prescriptions. Shelterwood treatments are being proposed on <1% of the project area. Approximately 1,087 acres would be precommercially thinned to improve tree growth and select desirable tree species, 164 of those acres would be accomplished as a follow-up treatment after harvest.

**Riparian treatment units** (Units: 3, 6, 7, 8, 14, 25, 26, 29, 30, 33, 34, 35, 45, 46, 49, 51, 52, 54, 55, 57, 58, 61, 65, 66, 70, 74, 75, 76, 77, 80, 85, 86, 87, 88) would be treated using the prescriptions previously described under Common Elements. Approximately 64 total acres within RHCAs would receive a precommercial thinning treatment (Units: 200, 201, 203, 212-215, 218, 223, 224, 227-229, 234, 237, 238) and 94 acres within RHCAs would receive a commercial thinning treatment.

Approximately 40 acres of fire/fuels (FFU) treatment units with RHCA treatments (Units 500, 503, 507) would be treated using the prescriptions described under Common Elements.

**Non-significant Forest Plan Amendments:**

**Section 1 - Forest Plan Amendment for treatment of LOS below HRV -** Approximately 511 acres would receive commercial thinning prescriptions. Trees $\geq$ 21 inches d.b.h. would not be cut. Treatments would assist in maintaining the sustainability of single-strata large tree structures (28 acres), and would move multi-strata stands towards single-strata stands (483 acres) while maintaining adequate levels of down logs and snags. All or portions of the following units would receive these treatments: 3, 6, 9, 12, 19, 24-27, 32, 33, 39, 40, 46, 48, 49, 51-53, 55, 56, 58-60, 65, 69-71, 76, 79, 80, 82, 84, 88, 91, and 92.

In addition to the Section above, the following Forest Plan Amendment for treatment in MA3 cover stands would be a part of this alternative:

**Section 2 – Forest Plan Amendment for Treatment in Winter Range (MA3)**

Stand density treatments throughout the project area have been designed to improve stand conditions, and restore structure and tree species composition that is sustainable and resilient to natural disturbances. Big game thermal cover is also a consideration in these treatments and as stated in the purpose and need, many of the stands proposed for treatment in the Sugar project are minimally meeting the definition of marginal thermal cover. Left untreated, these stands will decrease in cover quality and degrade from marginal thermal cover to forage.

A substantial portion of the Sugar planning area is Management Area 3 (MA 3), big game winter range. The Forest Plan contains direction (page 4-61) for MA 3 that requires at least 80% of the acres converted from a thermal cover condition to a forage condition to be within 600' of a satisfactory thermal cover patch of at least 40 acres in size. This standard was meaningful when the Forest Plan was finalized in 1990. During that period regeneration harvests were common, and risked depleting cover over large areas of winter range. The intermediate treatments used today retain varying levels of foraging areas and cover patches intermixed within a stand. Additionally, the naturally fragmented land types and dry biophysical environments in much of the Sugar project area are incapable of providing satisfactory thermal cover in patches of 40 acres or more.

In order to restore these stands to a more ecologically appropriate condition, while providing cover for big game where it will be functional and sustainable, the following modification is proposed to the Wallowa-Whitman National Forest Land and Resource Management Plan. This non-significant, project-specific amendment would allow some of the highest quality cover stands to be deferred from treatment, while lesser quality stands are restored to a more resilient condition that reflects historic stand structure and function.

> **Current Direction** (Forest Plan, p. 4-61)**:** "Vegetation manipulation (precommercial thinning, regeneration harvest, and overstory removal) which converts a site from satisfactory or marginal cover to a forage status will be designed so that:
>
> Winter Range – At least 80 percent of the treated area is within 600 feet of a satisfactory cover patch at least 40 acres in size."
>
> **Amended Direction:** Within Management Area 3 (winter range) a selection of the highest quality marginal and satisfactory thermal cover stands will be identified and deferred from treatment to retain their value as cover. Cover will be distributed across the analysis area consistent with land types and biophysical environments. Some of the poor quality cover stands will be treated to improve the condition and vigor of the stand and in doing so will be changed to forage until canopy closure recovers to provide cover again.
>
> Affected units are: 10-16, 18, 27, 33, 38, 39, 45, 48.

**Connective Corridor Units** – As stated under common elements, the goal within these units would be to maintain and enhance their cover and connectivity qualities such as medium to large trees as a common occurrence and canopy closure within the top 1/3 of site potential.

Affected Units: 1,2,5,7,19,31,33-35,38,43,43A,45,54,56,58,60,66,68,75-78,83,87,90

**Removal Systems Summary:**

Where treatments result in commercial products, they would be removed by tractor (1,141 acres), helicopter (71 acres), forwarder (365 acres), and skyline (138 acres) yarding systems. Approximately 4.56 million board feet of material is expected to be recovered from the proposed action. Danger trees would be cut along all haul roads. If they are outside of RHCAs or not required to be retained for other resource needs and are of commercial value, they may be removed with this timber sale.

No construction of new specified roads is anticipated for this project. Approximately 5.42 miles of temporary road construction is proposed to facilitate material removal systems. The majority of these temporary roads are interior to the harvest units, however, four road segments would cross RHCAs. Following completion of the sale activities, temporary roads would be left in a state of no-use by implementing some or all of the following activities; installation of erosion control devices, ripping to reduce soil compaction, seeding, and camouflaging roads to discourage further use.

Approximately 9.5 miles of road currently closed by gate or barricade would be re-opened and used to facilitate harvest activities. These roads would be re-closed in the same manner at the conclusion of harvest activities within the units they access.

Approximately .20 miles of Road 3106-100 (shown at left) would be reconstructed by installing drainage dips and spot rocking and armoring low areas that are currently collecting water. Blading and shaping would occur on the remainder of the road segment.

**Rehabilitation Work:**

As described under the Common Elements section, placement of large wood would occur in 5 Points Creek, forage enhancement work, and treatment of invasive species would be accomplished under this alternative.

## C) Alternative 3 - [Refer to map and data tables in appendix A]

***Alternative theme:***

Alternative three was designed to address the purpose and need while emphasizing retention or maintenance of stand structures and the highest quality satisfactory and marginal cover stands for big game habitat. These cover stands were either deferred from harvest treatment in this alternative or the treatment prescription was modified to enhance stand health while maintaining marginal cover. Implementation of these modifications also eliminates the need to amend the Forest Plan for treatments in MA3 described under Alternative 2 above.

The following units were deferred from treatment consideration in this alternative to maintain existing key cover areas or structural components (MSLT) in this alternative. Units: 3, 7, 36, 37, 75.

Prescriptions were modified on a site specific individual unit basis in Units 11-15, 27, 33, 38, 39, 42, 48, 51, 56, 58, 59, 76-78, 82-84, 89, and 91 to retain marginal cover in Management Area 3.

To respond to the key issue of Economic efficiency described in Chapter One, the following units were deferred from harvest treatment in this alternative due to lack of access insufficient commercial timber volumes to support road construction or helicopter yarding systems, and resource concerns (LOS, cover, RHCAs) which would increase logging costs. Affected units are: 24, 34, 80, and 81. In order to

ensure fuels reduction work adjacent to the Perry/Hilgard WUI, unit 24 was converted to an FFU (fire/fuels unit) in this alternative.

Alternative three is driven by the following key issues: 1) Improvement of long term forest health conditions; 2) Deficiency in LOS and departure from the HRV; 3) Big game security habitat; and 4) Return of fire intervals, and 5) Economic Efficiency.

**Vegetation Management:**

**Fuels Reduction:**

Mechanical fuels prescriptions and prescribed fire prescriptions will be as described under the Common Elements section above.

**Fire/Fuels Units (FFU) –** Approximately 338 acres of Fires/Fuels Units would be included in this alternative. These non harvest units would receive a mechanical fuels reduction treatment designed to increase the effectiveness of the proposed prescribed burning.

**Table 4 – Alt 3, Fire/Fuels Units**

| Fire/Fuels Unit (FFU) | Acres |
|---|---|
| 500 | 25 |
| 501 | 7 |
| 502 | 18 |
| 503 | 125 |
| 504 | 14 |
| 505 | 11 |
| 506 | 14 |
| 507 | 103 |
| 508 | 21 |
| **Totals** | **338** |

**Prescribed Burn Units -** Prescribed burning would occur as described in the Common Elements section above when weather and fuel conditions are appropriate to meet the objectives and prescription for each unit. Any burning within LOS stands and cover stands within biogroup G4 will be coordinated with the project Wildlife Biologist to ensure the retention/enhancement of the LOS and cover qualities within these stands. Because the burning will be in a diverse mosaic due to fuels, topography, weather, and site conditions, the following table provides for an estimate of approximate acres which may actually be burned within each burn block.

**Table 5 – Alt 3, Prescribed Burn Blocks**

| Prescribed Burn Block Unit Number | Burn Block Acres | Approx. Actual Burn Acres |
|---|---|---|
| 601 | 725 | 250 |
| 602 | 2707 | 1300 |
| 603 | 2186 | 800 |
| 604 | 1270 | 600 |
| 605 | 1382 | 700 |
| 606 | 2226 | 500 |
| 607 | 125 | 50 |
| **Totals** | **10621** | **4200** |

**Timber Harvest:**

Timber harvest treatments would occur on approximately 1,422 acres of in the Sugar project area. Treatments include stand density management through commercial thinning (HTH), shelterwood (HSH), improvement cuts (HIM), overstory removal (HOR), sanitation harvest (HSA), and fuels reduction with no commercial removal (FFU). These treatments are proposed to reduce stocking densities, remove diseased and poor growing trees, and promote stands with multi/single story large tree characteristics. Shelterwoods on 79 acres would remove poor growing, less vigorous trees while maintaining most of the larger component (trees larger than 18 inches dbh). The larger overstory component would remain and planting would ensure a healthy, viable understory of seral species. These stands are currently not LOS, however, treatment would accelerate them toward becoming Multi-stratum large tree (MSLT) structure stands over time. Their current condition precludes the use of intermediate treatment prescriptions. Shelterwood treatments are being proposed on <1% of the project area. Approximately 1,087 acres would be precommercially thinned to improve tree growth and select desirable tree species, 164 of those acres would be accomplished as a follow-up treatment after harvest.

**Riparian treatment units** (Units: 6, 8, 14, 25, 26, 29, 30, 33, 35, 46, 49, 51, 52, 54, 55, 56, 57, 58, 59, 61, 65, 66, 70, 74, 76, 77, 86, 87, 88) would be treated using the prescriptions previously described under Common Elements. Approximately 64 total acres within RHCAs would receive a modified RHCA precommercial thinning treatment (Units: 200, 201, 203, 212-215, 218, 223, 224, 227-229, 234, 237, 238) and 94 acres within RHCAs would receive a commercial thinning treatment.

Approximately 40 acres of fire/fuels (FFU) treatment units with RHCA treatments (Units 500, 503, 507) would be treated using the prescriptions described under Common Elements.

**Non-significant Forest Plan Amendments:**

**Section 1 - Forest Plan Amendment for treatment of LOS below HRV -** Approximately 426 acres would receive commercial thinning prescriptions. Trees $\geq$ 21 inches d.b.h. would not be cut. Treatments would assist in maintaining the sustainability of single-strata structures (28 acres), and would move multi-strata stands towards single-strata stands (398 acres) while maintaining adequate levels of down logs and snags. All or portions of the following units would receive these treatments: 6, 9, 12, 19, 25-27, 32, 33, 39, 40, 46, 48, 49, 51-53, 55, 56, 58-60, 65, 69-71, 76, 79, 82, 84, 88, 91, and 92.

**Connective Corridor Units** – As stated under common elements, the goal within these units would be to maintain and enhance their cover and connectivity qualities such as medium to large trees as a common occurrence and canopy closure within the top 1/3 of site potential.

Affected Units: 1,2,5,19,31,33,35,43A,54,56,58,60,65,66,68,76-78,83,87,90

**Removal Systems Summary:**

Where treatments result in commercial products, they would be removed by tractor (1,012 acres), forwarder (331 acres), and skyline (79 acres) yarding systems. Approximately 3.79 million board feet of material is expected to be recovered from the proposed action. Danger trees would be cut along all haul roads. If they are outside of RHCAs or not required to be retained for other resource needs and are of commercial value, they may be removed with this timber sale.

No construction of new specified roads is anticipated for this project. Approximately 4.13 miles of temporary road construction is proposed to facilitate material removal systems. The majority of these temporary roads are interior to the harvest units, however, two temporary road segments and two closed roads scheduled to be re-opened for use in this project would cross RHCAs. Following completion of the sale activities, temporary roads would be left in a state of no-use by implementing some or all of the following activities; installation of erosion

control devices, ripping to reduce soil compaction, seeding, and camouflaging roads to discourage further use. Previously closed roads would be re-closed as described below.

Approximately 8.26 miles of road currently closed by gate or barricade would be re-opened and used to facilitate harvest activities. These roads would be re-closed in the same manner at the conclusion of harvest activities within the units they access.

Approximately .20 miles of Road 3106-100 (shown at right) would be reconstructed by installing drainage dips and spot rocking and armoring low areas that are currently collecting water. Blading and shaping would occur on the remainder of the road segment.

**Rehabilitation Work:**

As described under the Common Elements section, placement of large wood would occur in 5 Points Creek, forage enhancement work, and treatment of invasive species would be accomplished under this alternative.

## Management Requirements, Constraints and Mitigation Measures

The following items are included in all action alternatives, unless otherwise noted, and provide the measures necessary to keep project impacts at acceptable levels. These items would be applied to the proposal as it is implemented on the ground. Unless specifically identified as a mitigation measure, the following are considered either management requirements or constraints.

### A) Soil Quality

Mass stability will be maintained (Forest Plan Soils S&G #1; FSM 2521.03.1.b R6 Supplement 2500-98-1), including stability of any existing landslides.

Soil productivity will be maintained by complying with Regional standards and guidelines in FSM 2521.03, R6 Supplement 2500-98-1. The standard is to "leave at least 80% of an activity area in acceptable soil quality condition." Specific standards are defined for soil compaction, puddling, displacement, burning, surface erosion and mass wasting. Guidelines are defined for organic matter and soil moisture regime.

Compliance with soil quality standards in FSM 2521.03, R6 Supplement 2500-98-1, will be determined through use of protocols described in "Interim Protocol for Assessment and Management of Soil Quality Conditions," Wallowa-Whitman National Forest, Version 3.3, September 2001 or subsequent version. Burn conditions will be monitored using "fire severity" (burn intensity) and "severity burn" (burn area) concepts in Fire's Effects on Ecosystems, by DeBano, Neary & Folliott, 1998, p. 63, as required by the current BAER manual, or appropriate modifications thereof to address thresholds in soil standards or hydrologic models.

The following soil guidelines from the Wallowa-Whitman National Forest publication, *Watershed Management Practices - Guide for Achieving Soil and Water Objectives,* (BMP's) are applicable to this sale:

**Existing infrastructure:** Existing landings and skid trails will be used as much as reasonable and practical.

**Soil Moisture**: Under saturated soil conditions no off-trail skidding or machine falling is allowed. Skidding on designated trails may be allowed as long as such use does not cause deep rutting (4 inches and greater) or high erosion potential. Allowing skidding under these conditions makes mitigation by subsoiling less effective and should be avoided both on and off trails. Existing skid trails will be used as much as reasonable and practical as well as use of BMPs such as waterbars and not operating in wet conditions mitigations.

**Subsoiling:** Evaluate activity areas for the need for subsoiling following use by the sale. In individual units greater than 20% DSC post harvest, mitigation methods will be evaluated by the sale administrator and district watershed personnel.

Approved skid trails, maximizing use of existing skid trails and landings, logging over snow or frozen ground, or some equivalent system for limiting the impact and aerial extent of skid trails and landings will be used to limit cumulative increases from multiple entries in tractor logging areas.

Recommended tons per acre of coarse woody material for long-term soil productivity are listed with Wildlife constraints under "Snags and Down Woody Material" for wildlife and soils.

To minimize accelerated erosion and to provide for long-term soil productivity, 85-100% ground cover will be maintained in forestlands and 65-85% ground cover will be maintained in rangelands, except for short-term reductions associated with management activities, or where natural potential is different. Standards for minimum percent effective ground cover during the first and second years following major disturbance are described in FSM 2500, R6 Supplement 2500-98-1, 2521.03. Erosion control methods are listed under the Water Quality and the Logging and Sale Design sections.

## B) Water Quality

### *1. Water Quality Standards*

Meet (or show progress toward meeting) water quality standards for Waters of the State of Oregon (Oregon Administrative Rules, Chapter 340-41) through project design, application and monitoring of best management practices (BMPs) as defined in the Code of Federal Regulations [40CFR 130.2(m)]. BMPs are used for various situations encountered during layout and administration of the timber sale contract and other activities. BMPs area listed in several sections of these constraints, including the "Logging and Sale Design" section, and in other documents, including the Wallowa-Whitman Watershed Management Practices Handbook, which is on file at the La Grande Ranger District.

### *2. Erosion Control Methods*

Highly disturbed areas (which may include: skid trails, roads, skyline corridors, landings, road cuts and fills, etc.) will be seeded. The seed mix to be used will consist of native species, or a non-native species mix, to be approved by the District Diverse Species Program (contact program coordinator for the exact species mix and seeding schedule). This may include one fast germinating annual grass species to provide immediate ground cover. Seed application rates will be adjusted, as needed, to compensate for the broadcast method of application, and to generate vegetation densities adequate to provide a deterrent to noxious weed invasion.

Seed will be certified weed free, per the Wallowa-Whitman Integrated Noxious Weed Management Plan protocol.

Erosion control measures will be taken on all skid trails and temporary roads as needed. Spacing of waterbars will be determined by on the ground conditions and guidelines stated in the Sale Administration Handbook.

Slash and soil material may be left in the trail to divert water, or the subsoiling can be done to provide lead-off drainage from the trails.

## C) Riparian Habitat and Fisheries

RHCAs were delineated along all riparian corridors, wetlands, intermittent streams, and other areas that help maintain the integrity of aquatic ecosystems. RHCAs 1) influence the delivery of sediment, organic matter, and woody debris to streams, 2) provide root strength for bank and channel stability, 3) shade the stream, and 4) protect floodplains and water quality.

The RHCA widths described below are minimum widths to be applied in all treatment units. With the exception of site specific RHCA treatments described under each action alternative, the remainder of the units will have no activity within these RHCAs:

1) *Fish Bearing Streams* – No harvest 300 feet on either side of the flood plain.

2) *Permanently Flowing Non-Fish Bearing Streams* – No harvest 150 feet on either side of the flood plain.

3) *Ponds, Lakes, Reservoirs, and Wetlands greater than 1 acre* – No harvest 150 feet from the edge of the wet area.

4) *Seasonally Flowing or Intermittent Streams, Wetlands less than 1 acre, landslide, and landslide-prone areas* - No harvest 100 feet on either side of the flood plain, no harvest within the extent of landslides and landslide-prone areas.

In ephemeral draws, trees will be left at a minimum of two large trees per 100 feet of draw bottom for future down woody material recruitment. All bank stabilizing, hardwood, and non-merchantable trees will be left.

Layout and marking of treatment units with treatments within the RHCAs will be done in conjunction with the watershed specialist identified for the project.

## D) Wildlife

### *1) Down Woody Material (for wildlife and soils)*

Where material is available, all treatment units (harvest and prescribed burn) will exceed the minimum levels for down woody material described in the table below for each species. The pieces per acre are the minimums required by the Forest Plan for wildlife and would be used in the appropriate contract provision:

**Table 6 – Minimum requirements for down woody material.**

| SPECIES | PIECES PER AC | PIECE LENGTH AND DIAMETER SMALL END Diameter \| MinLength | TOTAL LINEAL LENGTH | Approximate TONS PER ACRE |
|---|---|---|---|---|
| Ponderosa Pine | 3-6 | 12” \| 6ft | 20-40 ft | 0.2 - 0.4 |
| Mixed Conifer | 15-20 | 12” \| 6ft | 100-140 ft | 1.0 – 1.5 |
| Lodgepole pine | 15-20 | 8” \| 6ft | 120-160 ft | 0.5 – 0.8 |

The above pieces per acre are the minimums required by the Forest Plan for wildlife and would be used in the appropriate contract provision; it is desirable to meet the following tons/acre of coarse woody material for soil productivity after harvest/burn operations:

**Table 7 – Desired requirements for woody material.**

| TONS PER ACRE | PLANT ASSOCIATION |
|---|---|
| 5-10 | Douglas-fir/spirea, Douglas-fir/elk sedge, Douglas-fir/pinegrass, Grand fir/pinegrass, Ponderosa pine/pinegrass, ponderosa pine/elk sedge, ponderosa pine/snowberry |

| | |
|---|---|
| 7-15 | Grand fir/twinflower, grand fir/huckleberry, grand fir/spirea, sub-alpine fir, and lodgepole pine |

Coarse wood material includes all diameter classes. The large (>12") snags and logs should be protected during all phases of the project including prescribed burning.

**Green Tree Replacements (GTRs)**

In addition to the guidelines for logs and snags, sufficient green trees of adequate size are to be retained in harvest units to provide replacements for snags and logs through time. Generally GTRs need to be retained at a rate of 25-45 trees per acre, depending on biophysical group. All harvest prescriptions in the Sugar project would retain GTRs within or above this range.

**2) *Raptors***

No active raptor nest sites were found during field reconnaissance for this project. If active raptor nests are located during layout, marking, or project activities, appropriate protection measures will be prescribed as described in the Wildlife Inventory document in the project file.

**3) *Sensitive Habitats***

Plant communities adjacent to sensitive/unique habitats will be protected by maintaining vegetative structure characteristic of the edge inherent to these areas. These areas include cliffs, caves, talus, natural openings, and meadows. No harvest buffers, feathered buffers, or retention of higher basal area will be used to maintain the context of these features.

Buffer widths for sensitive habitats will be at least 100 feet, possibly more on some habitats. The degree of activity allowed within these buffers will vary depending on the type of sensitive habitat. Natural openings will generally not receive a buffer but will have prescription modifications to retain basal areas in the upper half of the management zone to maintain the integrity of the inherent edge for these areas.

Grassy scabs and meadows will not be used as locations for landings or skid trails unless no other location is practical. In those situations where landings are necessary, using the edge of these openings is preferred.

***4) Big Game Winter Range***

Logging operations will be conducted outside the period between December 15 through April 30 in the following units. Waivers to operate during this time period may be requested of the District Ranger.

Affected Units: Alternative 2: 9-43, 45-61, 76-92, 503-507
Alternative 3: 9-23, 25-59, 61, 76-79, 82-84, 86, 89-92, 503-508

***5) Management Indicator and Neotropical Migratory Species***

If management indicator species, other than those protected by the design criteria and specifications or the stream buffers discussed earlier, are discovered in any units programmed for prescribed burning the following protective measures could be applied either separately or in combination to reduce possible impacts to snags with nest cavities, and to protect other nest sites during burning: a) fuel distribution (pull back) around snags, b) varied lighting techniques, c) fall burning, d) deferred burning until after the unit is no longer being used during the reproductive period.

**E) <u>Fuels and Smoke Management</u>**

***Project Generated Slash:***

Trees (5-7 inch DBH) that are dead, diseased, damaged, or not required for future stand structure will be felled and removed to reduce heavy fuel loadings, fire risk, and stocking densities.

Landing slash will be pile burned in landing areas or scattered when amounts do not warrant piling.

Road Construction/Reconstruction Slash – Disposal of all created slash is based on "least cost" method. Where a road traverses through a harvest unit the fuel treatment should closely correspond to the treatment of slash in the unit.

***Smoke Management:***

A voluntary Smoke Protection Zone has been established around the City of La Grande. Northeast Oregon Inter-agency Dispatch Center (NOIDC) will be contacted prior to any prescribed burning on National Forest Lands.

Prescribed burning activities are coordinated with the Oregon Department of Environmental Quality by NOIDC to assure that burning conditions will meet with air quality standards for personal health in the City of La Grande. Visual quality standards will be protected in the Eagle Cap Wilderness area during the peak recreational use period of July 1 through September 15. These actions respond to the non-key issue of air quality.

***RHCA Burning Procedures:***

During prescribed burning in harvest units, there will be no direct ignition within PACFISH RHCAs, fire will be allowed to back into RHCAs. Direct ignition will be prohibited within 300' of class I streams, within 150 feet of class III streams, and within 100 feet of class IV streams. This includes the modified RHCA units described under the Common Elements section of this Chapter. Use RHCA distances described under the Riparian Habitat and Fisheries section of constraints and mitigation measures.

Prescribed fire will be kept to a minimum inside RHCAs. Brushline (no mineral soil exposed) will be constructed if necessary within RHCAs to keep fires from burning riparian vegetation.

Fisheries and watershed personnel will be notified prior to burning near RHCAs, and will be on site when burning near RHCAs occurs.

***Prescribed Burn Units:***

Prescribed burning in units that have been mechanically treated may be delayed 2-3 years after the completion of the mechanical treatment to allow the stand to recover from thinning induced stress. This decision will be coordinated with the project Silviculturist prior to any planned ignitions.

Prescriptions on Warm/Dry sites (open pine with grass understory) will limit burn effects to the low-severity burn class which means less than 17% high severity plus moderate severity will be allowed on treated grounds.

Under Alternative 3, any burning within LOS stands and cover stands within biogroup G4 will be coordinated with the project Wildlife Biologist to ensure the retention/enhancement of the LOS and cover qualities within these stands.

Prescriptions on Cool/Moist sites will limit burn effects to the moderate-severity burn class with no more than 40% high severity plus moderate severity will be allowed on treated grounds.

No direct ignition will occur immediately adjacent to large down logs or large snags.

Water sources needed during prescribed fire operations will consist of temporary sumps. Sites to be identified at a later date will be constrained by the following:

a) Seed disturbed ground following operations with a mix recommended by the District Diverse Species Coordinator if appropriate.
b) Locate site to minimize washout and erosion potential.
c) Springs and elk wallows will be avoided.
d) Avoidance of potential habitat of PETS plant species.

**F) Logging and Sale Design**

The sale area boundary will be the project area boundary as described under Project Area Description, section I of this EA and identified on alternative maps in appendices A and B.

All units with ponderosa pine listed as one of the principal conifer species shall be cut between July 1st and December 1st.

Trees selected for retention under the Tree Improvement Program will be protected during project activities.

***General Soil and Water Mitigations:***

Generally, ground-based yarding will not occur on ground steeper than 35%. Ground-based yarding on slopes over 35% and greater than 200 feet distance will be identified during pre-sale activity (layout and marking) and approved by the Forest Service Representative/Sale Administrator and district hydrologist/fisheries biologist.

Short, steep areas in tractor ground (up to 200 feet and 50% slope) should require winch lines on all skidding equipment operating on those slopes or use of forwarders which provide full suspension of logs during skidding/yarding.

Skid trails will not be located in ephemeral drainage bottoms and will not cross ephemeral draws on an average of more than once every 200 feet of linear distance.

Designated skid trails will be pre-approved in advance of felling operations by the Forest Service Representative or Sale Administrator to minimize detrimental soil impacts. A unit-by-unit evaluation of detrimental soil conditions will be made in sensitive units upon completion of logging activities. Where detrimental soil impacts exceed twenty percent (20%) of the total acreage within the project area, including landings and system roads, restoration treatments will be considered. Detrimental soil conditions include compaction, puddling, displacement, and severe burning, surface erosion and mass wasting.

Recommended average minimum skid trail spacing for ground-based equipment is 60 feet, center to center for mechanized harvesting, and 80-100 feet for conventional hand felled trees. Require directional felling to minimize soil disturbance during skidding operations. Recommended minimum skyline corridor spacing is 150 feet, center to center, to minimize ground disturbance and protect residual trees. See Soil Quality section.

Full suspension will be required across stream channels and no activity buffers within skyline units receiving RHCA treatments.

The normal operating season for the analysis area is July 1 to October 31.

To prevent road damage and maintain water quality, road use will be restricted to dry or frozen conditions. If road use is approved outside the normal operating season, drainage structures (waterbars, Utah dips) will be kept in a functional condition, and daily operations will be managed to

minimize sediment transport from roads. Operations will cease when roads turn muddy and/or rutting occurs, resulting in sediment transportation. Reference the district forest roads and erosion control document in analysis file, transportation section.

Temporary roads will not be constructed immediately adjacent to or within riparian areas. Any planned reconstruction or construction of roads crossing riparian areas will not alter stream or groundwater flow characteristics to the extent that it will impact the riparian area. Locate roads to avoid paralleling stream channels in streamside management units. Roads will be managed to minimize impacts to water quality and fish and wildlife habitat. Design and maintain road drainage to prevent the influx of significant amounts of road sediment runoff into streamcourses.

Temporary roads will be obliterated at the completion of harvest activities and put back into production. Obliteration may include re-contouring, scattering slash, subsoiling, and seeding, as ground conditions dictate.

Drainage structures will be installed and maintained on all open roads within RHCAs, using spacing guides listed in the Watershed Management Practices Handbook.

Road maintenance will maintain existing drainage features. Post-haul maintenance will protect the road surfaces during future periods of inactivity and may require construction of additional drainage features. Cross drains will not discharge onto erodible slopes or directly into stream channels, including ephemeral drainages.

**G) Range**

Allotment boundary fences and other improvements damaged during the grazing season must be repaired to their functional condition immediately and damage outside the grazing season must be repaired two weeks prior to permitted livestock entry. Any damage occurring to existing range improvements should be reported to the District range manager and/or private landowner. This responds to the non-key issue of range and livestock management.

All range improvements will be protected during prescribed burning activities. If damaged they will be repaired as discussed above.

**H) Proposed, Endangered, Threatened, and Sensitive Species (PETS)**

Biological evaluations and/or assessments have been completed for plants, fish, and wildlife PETS species. Contract provisions will be included to provide for the protection of areas where PETS occur and for those that may be discovered in the area during the contract period.

The following site specific constraints/requirements would be applied to protect the PETS species identified during field reconnaissance for this project:

1. *Botrychium montanum* - The new site and habitat will be coordinated with the District Botanist, excluded from treatment during the final layout of Unit 62 and designated as an Area to Protect (ATP) on the contract sale maps.
2. Layout of units 1, 2, 62, 63, 65, 66, and fire/fuels unit 500 will be coordinated with the District Botanist to ensure that *Botrychium*, *Carex, and Trifolium douglasii* species and habitat are buffered out of unit boundaries.
3. Potential habitat for *Phacelia minutissima* was identified in units 41, 42, 43A, 44, 87, 90 and 92. Natural openings will not generally receive a buffer, but will have prescription modifications to the upper management zone to maintain the integrity of the inherent edge. These openings are sometimes used as landings, when no other locations are practical. In those situations using the edge of these openings is preferred. With respect to the scabland openings in the units listed above, these should be designated as ATP, with no equipment, skidding or burn piles located within the openings.

## I) Managing Competing and Unwanted Vegetation

An assessment report of known noxious weed populations is available in the Analysis File. Noxious weed locations also appear on project maps in the analysis file. If new noxious weed infestations are located within the project area, a noxious weed inventory and site assessment will be completed.

The analysis for vegetation management is conducted in accordance with the 1990 Forest Plan Standards and Guidelines, the 1998 Forest Noxious Weed EA, the Integrated Noxious Weed Management Plan - Wallowa Whitman National Forest (INWMP, 1992), and the 2005 Pacific Northwest Region Invasive Plant Program Preventing and Managing Invasive Plants FEIS. Management activities will give consideration and evaluation of prevention strategies during the planning process (INWMP, Chapter V. Prevention Strategies, Section B).

The following measures shall be implemented to reduce new establishment or spread of noxious weeds and responds to the non-key issue of noxious weeds:

**Table 8 – Noxious Weed Known Sites**

| Subwatershed number | Subwatershed name | Species (Common name) | Total Acres | # of sites |
|---|---|---|---|---|
| 170601040403 | Lower 5 Pts Crk | Diffuse knapweed | 21.7 | 7 |
| 170601040403 | Lower 5 Pts Crk | Spotted knapweed | 0.125 | 4 |
| 170601040403 | Lower 5 Pts Crk | Canada thistle | 0.247 | 3 |
| 170601040403 | Lower 5 Pts Crk | Hound's tonge | 5.946 | 3 |
| 170601040403 | Lower 5 Pts Crk | Sulfur cinquefoil | 0.088 | 1 |
| 170601040403 | Lower 5 Pts Crk | St. John's Wort | 0.088 | 1 |

No road construction or maintenance should occur at these sites, until the previous years dead plants/stalks have been removed.

1. Noxious weed locations are on maps located in the Sugar analysis file. A copy of these will be included in the contract preparation package, for use by the sale administrator. These sites will be reviewed with the contractor and mitigations explained.

2. Treatment of the noxious weed sites located along haul route roads should be a high priority, along with monitoring.

3. Pre-treatment of weeds along closed roads prior to opening, is recommended. Any soil disturbance should be reseeded, if necessary, and the roads should be monitored following re-closure. Native species should be used where appropriate. (The same is true for the temporary roads, especially T-4, T-5, T-20 and T-21.)

4. Any burn piles should be monitored and reseeded with desirable native grass and forbs species.

5. Rock pit and sources should be inspected, and cleared prior to use of any materials (see Standard 7).

6. Known infestations should be designated as Areas to Protect, and no grapple or hand piling of slash should be allowed there.

7. Before road maintenance activities on roads with active infestations occurs the contracting officer (COR) will contact the District Noxious Weed Coordinator, to inform them of maintenance plans. The Noxious Weed Coordinator will take the appropriate action to treat the noxious weeds on the infested portions of these roads. (Note: Recommended treatment includes removal of previous year's stalks, to be conducted before maintenance activities occur there; and maintenance activities should not be

conducted after the current year's plants have bolted and flowered (mid to late June) unless prior treatment of current year's growth occurs.)

8. If new noxious weed infestations are located within the project area, a noxious weed inventory and site assessment (as defined in the W-W INWMP) will be completed. Location of other species, conditions or future treatments may require additional analysis to determine the appropriate treatment method.

9. All mapped weed sites will be designated as "Areas to Protect" (no decking, skidding or equipment) and include in the contract package (use C.512), for use by the sale administrator. Logs should not be skidded or yarded through areas infested by noxious weeds. Landings and log decks should not be built on or near sites of noxious weed infestation.

10. Roads to be closed will be inspected for known and new noxious weed infestations (and treated as determined to be necessary) prior to road closure. When opened for logging operations, Sale Administrator will notify the Noxious Weed coordinator.

11. Highly disturbed areas (which may include: skid trails, landings, road cuts and fills, etc.) will be seeded. The seed mix to be used will consist of native species, or a non-native species mix, to be approved by the District Diverse Species Program. This may include one fast germinating annual grass species to provide immediate ground cover. Seed application rates will be adjusted, as needed to compensate for the broadcast method of application, and to generate vegetation densities adequate to help in deterrence of noxious weed invasion.

12. Seed will be certified weed free, per the Wallowa-Whitman INWMP protocol.

13. All hay or straw used for mulching, erosion control, or other rehabilitation purposes will be weed free (per the Wallowa-Whitman INWMP protocol).

14. All equipment to be operated on the project area will be cleaned in a manner sufficient to prevent noxious weeds from being carried onto the project area. This requirement does not apply to passenger vehicles or other equipment used exclusively on roads. Cleaning, if needed, will occur off of National Forest System lands. Cleaning will be inspected and approved by the Forest Officer in charge of administering the project. (Use D.6343 Option #2).

**J) Water and Material Sources**

Material sources, if needed, will be existing sources. No expansion of sources is anticipated. All work will stay within existing source boundaries. The following rock pits have been identified for project use pending noxious weed inventories (see #11 above):

Rock and Water Source locations:

1. T1S, R36E, Section 35
2. T2S, R36E, Section 1.

Water sources will be designated from the La Grande Ranger District Water Source Inventory. Available water sources within this area are as follows:

1. T2S, R36E, Section 12
2. T2S, R37E, Section 9
3. T2S, R37E, Section 10

**K) Precommercial Thinning**

The following constraints will apply to all precommercial thinning (SPC) units:

1. Along perennial streams tree spacing will range from 14 to 16 foot, within 100' of the stream bank, in order to retain stream shading and hiding cover, along with promoting overstory development.

2. Vegetative visual screens will be maintained adjacent to roads open to vehicular traffic (See District Access and Travel Management Plan) to reduce sight distances and mitigate the reduced big game security.

3. All snags within thinning units will be maintained on site to provide wildlife habitat. Trees 7-9 inches DBH infected with dwarf mistletoe will be girdled to insure the regenerating understory does not become infected. Dwarf mistletoe-infected lodgepole pine trees up to 7 inches DBH will be cut.

4. Appropriate contract clauses will be incorporated into the final contract for protection of raptor nest sites if any are discovered during project implementation.

5. Appropriate contract clauses to protect cultural resources and Proposed, Endangered, Threatened, or Sensitive (PETS) species will be incorporated into the final contract to protect these resources should they be discovered during project implementation.

6. Special or unique features such as rock outcroppings and wet meadows were avoided through thinning unit design (See Wildlife Habitats in Managed Forests in the Blue Mountains of Oregon and Washington, Thomas 1979, on file at the La Grande Ranger District Office). However, if additional features are encountered during unit layout, well defined edges around these areas will be achieved by retaining a feathered no-cut buffer of at least a hundred feet projected into the stand from the outer edge of the ecotone (area where there is a marked difference in vegetative communities).

7. Thinning design will incorporate concerns related to biodiversity and wildlife habitat. This includes, but is not limited to, developing a mosaic throughout the landscape by leaving areas un-thinned, variable leave tree spacing, and maintaining as much overstory as possible (consistent with item #3 above) within thinning units. Activities will be coordinated with district wildlife personnel.

8. Thinning will be accomplished when possible, while trees are less than 2" in stem diameter. Trees of this size have faster decay rates and fuel loads will be reduced sooner. Where TSI slash affects a large area (40 contiguous acres) whether from this years or previous years, activity will be spread out over several years to reduce fuel accumulations. This mitigation may be waived by the fuels management specialist assigned to the project if determined that fuel loadings are at acceptable levels. Generally 2-3 years is required for needles to fall off, at which time the fire hazard is significantly reduced.

9. Slash treatment is required within 100 feet of an open collector (4 digit) road. Treatments will consist of pull back of all slash 5 feet beyond the shoulders on each side. In areas with cut and fill construction, this distance shall be measured from 5 feet beyond the top of the bank to 5 feet beyond the point where the shoulder meets the fill slope (i.e. hinge point of road shoulder and fill slope). All roads shall be kept free of thinning slash, whether the road is blocked by barriers or not. Within the 100 foot area along the roads maximum slash depth will be 18 inches; boles over 15 feet and greater than 2 inch cut diameter shall be bucked in half.

10. Slash treatment is required within 200 feet of private land boundaries. Treatments will consist of pull back of all slash within 5 feet of the edge of private lands. Within 200 feet of the boundary maximum slash depth will be 18 inches; boles over 15 feet and greater than 2 inch cut diameter shall be bucked in half.

11. All units with ponderosa pine listed as one of the principal conifer species shall be cut between July 1$^{st}$ and December 1$^{st}$.

12. Special areas (springs, seeps, etc) will be given a 50 foot buffer.

13. Leave trees shall be selected within the following order of species preference, the most preferred species listed first: ponderosa pine, western larch, Douglas-fir, Engelmann spruce, white/grand fir, lodgepole pine, and sub-alpine fir. This order of preference only applies if the trees are free of damage or defect.

14. Active raptor nest sites will be protected by seasonal restrictions. If raptor nests are found, restrictions will apply (see project file).

15. Slash shall be immediately removed from all open roads. Trees will be felled away from roads and established trails. Pull back of all slash will occur 5 feet beyond the shoulders on each side. In areas with cut and fill construction, this distance shall be measured from 5 feet beyond the top of the bank to 5 feet beyond the point where the shoulder meets the fill slope (i.e.hinge point of road shoulder and fill slope). All roads shall be kept free of thinning slash, whether the road is blocked by barriers or not. A spotter shall be required when felling trees which may reach the roadway.

**L) Cultural Resource Protection**

Several existing historic and prehistoric sites are located within the project area. Sites requiring protection have been mapped and layout of units 3, 7, 15, 22, 69, 75, 500, 503 will be coordinated with the project archaeologist.

Prescribed burning within the project area has the potential to affect several known sites. Layout and burn plans for all prescribed burning within the project area will be coordinated with the map of known sites and the project archaeologist before ignition to provide adequate avoidance/protection.

No new cultural sites were discovered during surveys in proposed activity areas for this project. However, should any sites be discovered during project activities, the Wallowa-Whitman Forest Archaeologist will be notified immediately and appropriate protection measure employed.

**M) Recreation**

Maintain the character of dispersed camping sites by cleaning up project-created slash. Maintain access to dispersed sites on roads to be left open. Leave adequate space for camping at the point where roads are closed.

**N) Improvement-Mitigation Measures with KV or Appropriated Funds**

The following projects were identified by the ID team and prioritized in the following order:

*ESSENTIAL KV*

A) Planting and Site Prep Burning – Units 1 and 63

Planting: Alternative 2 = 52 acres @ $500/acre = $26,000
Burning: Alternative 3 = 52 acres @ $75/acre = $3,900

*MITIGATION (Non-essential KV - in order of priority)*

A) Noxious weed control - Grass seeding, control, and monitoring.

- Seeding - 15% of tractor and landing acres @ $15 per acre.
- Control - 1% of seeded acres @ $189 per acre. (hand work or chemical if available)

- Monitor KV Work (seeding and control) - @ $2.88 per acre.

*ENHANCEMENT*

**Table 9 – Non-essential KV in order of priority.**

| Indicator | Alt 2 | Alt 3 |
|---|---|---|
| 1. Release Treatments (@$220/ac) | $239,140 | $239,140 |
| 2. Aspen Restoration | $5,000 | $5,000 |
| 3. Forage Enhancement | $10,000 | $10,000 |
| 4. Prescribed Burn Fuels Reduction | $315,000 | $315,000 |
| 5. 5 Pt. Large Wood Placement | $125,000 | $125,000 |
| **Total** | **$694,140** | **$694,140** |

## Sugar - Alternatives at a Glance

**Table 10 – Sugar Alternatives**

| Alternative Elements | | Alternative 1 | Alternative 2 | Alternative 3 |
|---|---|---|---|---|
| Harvest Treatment Acres | | 0 | 1,715 acres | 1,422 acres |
| Prescribed Fire: | Total Burn Block Acres | 0 | 10,621 acres | 10,621 acres |
| | Approx Actual Burn Acres | 0 | 4,200 acres | 4,200 acres |
| | Fuels Reduction w/o commercial harvest (FFU) | 0 | 317 acres | 338 acres |
| Acres of RHCA Treatments: | Precommercial Treatments | 0 | 64 acres | 64 acres |
| | Commercial Treatments | 0 | 94 acres | 62 acres |
| | Fire/Fuels Treatment Units (FFU) | 0 | 40 acres | 40 acres |
| LOS Acres Treated | Total | 0 | 511 acres | 426 acres |
| | MSLT | 0 | 483 acres | 398 acres |
| | SSLT | 0 | 28 acres | 28 acres |
| Release Treatments w/o harvest (SPC) | | 0 | 923 acres | 923 acres |
| Release Treatments w/harvest (SPC) | | 0 | 164 acres | 164 acres |
| Enhancement/ Safety Work: | Large Wood Placement in 5 Points Creek | No | Yes | Yes |
| | Forage Enhancement | No | Yes | Yes |
| | Invasive Species Treatments | No | Yes | Yes |
| | Danger Tree Removal | No | Yes | Yes |
| Yarding Systems: | Tractor | 0 | 1,141 acres | 1,012 acres |
| | Skyline | 0 | 138 acres | 79 acres |
| | Forwarder | 0 | 365 acres | 331 acres |
| | Helicopter | 0 | 71 acres | 0 acres |
| Road Work: | Reconstruction | 0 | 0.2 miles | 0.2 miles |
| | Temporary Road Construction | 0 | 5.42 miles | 4.13 miles |
| | Closed Roads to be Re-opened | 0 | 9.5 miles | 8.26 miles |
| Saw/chip Volume Recovered | | 0 | 4.56 MMBF | 3.79 MMBF |

## Comparison of How the Alternatives Respond to the Key Issues

The following table compares each alternative with the key issues and key indicators identified in section I.

**Table 11 – Alternative Comparisons**

| Comparison Factors | | Alternatives | | |
|---|---|---|---|---|
| **Key Issue** | **Key Indicator (s)** | **1** | **2** | **3** |
| Improvement of Long-term Forest Health Conditions | Acres of stand density reduction | 0 | 1,715 | 1,422 |
| Large structure is below the historical range of variability | Acres of understory reinitiation accelerated toward large structure (SSLT and MSLT) | 0 | 1,147 | 945 |
| | Acres of MSLT restored to SSLT | 0 | 483 | 398 |
| | Acres of treatments within connective corridors | 0 | 602 | 528 |
| Area is outside of historic fire return intervals | Fire Regime Departure – the amount of acres treated in fire regimes 1, and 3 that have:<br>Moderate and/or High departures from Historic | 0 | 4,905 | 4,634 |
| | Wildfire Risk - the amount of acres untreated that have a moderate to high risk of wildfire damage due to heavy fuel loadings and dense ladder fuel arrangement | 7,576 | 2,671 | 2,942 |
| Economics | Predicted High Bid in $/CCF | 0 | 97.91 | 101.36 |
| | Present Net Worth (Dollars) | 0 | - 172,788 | - 161,267 |
| | Payments to Counties (Dollars) | 0 | 111,912 | 96,114 |
| | Number of Jobs | 0 | 26 | 21 |
| Big Game Security Habitat | Acres of Satisfactory cover converted to Marginal cover or Forage | 0 | 0 | 0 |
| | Acres of Marginal cover converted to Forage | 0 | 905 | 333 |
| | Habitat Effectiveness value for roads value:<br>Road Densities<br>Distance Bands | <br>0.50<br>0.36 | <br>0.50<br>0.36 | <br>0.50<br>0.36 |
| | Total Habitat Effectiveness Indices using:<br>Road Densities<br>Distance Bands | <br>0.69<br>0.68 | <br>0.68<br>0.67 | <br>0.70<br>0.69 |
| | Percent of Analysis Area further than 0.90 km from a motorized route | >2% | >2% | >2% |

## Monitoring Plan

Monitoring specific to project activities, and not in conjunction with research studies, would be accomplished to assure that activities conform to objectives of the Forest Plan. Project level monitoring is a component of Forest Plan monitoring. The following types of monitoring will be accomplished:

**Implementation Monitoring** - Are mitigation measures and BMPs being implemented as planned?

For example, monitoring of sale layout and timber designation will occur to assure proper application of all identified resource objectives, constraints, and mitigation measures. Monitoring will also consist of timber sale contract administration to ensure that all required mitigation measures are properly implemented and are effective.

Included in the monitoring activities is compliance monitoring of Proposed, Endangered, Threatened, and Sensitive species (PETS). If PETS species are discovered in the area during project activity they will be protected in accordance with appropriate contract provisions. Additional site monitoring by the district fisheries and watershed staff during road construction, pre-sale layout and marking, and timber harvest will be undertaken to assure compliance with water quality standards, hydrology, and soil parameters.

**Effectiveness Monitoring** - Did mitigation and protection measures result in desired effects?

A walk-through survey of the project area during implementation and after sale closure will be conducted to qualitatively monitor on-site and downstream effects of project implementation.

If monitoring shows that mitigation measures of BMP's are not being implemented as planned or are not being effective in meeting resource objectives, activities will cease or be modified to correct problems.

Monitoring in areas where PACFISH RHCA widths are modified and burned by direct ignition will be undertaken at five-year intervals to determine vegetative responses.

**Other**

**Regeneration Monitoring** - Planting monitoring will occur in years one, three, and five following treatment. Natural regeneration monitoring will occur in years three and five following treatment.

**Prescribed Burning Monitoring** - Fire Management will conduct monitoring of the prescribed burned acres as outlined in the District Prescribed Burn Monitoring Plan.

**Noxious Weeds** - The following elements will be monitored and documented; for a list of the species and the responsible person, refer to the Noxious Weed Report in the analysis file:

- Effectiveness of treatments.
- Cost of the project (direct and indirect)
- Analysis of unintended effects**.**
- Impacts to human health
- Analysis of the degree of success.
- Effectiveness and adherence to the mitigation measures.

**Fisheries and Watershed** - The following is a list of monitoring activities for fisheries and watershed resources, which have been or will be implemented prior to and following the Sugar Vegetation Management project. These activities will provide information on evaluation of the sale and for future planning of projects in the area.

a. Monitor the project to ensure that all standards and guidelines in the Wallowa-Whitman Forest Plan are met through implementation of mitigation measures as identified by the interdisciplinary team.

b. Pre-project monitoring for each Forest Management project includes on the ground survey of the project area, and the proposed treatment units. Monitoring of the proposed treatment units includes survey of any stream channels, RHCAs, slope stability, and general riparian vegetation characteristics.

c. Monitoring of the implementation of the project and protection measures will take place throughout the life of the project by the TSA and Watershed Specialist. For example, if an intense thunderstorm caused overland flow and subsequent excessive soil displacement or sediment production, harvest operations would cease until the soil moisture decreased or protection measures were complete. Potential effects from log haul on roads which parallel RHCAs will be monitored throughout the life of the project by the TSA and Watershed Specialist. Timber harvest operations will be halted if adverse impacts are observed at any point during the operation.

**Soils** - Monitoring will be undertaken

1) To ensure that best management practices and mitigating measures incorporated into the sale are being followed, and
2) To determine if these practices and measures are adequate to meet the intent of management directives.

Monitoring of sale layout and contract administration will be undertaken to ensure proper application of all identified constraints and mitigating measures. Ground-based harvest units will be monitored to ensure adequate spacing between skid trails, restriction of equipment to skid trails, prevention of wet weather yarding, and effective subsoiling of compacted skid trails and landings. Monitoring to ensure that project design and mitigations are properly implemented to ensure DSC levels remain below Forest Plan minimums would occur and where detrimental impacts affect over 20% of the area, mitigation or enhancement measures would be considered. Monitoring on units 4, 5, 17, 19, 20, 22, 23, 26, 32, 35-37, 39, 41, 49, 50, 69, 73, and 90 will occur to ensure DSC levels remain below Forest Plan minimums for the area.

Post-harvest activities will be monitored to ensure that guidelines to minimize soil disturbance are being followed. Subsoiling will be monitored to ensure additional soil damage related to project implementation is negligible. Burning will be monitored to ensure high and moderate fire severity is within the limits described as low-severity burn or moderately-low severity burn, depending on burn objectives.

**Table 12 - Wildlife**

| What | Type | When | Who | Why |
|---|---|---|---|---|
| Snags, logs Sample of units | Implementation | During logging, one year after logging | TS administrator & wildlife personnel | To determine if prescribed material was retained |
| Aspen Restoration | Effectiveness (photographic and narrative records) | Five years following implementation. | Wildlife Biologist or Botanist | Monitor success of aspen regeneration and growth and apply adaptivemgmnt as needed to meet objectives. |

**Table 13 - Botany – Sensitive Plant Species**

| What | Type | When | Who | Why |
|---|---|---|---|---|
| Botrychium montanum site | Implementation, Effectiveness | Immediately after burning, and one year following logging | District Botanist | To determine effectiveness and adequacy of the buffers and ATP requirements. |

# Chapter III. Environmental Consequences

## A. Introduction

To facilitate the reader's understanding of the effects analysis, this chapter describes the present resource situation using the purpose and need accomplishments and key issues, as needed. The No Action Alternative (Alternative 1) and Action Alternatives (Alternatives 2 and 3) are described in detail in Chapter 2, and a comparison of the alternatives was developed for the Sugar Vegetation Management Project and presented in the Alternatives At A Glance table in Chapter 2. This chapter also discloses the anticipated environmental consequences of the No Action and the Action Alternatives on various resources for which there are potential direct, indirect and cumulative impacts. The effects analysis forms the basis of comparison of the alternatives through evaluation of the key issues and select non-key issues.

All known baseline activities used by the Interdisciplinary team for their cumulative effects analyses, is located in Appendix D of this EA. The duration of direct, indirect, and cumulative effects varies, and is addressed by each resource and subject area to follow. Key indicators will be used to measure alternatives for each key issue. The effects will be discussed by resource or subject area, and key issues and indicators will be addressed under the appropriate area. The scale of analysis of effects is on a subwatershed level (including all the subwatersheds as identified in Chapter 1 – Project Area Description), unless otherwise identified under a specific resource area.

For the purposes of this EA, the cumulative impacts are the sum of all past and present actions, and reasonably foreseeable future actions. The purpose of the cumulative effects analysis in the EA is to evaluate the significance of the No Action's and Action Alternatives' contributions to cumulative impacts. A cumulative impact is defined under federal regulations as follows:

> "...the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

As required under the NEPA and the Council on Environmental Quality (CEQ) regulations for implementing NEPA, this section addresses those cumulative effects on the environmental resources in the Cumulative Effects Analysis Areas (CEAAs). Cumulative effects could result from the implementation of the No Action or Action Alternatives added to past, present, or reasonably foreseeable future actions. The extent of any given CEAA may vary by resource, based on the geographic or biologic limits of that resource. As mentioned above, subwatershed level (including all the subwatersheds) is the CEAA unless otherwise noted. As a result, the list of projects considered under the cumulative analysis may vary according to the resource being considered. In addition, the length of time for cumulative effects analysis will vary according to the duration of impacts from the Action on the particular resource.

The best available science is considered in preparation of this EA; however, what constitutes best available science might vary over time and across scientific disciplines. As a general matter, we show consideration of the best available science when we insure the scientific integrity of the discussions and analyses in the project NEPA document. Specifically, this EA and the accompanying Project Record identifies methods used, references reliable scientific sources, discusses responsible opposing views, and discloses incomplete or unavailable information, scientific uncertainty, and risk (See 40 CFR, 1502.9 (b), 1502.22, 1502.24).

The Project Record references all scientific information considered: papers, reports, literature reviews, review citations, academic peer reviews, science consistency reviews, and results of ground-based observations to validate best available science. This EA incorporates by reference (as per 40 CFR 1502.21) the Project Record, including specialist reports and other technical documentation. Analysis was completed for Silviculture, Wildlife, Botany, Proposed, Endangered, Threatened, and Sensitive (PETS) Species, Fire/Fuels, Economics, Soils, Watershed and Fisheries, Access and Travel Management, Range, Noxious

Weeds, Cultural/Heritage, and Recreation/Visuals. Information from these reports has been summarized below in this Chapter. The Project Record is located at the La Grande District Office.

## B. Alternative Evaluation as They Respond to the Key Issues

## Silviculture/Vegetation Management – Improvement of Long Term Forest Heath Conditions

### Introduction

Several factors in the Sugar Analysis Area affect overall landscape health as described by tree health and vigor and insect/disease susceptibility. These factors are major silvicultural concerns to implementing the Wallow-Whitman Forest Plan in regards to the timber standards and guidelines and direction for management areas 1 and 3. The project area as described in Chapter 1 is the analysis area for the Silviculture/Forest Health analysis below.

Overstocking can lead to an increase in beetle populations, reduced health of the stand, decreases in production of both the overstory and understory, and alter stand structures and compositions. In many instances, stress, particularly drought stress is compounded by overstocking (Fiddler, et.al., 1995). This stress can lead to losses in tree growth and increases in insect and disease caused mortality. Appropriate stocking levels can help to increase tree growth and the fire, insect, and disease resistance of stands (Lambert, 1994).

The number of stands treated would measure the effectiveness of the alternatives towards reducing density.

Current management maintains stands within a range of densities. The lower range or lower management zone (LMZ) would maintain stocking at a point where a significant portion of the site resources is captured in tree growth. The upper range of density or upper management zone (UMZ) prevents the establishment of a suppressed tree class to develop. Stands near or above the UMZ are more likely to develop stress, be less vigorous, and contain more mortality.

To restore and maintain the landscape, silvicultural treatments can be used to modify and rejuvenate the forested landscape in the analysis area. Improvement cuttings, shelterwood, commercial thinning, and salvage/sanitation are types of silvicultural methods that can improve landscape health, reduce the risk of insects, diseases, and wildfire (Powell, 1999, Graham et.al. 1999, Torgenson, 2001, Starr et. al 2001, Thies, 2001, Graham and McCaffrey, 2003, Fettig et. al. 2007). Treatments can begin to provide a range of structures for the long term, release potential of the sites, and alter species composition.

According to the Intergovernmental Panel on Climate Change, there has been a clear pattern of temperature increases and long-term trends in precipitation changes (Kimbell, 2007). The panel concludes that disturbances from pest, diseases, and fire are projected to have increasing impacts on forests. Insect life cycles are highly sensitive to temperature; climate change can have a large impact on the development, survival, and distribution of insects (Mock, et.al. 2007, Redmond, 2007). Recent warming trends have caused mountain pine beetle infestations in areas that have not previously recorded outbreaks in British Columbia and this increase has occurred largely in part due to a shift in climate (Carroll, 2007, Beukema, et.al. 2007).

Environmental changes from ongoing climate changes could create forests that are ill adapted to conditions and more susceptible to undesirable changes (Millar et.al. 2007), such as extreme events due to insect and disease outbreaks and wildfire. Management strategies can assist forests in becoming more resistant and resilient under climate-induced change.The following effects will address the key issue that the analysis area has overstocked stands.

The Key indicator is as follows:

- Acres of stand density reduction accomplished

## Effects Analysis

### No Direct, Indirect, or Cumulative Effects

The following restoration activities associated with the Sugar Vegetation Management project are of such limited and constrained nature they would not disturb the forested vegetation in the project area and would therefore have no effect on Vegetation resources or activities.

- Road Reconstruction
- Large Wood Placement
- Forage Enhancement

These activities and their effects will not be discussed further in the Vegetation section.

### Direct and Indirect Effects on Vegetative Health

***ALTERNATIVE 1 – NO ACTION***

The following discussed the direct and indirect effects on the biophysical environments within the project area of not managing the vegetation under the no action alternative.

**Cool Grand Fir**

In these stand types, grand fir, and Douglas-fir will continue to die creating stands, in the short term, which will be clumpy in nature with overstocked patches of fir perpetuating existing conditions. Many of these stands will remain in a condition of low vigor, because of overstocking, which increases the risks of poor stand health for the future. Dead trees and remnant green trees will provide shade, for a short time, and the accumulation of litter on the forest floor from limbs and tree boles falling down will decrease the amount of exposed soil. Shading and a decrease in exposed soil will reduce the success of seral species regeneration, which would delay the desired future condition for the area. Climate-induced change were temperatures are elevated and precipitation is reduced will increase stress to these grand fir dominated stands. As the canopy naturally opens, ground vegetation will increase and begin to occupy the site delaying natural regeneration. Natural openings will occur and remain that way for approximately 25-30 years.Fuel conditions in these stands, fuel loading, and accumulation will be excessive and the likelihood of a high intensity fire is high. Fires have the potential to damage adjacent stands some of which do not have excess fuel loadings or where fir is a minor component; and may create stand openings equal to or greater than those openings due to mortality from insects. Excessive heat from fires also has the potential to cause soil sterility, thereby reducing future regeneration success.

**Warm Grand Fir and Douglas-fir-Ponderosa Pine Group**

Without some type of disturbance, these stands would continue to have an excessive understory component. If left untreated these stands would continue to exhibit reduced growth rates and become more susceptible to diseases and insects. Fire and insect/disease risks will not be reduced and structural stages would be largely understory re-initiation and multi-stratum with large trees until a

wildfire creates stand initiation conditions. The grand fir component in these stands will be maintained at higher levels then present historically.

This alternative would result in a continued decline in overall forest health due to climate-induced change and overstocking which increases susceptibility to insects and diseases, as well as, increases in fire intensities. Fuel loadings will continue to be excessive and contribute to higher fire intensities than those that would have occurred historically. Overstocked stands would continue to be selected for haphazard stocking reduction by future insect/disease outbreaks. The dryer biophysical groups would continue to be in an overstocked, low vigor condition; the risk of losing those stands to mountain or western pine beetle would increase (Sartwell and Stevens 1975; Hessburg, Mitchell and Filip 1994). Additional growth to trees would be reduced and movement towards larger diameter trees would be delayed until densities are reduced. Moist biophysical groups would continue to be at risk to insect/disease damage and stand replacement fires. The desired future condition of meeting stocking levels and species composition is not considered with this alternative.

***ALTERNATIVES TWO and THREE***

These alternatives, as noted in the table below, are comprised of a combination of treatment prescriptions. These treatments would provide stocking levels and species composition compatible with site production to promote healthy, vigorous stand conditions and begin to provide vegetative conditions in terms of structural stages and patch sizes that are within the Historic Range of Variability (HRV). Woody debris would be left on the site to contribute to the nutrient level (long-term site productivity) and enhancement of small mammal habitat. Prescribed underburning in treated stands of the drier biogroups would occur in three to five years. Burning is designed to reintroduce fire in drier biogroups to emulate natural fire return interval and return fire to its role as an ecosystem process. Management actions that improve forest health will enable forests to withstand stresses associated with climate change.

**Table 1 - Treatment Types**

| Alternative | Treatment Types by Alternative | | | | | | |
|---|---|---|---|---|---|---|---|
| | **HTH** (acres) | **HSA** (acres) | **HIM** (acres) | **HSH** (acres) | **HOR** (acres) | **FFU** (acres) | **SPC** (acres) |
| 2 | 1123 | 18 | 395 | 85 | 48 | 316 | 1000+72 |
| 3 | 884 | 5 | 355 | 79 | 48 | 316 | 1000+72 |

Under Alternative 2, 74% of the acres identified as overstocked during the reconnaissance are treated. 4.6 million board feet are generated from 1,715 acres. While under Alternative 3, 61% of the acres identified as overstocked during the reconnaissance are treated generating 3.8 million board feet from 1,422 acres. These treatments would produce the following effects in each of the biophysical environments treated within the project area.

**Cool Grand Fir Group**

Treatments in this group would remove suppressed trees and those with poor live crown ratios (LCR), generally trees with less than 30-40% LCR, and reduce basal area to the appropriate level based on alternative. Individual stand information about stocking and management zone levels are in the analysis file. Reducing stand densities would enhance stand and landscape health and begin to provide for climate-induced change, while helping to create conditions that would allow a healthy understory to develop. Shelterwood cuttings in this group, would remove poor growing, less vigorous trees while maintaining most of the larger component (trees greater than 18" DBH). Overstory densities, in shelterwoods, would be between 30-50 trees per acre between 7" and 21+" DBH and help to provide site conditions for a healthy understory of mixed species to develop and provide for multistory late/old structure (MSLT) in 15 to 25 years.

Sanitation and overstory removals will remove mistletoe-infected trees along with those that have less than 20% live crown ratio. In the overstory removals, release treatments will be conducted to improve health and vigor and provide for site conditions to develop large trees.

Commercial thinnings and improvement cuttings will remove less vigorous trees and reduce densities and would provide for future treatment of understory component. In stands where the understory is healthy, release treatments will reduce densities and allow those trees to maintain growth rates and minimize a future suppressed class.

Treatments will reduce the risk of insect/disease problems and overstocking for 20-30 years.

**Warm Grand Fir/Douglas-fir Groups**

Treatments in this type would provide more disease resistance and structures more consistent with natural disturbance regimes (Schmidt 1994; Scott 1996; Schowalter and Withgott 2001). Many of these stands would begin to provide more open conditions dominated by ponderosa pine, Douglas-fir, and western larch. The effects of potential climate-induced change will be minimized by reducing densities and minimizing grand fir. Post harvest burning of these stands would play an important role in maintaining them. Density levels, as well as, the amount of understory in the stands would be reduced as burning is conducted.

**Summary:** In general the differences between direct and indirect effects of implementing the action alternatives are relatively minor in relation to the scale of the project area over the short (1-5 years) term. However over time, the acres deferred from treatment in these alternatives will be less and less likely to receive treatment in the future due to the difficulties associated with accessing large portions of this project area. Therefore, these acres are more likely to continue under the failing forest health conditions described in Alternative One for a much longer (50+ years) period of time. More of these acres would be realized under Alternative 3 than by Alternative 2.

## Cumulative Effects for Vegetative Health

***ALTERNATIVE 1 – NO ACTION***

A list of past harvest activities and the prescriptions are located in Appendix D of the EA. Harvest activities occurred on 3,783 acres prior to 1996. Between 1997 and 2007, 1,021 acres of harvest, 97% intermediate treatments, were completed. Prescribed burning has occurred on 478 acres. The largest wildfire in the last 40 years was 105 acres.

Past management activities that affected overstocking were primarily historic timber harvests. Intermediate treatments, such as thinnings, partial removals, salvage and sanitation cuttings have reduced densities and removed dead or damage trees. Of those activities, regeneration harvest such as clearcuts, seed tree, and shelterwood cuts have removed older, mature stands and allowed for younger healthy stands to develop. Regeneration harvests have helped to alter species composition to more seral, disease resistant species. Past selective harvesting along with fire exclusion have produced excessive disturbance by pathogens and insects (Hessburg, Mitchell and Filip 1994) and has increased the amount of shade tolerant species which are more susceptible to insects and diseases. Past release treatments have helped to maintain appropriate stocking levels.

Structure is a function of the disturbance regimes operating within the biophysical groups. Single storied structures are generally found on sites experiencing frequent disturbance regimes whereas multi-layered structures dominate on more mesic sites experiencing less frequent disturbance regimes. Research done in the Blue Mountains (Hall 1991, Agee and Maruoka 1994) indicate that fire was a major disturbance in creating landscapes resulting in single story late and old structure due to low severity, high frequency fire in warm, dry types. Recent research by Hessburg et al. (2007), in northeast Washington reported that fire intensity was more variable in the drier grand fir

and Douglas-Fir types than previously believed, resulting in more intermediate and young multistoried stands. However, forest sites in northeast Washington tend to be different than those in the Blue Mountains. Structural distributions outside of the historic range of variation (HRV) are likely to result in an increased risk of undesirable ecological change (Swanson and others 1994). It would require excessive resource protection measures to maintain a multi-layered structure within an environment historically experiencing frequent fires. Warm-dry stands in multi-layered late/old conditions that are more typical of cool environments would be treated to convert to single storied condition. Existing single storied late old structure (LOS) is almost nonexistent (less than 8%) in the warm dry type of the project area. In the absence of density management, these stands would continue to exhibit poor growth rates when compared to site potential. This delay would lengthen the period of time that would be necessary to achieve the "large tree" component of old-growth structure and these stands would be highly susceptible to stand replacement fire.

***ALTERNATIVES TWO and THREE***

Manipulation of stands in Alternatives 2 and 3 within the overstocked mid-seral structural stages (stem exclusion closed canopy and understory reinitiation) and those that are multi-stratum large tree (MSLT) would provide the best opportunity to begin the process of increasing the representation of single stratum large tree (SSLT) structures on warm/dry sites. In the absence of density management, these stands would continue to exhibit poor growth rates when compared to site potential. This delay would lengthen the period of time that would be necessary to achieve the "large tree" component of old-growth structure and these stands would be highly susceptible to stand replacement fire. Treatments in this assessment would begin to provide late/old structure within the next 20-60 years, depending on existing size classes and move the area toward the HRV.

Forested stands will continue through successional stage development. Previous harvest reduced the amount of LOS within the area. The amount of departure from HRV is located in Chapter 1 of this EA. Proposed treatments will accelerate stands toward LOS and convert warm/dry MSLT stands to SSLT, which will move the area toward HRV across the landscape reflecting past and present management activities.

Previous prescribed fire treatments began the reintroduction of fire into areas outside historic fire return intervals, but were primarily focused in grassy timbered stringers. Prescribed fire in this project will continue the treatments started in earlier burns, reduce fuel loadings, improve forage, and reduce encroachment into meadows and reduce the amount of grand fir in timbered stands, which would have historically been Douglas-fir and, ponderosa pine. This, in combination with previous burns, would accelerate movement towards desired stand conditions to create healthier stands more resilient to effects from wildfire.

**Other Activities Common to the Action Alternatives 2 and 3**

## Direct, Indirect, and Cumulative Effects for Vegetative Health

RHCA Treatments - Common to most harvest units are no activity buffers within riparian habitat conservation areas (RHCAs), which range from 25 to 100 feet in width on both sides of the stream depending on the stream class and prescription treatment called for. Many of the no harvest buffers would experience effects similar to those described for Alternative 1 above; however, some of the density related mortality is expected to provide for riparian large wood needs. Treatments within the RHCAs, would improve the health of the trees within the riparian area reducing the risk to fire and provide for the key factors required to meet riparian management objectives.

Subsoiling - This activity would have positive silviculture effects. Areas that have had detrimental impacts would be treated which would increase the overall productivity of the sites (Howes 1997) improving the establishment of new trees and increasing the growth rates of existing trees.

Release Treatments (Non-commercial Thinning) – Precommercial thinning would have positive silvicultural effects by reducing competition, increasing growth rates, and helping to maintain species composition (Streeby 1979; Powell 1999).

Road Closure/Rehabilitation - Closures of rehabilitation of existing roadways would have no adverse silvicultural effect. Rehabilitation or obliteration would reduce compaction in the analysis area that would allow for better long-term site productivity, increased water holding capacity, and increased root penetration (Adams and Froehlich 1984).

Prescribed Burning and Mechanical Fuels Reductions - Burning and fuels reduction treatments would provide for some additional openings within stands to assist natural and artificial regeneration and reduce the possibility of a wildfire damaging the residual stand.

Planting – Hand planting of seedlings would have positive silvicultural effects by providing: regeneration in stands that have few viable seedlings or saplings, a structural component that is lacking in some stands, and tree densities at appropriate numbers.

Noxious Weed Treatment – Treatment of invasive species would have a positive silvicultural effect due to the removal/reduction of plants competing for resources, there would be more available resources (water, nutrients) for native plants (Sheley and others 2001).

Connective Corridors - Those stands that have been designated as connective corridors would be managed to higher density levels. Stand information and density levels are located in the analysis file. Managing to higher density levels would reduce the risk of insects/disease problems and overstocking for 10-15 years.

Aspen Restoration - Aspen restoration would improve biodiversity and maintain soil quality and nutrient cycling. This project will increase acres of aspen stands which are being protected in order to keep them from browsing and conifer tree encroachment. Enhancement and protection of these areas will increase the vegetative diversity within the area and allow aspen to persist where it is at risk of disappearing.

## Wildlife Effects

**Introduction**

The following is a wildlife effects analysis and a comparison of the project alternatives. A Wildlife Inventory describing the existing condition of habitat within the analysis area is in the analysis file. A Biological Assessment/Evaluation was conducted to address effects to Endangered, Threatened, and Sensitive species, and it also resides in the Sugar Analysis File.

The analysis area for wildlife in this section is defined as the Lower Five Points Creek watershed (170601040403) and a minor portion within the East Meacham Creek watershed (170701030202).

Two key issues concerning wildlife were identified for this project: 1) Late/Old structure (LOS) is below the historical range of variability, and 2) the impacts to security habitat for big game by marginal cover and motorized access. These key issues will be analyzed in terms of key indicators as a means of quantifying effects of alternatives.

Key Indicators are as follows:

- **Late/Old Structure (LOS)**
    1. Acres of understory reinitiation accelerated toward Single Stratum and

Multi-Stratum Large Trees (SSLT and MSLT)
2. Acres of MSLT restored to SSLT (all biogroups)
3. Acres of treatments within connective corridors.

- **Big Game Security Habitat**
  1. Acres of Satisfactory thermal cover converted to Marginal cover or forage
  2. Acres of Marginal thermal cover converted to Forage
  3. Percent of analysis area further than 0.90 km (moderate quality security habitat) from a motorized route.

**Analysis Assumptions - Temporal Considerations**

The duration of effects are discussed when relevant or practical to predict. The following timeframes will apply for the purpose of this analysis. I feel these timeframes are appropriate given the scale of this analysis and the duration of effects expected from the prescribed treatments.

| | |
|---|---|
| Short term | 0 – 20 years |
| Mid term | 20 – 80 years |
| Long term | Greater than 80 years |

**Analysis Assumptions - Historical Range of Variability and Old Growth (LOS Structure)**

As management indicator species, the American marten, pileated woodpecker, and northern goshawk, are closely associated with or dependent on some aspect(s) of mature or old forest habitat. Northern goshawk is addressed in more detail in a separate section later in the EA, but is mentioned here due to its association with LOS forest habitat. Structural stages and biophysical environments referred to in this section are defined in table W2 and under the Historical Range of Variability below.

**American Marten** (*Martes americana*) is a management indicator species that represents mature and old growth forest habitat. Contiguous forest cover, large trees, abundant large snags and down wood, and closed canopy, best describe marten habitat in the Blue Mountains of Oregon. These conditions correspond to forest structural stage MSLT in biogroups G1 through G5. Understory reinitiation, stem exclusion closed canopy, and multi-stratum large trees uncommon in biogroups 1-5 also provides habitat in varying degrees for marten. Dry forest types and naturally fragmented stand configurations make much of the Sugar analysis area unsuitable for marten.

**Pileated Woodpecker** (*Dryocopus pileatus*)

The pileated woodpecker represents species dependent on large diameter snags and down trees in the older-aged forests. Pileated woodpeckers use snags for nesting, roosting and foraging (Bull and Holthausen 1993, McClelland and McClelland 1999).

The most common prey of pileated woodpeckers is ants, most often obtained by excavating in rotten wood (Bull and Jackson 1995). In northeastern Oregon, snags and logs >15 inches diameter were preferred, as were Douglas-fir and western larch (Beckwith and Bull 1985, Bull and Holthausen 1993, Bull et al. 1992a). Stands with higher density of snags and logs are preferred for foraging (Bull and Meslow 1977). Hollow, live grand fir provide important roost trees for pileateds.

The above habitat characteristics, including large trees, closed canopy, abundant large snags and down wood, best correspond to forest structural stage MSLT in biogroups G4 through G6. Although it is likely that other structure stages and biophysical groups provide pileated woodpecker habitat, they do not meet all the criteria of large structure, cover and abundant down wood that seem to be necessary for successful reproduction.

**Northern Goshawk** (*Accipiter gentilis*)

The northern goshawk is the largest North American accipiter, or forest hawk. In the western US, it is often associated with closed canopy, mature and old growth forests (reviewed in Kennedy 2003). Important habitat features provided by LOS forests include large trees for nesting, closed canopy forests with open understory for hunting, down logs as places to pluck their prey, and abundant prey (Bull and Hohmann 1994, DeStefano et al. 2006, reviewed in Kennedy 2003, Reynolds et al. 1992).

Considered a "forest generalist", it might be better termed a forest-type generalist as it has been observed to breed in everything from dry pine to spruce-fir, aspen and cottonwood (reviewed in Kennedy 2003). However, it is a forest structure specialist as it prefers closed-canopy forest of large trees (DeStefano et al. 2006, reviewed in Kennedy 2003, McGrath et al. 2003).

Conditions used by goshawks for foraging and nesting can be found in biogroups G1 through G9 in nearly all structural stages except stand initiation and some categories of stem exclusion. The highest quality goshawk habitat (source habitat) is found in MSLT and MSLTU in biogroups G4 through G6.

**Historical Range of Variability**

An analysis of the historical range of variability (HRV) was done to assess how current forest conditions compare to pre-settlement conditions. One of the key issues for this project is that LOS habitat is below the HRV. Forest Plan amendment #2 (formerly referred to as screens) contains standards and guidelines (S&Gs) that address HRV. The analysis area for LOS dependent wildlife species (including marten, goshawk, and pileated woodpecker) is the subwatersheds that contain the project area. The reason HRV is important to wildlife populations is because the distribution, quality and quantity of habitat largely determines the potential for a wildlife species to exist at viable levels. Therefore, by managing habitat within the historical range of variability it is assumed that adequate habitat will be provided because species survived at viable levels previously under those conditions.

The further current conditions depart from HRV the less likely adequate habitat is being provided to sustain those species associated with the habitat. Just as importantly, departure from HRV leads to less resilient forests that are at increased risk from wildfires, drought, insects and diseases. For the purpose of this analysis LOS equates to "multi-strata large trees common (MSLT)" and "single-strata large trees common (SSLT)" structural stages. Structural stages referred to in the Wildlife Effects are from "Recommended Definitions for New Structural Stages Per Amendment #2", 11/09/95. "Biogroups" is an abbreviated term for biophysical environments, groupings of forest stands based on moisture, temperature, and disturbance regimes. Table 2 contains abbreviations for structural stages.

**Table 2 - Structural Stage Abbreviations**

| Structural Stage | Abbreviation |
|---|---|
| Stand Initiation | SI |
| Stem Exclusion Open Canopy | SEOC |
| Stem Exclusion Closed Canopy | SECC |
| Understory Reinitiation | UR |
| Multi-Strata Large Trees Uncommon | MSLTU |
| Multi-Strata Large Trees Common | MSLT |
| Single-Strata Large Trees Common | SSLT |

The northeast and north central portions of this analysis area are dominated by mixed conifer forests and are fragmented by created and natural openings. The term "created opening" is used relevant to wildlife species that require or prefer closed canopy forest habitat, which is not consistent with the definition used when discussing the regeneration status of stands. Many of these created openings are regenerating to the point where they can provide hiding cover for some species, but have not

developed the large trees, snags, logs, and canopy closure necessary to support old growth associated wildlife species. To species such as marten, pileated woodpecker, and goshawk these openings are inhospitable environments that will generally be avoided. This has led to these wildlife species being restricted to smaller parcels of habitat, which decreases distribution across their geographic range. This in turn increases the probability of local extirpations when disturbances (natural or anthropogenic) impact remnant habitat patches.

The concept of source habitats is used to assess the risks associated with departure from HRV for LOS habitat. "Source habitats are those characteristics of macro-vegetation that contribute to stationary or positive population growth for a species in a specified area and time" (Wisdom 2000). Wisdom et. al. refers to "groups", and the relevant groups for this LOS forest habitat discussion are groups 1, 5 and 6. Group 1 includes pygmy nuthatch, white-breasted nuthatch, and white-headed woodpecker. Group 5 includes American marten, fisher, flammulated owl, and summer habitat for northern goshawk. Group 6 includes pileated woodpecker, Vaux's swift, Wiliamson's sapsucker, Hammond's flycatcher, chestnut-backed chickadee, brown creeper, winter wren, golden-crowed kinglet, varied thrush, silver-haired bat, and hoary bat.

Generally source habitat had experienced dramatic decreases for groups 1, 5 and 6 across much of the Interior Columbia Basin. More than 40% of the watersheds within the Blue Mountains ecological reporting unit (which contains the Sugar analysis area) have experienced a decrease of $\geq$ 60% in source habitats for groups 1, 5 and 6. The watershed that contains the Sugar analysis area has seen a reduction of source habitat for groups 1, 5 and 6 of $\geq$ 60%. Wisdom et. al. offers potential strategies for reversing the broad-scale declines in source habitats and associated wildlife populations for group 1:

1) Retain stands of interior and Pacific ponderosa pine where old-forest conditions are present, and actively manage to promote their long-term sustainability;
2) Restore dominance of ponderosa pine to sites where transition to other cover types has occurred;
3) Accelerate development of late-seral conditions, including snag recruitment, within stands that are currently in mid-seral stages;
4) Include provisions for snag retention and snag recruitment where needed in all management plans involving forests used as source habitats for group 1;
5) Reduce risk of stand-replacing fires in late-seral ponderosa pine; and
6) Maintain existing old cottonwood-willow stands, and identify younger stands for eventual development of old-forest structural conditions.

Potential strategies for group 5:

1) Increase the representation of late-seral forests in all cover types used as source habitats;
2) Increase connectivity of disjunct habitat patches and prevent further reduction of large blocks of contiguous habitat patches;
3) Identify potential species strongholds for long-term management of marten and fisher;
4) Reduce human disturbances in source habitats;
5) Restore aspen and cottonwood-willow forests;
6) Reduce the risk of loss of habitat by focusing old-forest retention and restoration efforts on areas where fire regimes are either non-lethal or mixed;
7) Maintain stands with active goshawk nests in old-forest condition; and
8) Embed the conservation of old forests within a larger, ecosystem context that considers historical fire regimes and landscape patterns and the habitat needs of species that are prey of the members of this group (essentially an HRV approach).

Potential strategies for group 6 include:

1) Accelerate development of late-seral conditions in lower montane, montane, and subalpine forest types and retain large snags and logs in all forest seral stages;

2) Restore forest conditions that are more resistant to catastrophic fire, insects, and disease problems, while retaining sufficient habitat to support species in this group;
3) Maintain and improve riparian shrubland and riparian woodland communities;
4) Protect known and potential bat roosts;
5) Minimize direst physiological effects on bats, as well as indirect effects on their insect prey (insecticides and pesticides); and
6) Modify management practices as appropriate to enhance the insect prey base for bats.

The following table displays the HRV for LOS within the project area. Figures in this table do not provide information on patch size, distribution or connectedness, so their utility is limited.

**Table 3 - HRV for LOS**

| Bio-group | Total Acres in Biogroup | SSLT (existing) | | SSLT HRV (% of biogroup) | MSLT (existing) | | MSLT HRV (% of biogroup) |
|---|---|---|---|---|---|---|---|
| | | Acres | % of biogroup | | Acres | (% of biogroup) | |
| G4 | 3,086 | N/A | N/A | N/A | 537 | 17% | 30-60% |
| G5 | 2,382 | 0 | 0% | 15-55% | 317 | 13% | 5-25% |
| G6 | 560 | 52 | 9% | 15-55% | 108 | 19% | 10-30% |
| G7 | 2,238 | 38 | 1% | 15-55% | 308 | 13% | 5-25% |
| G8 | 261 | 32 | 12% | 20-70% | 34 | 13% | 2-15% |

Connective corridors between allocated old growth (MA-15) areas and LOS habitat patches were delineated according to criteria from the Forest Plan Amendment #2. Corridors range in quality from highly functional to practically non-functional, but they represent the best options available.

## Effects Analysis

### No Direct, Indirect, or Cumulative Effects

The following project activities associated with the Sugar project are of such limited and constrained nature due to their small scale and shortness in duration that they would produce negligible effects on big game habitat or old growth.

- Tree Planting
- Large wood placement in 5 Points Creek

These activities and their effects will not be discussed further in this Wildlife section.

## A. Late/Old Structure

### Direct and Indirect Effects on LOS

**Table 4 - Comparison of Key Indicators by alternative for LOS.**

| Key Indicators | Alternative | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| Acres of UR accelerated toward MSLT/SSLT | 0 | 1,147 | 945 |
| Acres of MSLT restored to SSLT (warmer/drier biogroup types) | 0 | 483 | 398 |
| Acres of treatments within connective corridors | 0 | 602 | 528 |

***ALTERNATIVE 1 - NO ACTION***

Alternative 1 would result in no direct effects to LOS associated wildlife. The existing level of old growth habitat would contribute modestly to the old growth associated wildlife community into the long term in the absence of large scale disturbances. The Sugar analysis area would continue to function as a sink for late/old growth associated wildlife species well into the mid-term.

No new specified, reconstructed, or temporary roads occur with this alternative, so there would be no direct or indirect effects associated with roads.

Stands within drier biogroups G5, G6 and G7 would continue to function as MSLT, predisposing the larger trees to threats of fire, insects and diseases. This alternative would be inconsistent with strategies #1 and 2 for group 6, and strategies #1, 2, 3, and 5 for group 1.

Perpetuating MSLT structure in drier (G5 biogroups) stands would benefit species like pileated woodpeckers in the short-term that are currently using them, but there are risks associated with retaining this structure that could result in long-term loss of large diameter trees, namely ponderosa pine and Douglas-fir. In the event that large overstory ponderosa pine is lost to fire or insects, species such as white-headed woodpecker, flammulated owl, and pygmy nuthatch would suffer setbacks, as well as pileateds and other species using these stands. These species (except pileateds) are already poorly represented due to low levels of their source habitat (SSLT).

This alternative would not affect the allocated old growth (MA 15) network established by the Wallowa-Whitman LRMP to meet management requirements for marten and pileated woodpecker. The forested habitat between MA 15 areas would progress toward LOS habitat slower under the no action alternative than under the action alternatives.

The analysis area for northern goshawk, pileated woodpecker, and marten is all National Forest land within the subwatersheds that encompass the Sugar project area. There are approximately 4,441 acres of source habitat for northern goshawk and 4,743 acres for pileated woodpeckers in this analysis area. A query using only biophysical environments and structural stages resulted in 4,816 acres of source habitat for marten. However, marten are less likely to use highly fragmented landscapes or narrow stringers of otherwise suitable habitat. For this reason the western and southern portions of the Sugar area are not considered source habitat for marten. These areas are highly fragmented by natural grassland openings and dry ponderosa pine stands. A conservative estimate of 3,000 acres of source habitat for marten exists in the Sugar area, and is located from Sugarloaf Mountain southward to Smith Ridge and Camp One. The Smith Ridge area is immediately

outside of the Sugar analysis area, but within the area defined as the analysis area for marten, pileated woodpecker and goshawk.

Alternative 1 would not change the amount or distribution of source habitat for these species in the short-term. In the absence of large wildfires and insect epidemics, source habitat for these species would increase slowly over time. However, risks from catastrophic disturbances would also increase over time. Effects from a stand replacing wildfire could convert the source habitat for these three indicator species to an unsuitable condition which would have a greater negative effect than either of the action alternatives. A stand replacing wildfire would also have negative consequences for those species associated with SSLT forest structure that is currently deficient in the Sugar area. Large diameter ponderosa pine and Douglas-fir would be killed in a stand replacing wildfire, which would set back development of SSLT habitat by over a century.

***ALTERNATIVE 2***

Alternative 2 would accelerate development of LOS (MSLT and SSLT combined) structure through intermediate treatments on 1,147 acres of UR. Biogroup G4 represents cooler, moister plant associations that are capable of developing and persisting in an MSLT condition. This alternative accelerates 436 acres of UR toward MSLT. Biogroups 5, 6, 7 and 8 will generally move toward an SSLT condition with intermediate silvicultural prescriptions. Intermediate prescriptions (HTH, HSA, HIM, HFU) applied to UR stands in these drier biogroups will accelerate 711 acres of UR toward SSLT. This approach is consistent with potential strategies #1, 6 and 8 for group 5 (Wisdom 2000). Shelterwood and overstory removal treatments (HSH and HOR) will return UR stands back to an earlier structural stage before they can begin progressing toward LOS. There are 133 acres of HSH and HOR prescriptions in this alternative, and these stands are in a condition that precludes intermediate prescriptions.

Twenty-eight acres of existing SSLT structure would receive maintenance type treatments. This will reduce ladder fuels and prolong the structure and function of this deficient habitat type. These treatments will not result in a net decrease in LOS habitat, but will reduce structural complexity at the stand scale. These stands are inherently less structurally complex when fire is allowed to perform a maintenance function in them. These treatments are consistent with potential strategies #1 and 2 for group 6 and strategies #1, 2, 3, and 5 for group 1 (Wisdom 2000).

This alternative involves 0.2 miles of road reconstruction and 5.42 miles of temporary road, 1.29 miles more than Alternative 3. Any new roads, even temporary roads can lead to easier access into timbered stands for the removal of firewood and recreational off highway vehicle riding. Unless these temporary roads are made impassable following logging, increased loss of structure is expected from a reduction in sound logs and snags by firewood cutters, and the potential for disturbance increases from motorized access. The effects from increased motorized access should decrease following implementation of the travel and access management plan that will restrict cross country motorized travel. However, effectiveness of the travel and access management plan will largely depend on enforcement and voluntary compliance from the users.

Alternative 2 would have a greater negative impact on habitat used by old growth associated wildlife than Alternative 3 in the short and mid-term since it reduces canopy closure and structural complexity on more acres, and includes more road construction. Alternative 2 accelerates more acres toward old growth in the future, while reducing already limited habitat values on more acres in the short and mid-term.

Prescribed fire burn blocks encompass 10,621 acres in Alternative 2. These represent logical burn boundaries defined by roads or other features that could serve as boundaries. Not all acres within these burn blocks would actually be burned, and it is difficult to accurately assess the actual acres that are to be burned. An estimated 4,200 acres would be burned within the analysis area, much of which would be a mosaic of burned and unburned habitat. Effects to LOS from burning are reduced snags and logs, particularly those in the later stages of decay. New snags and logs are typically

created from burning, but they are usually sound and not easily excavated. Burning creates a period of reduced "soft snag" habitat that persists into the early mid-term. This can cause wildlife species that depend on such structures to move to other areas in search of suitable habitat, resulting in lower productivity and reduced local populations. Although some negative effects will occur, the wildlife and vegetation in this area evolved with fire as a frequent and common influence. Prescribed burning is done under more controlled conditions than wildfire so desirable results are more likely.

Alternative 2 moves more acres toward LOS conditions than the other alternatives which would strengthen the MA 15 network. This potential positive effect would be slight and would not be realized until the mid-term.

There are approximately 4,743 acres of source habitat for pileated woodpeckers, and alternative 2 would alter conditions on 919 of these acres. This leaves 3,824 acres of potential source habitat unchanged in the analysis area. Effects to pileateds would be similar as discussed above for goshawks with a few differences.

Large diameter snags are an essential component of pileated nesting habitat. Pileateds seem to occur in many forest settings, but are most productive where nesting, roosting, and foraging substrate are abundant. The drier ponderosa pine stands that represent the majority of proposed treatments are inherently less suitable for this species than the moister, mixed conifer stands that occur interspersed with the pine stands. Thinning prescriptions will retain all existing snags except those that pose safety concerns. Foraging (down logs) and roosting (hollow, live grand fir) substrate will be reduced, but not eliminated from treated stands. This may lead to reduced capability of these stands to support pileated woodpeckers, but will not preclude their use of these stands.

Marten likely occur in very low numbers and only in the area from Sugarloaf Mountain south to Smith Ridge. This is due to inherent habitat capability more than anthropogenic perturbations. There are currently an estimated 3,000 acres of potential source habitat for marten in this area. Of these, alternative 2 would alter conditions on approximately 300 acres. This leaves around 2,700 acres of source habitat unaffected. Marten would experience very little effect from this project due to the focus of treatments in areas of drier ponderosa pine where habitat is unsuitable for marten. More suitable, contiguous areas of source habitat for marten exist in the headwater areas of Five Points Creek to the east and in the Meacham drainage to the north.

***ALTERNATIVE 3***

Alternative 3 would accelerate development of LOS habitat through intermediate treatments in 945 acres of UR (all biogroups combined). Intermediate treatments will accelerate 398 acres of UR stands in biogroup G4 toward MSLT. Approximately 547 acres of UR stands in biogroups G5 – G8 will be accelerated toward SSLT through intermediate treatments. These treatments would benefit the MA 15 network in the long-term by increasing LOS habitat in the matrix between MA 15 areas and through improved connectivity. Source habitat would increase for goshawk, marten and pileated woodpeckers, as well as other species associated with LOS forest structure.

Additionally, 28 acres of existing SSLT would receive maintenance type treatments aimed at restoring SSLT character and reducing fuel loading that resulted from fire exclusion. These treatments will not result in a net decrease in LOS, but will reduce structural complexity in the short-term at the stand scale. These treatments address strategies #1, 2, 3, and 5 for group 1, #1, 6, and 8 for group 5 and #1 and 2 for group 6.

This alternative includes 0.2 miles of road reconstruction and 4.13 miles of temporary road, 1.29 fewer miles than Alternative 2. The type of effects from temporary roads are generally the same as those described under Alternative 2 above, however at a slightly reduced level due to fewer roads. The quality of LOS habitat could be reduced due to easier access into or nearer to LOS stands, facilitating firewood removal and disturbance to wildlife from motorized vehicles. These effects could

be reduced to very short duration (during project implementation) if temporary roads are made impassable following logging.

Alternative 3 would have less of a negative effect on habitat used by old growth associated wildlife than Alternative 2 in the short and mid-term. Alternative 3 accelerates fewer acres toward LOS than Alternative 2, but maintains more wildlife habitat values in the interim than Alternative 2. Considering the number of acres that have been previously thinned, and the acres being proposed in Alternative 3, ample acres will be in a condition to meet HRV objectives in the later part of the mid-term.

Prescribed fire burn blocks encompass 10,621 acres in Alternative 3. These represent logical burn boundaries defined by roads or other features that could serve as boundaries. Not all acres within these burn blocks would actually be burned, and it is difficult to accurately assess the actual acres that are to be burned. Approximately 4,200 acres would be burned. However, site specific exclusions have been agreed to between wildlife and fire personnel to keep fire out of high quality LOS stands and big game cover stands where fire could negatively affect habitat values. More site specific modifications are likely to occur to protect areas with high quality LOS habitat, and that can not be safely burned without high risk of killing overstory trees. Although some negative effects will occur, the wildlife and vegetation in this area evolved with fire as a frequent and common influence and fire remains a critical disturbance process in these systems. Prescribed burning is done under more controlled conditions than wildfire so desirable results are more likely.

For relative effects to potential source habitat for pileated woodpecker and marten, see effects of Alternative 2. The only differences between the action alternatives is that Alternative 3 would have less short-term negative effects on these species' habitats due to fewer acres being treated. Table 5 compares the current amount of potential source habitat to how much would be altered (quality reduced for the short to mid-term) by each alternative.

In the mid to long-term alternative 3 would result in slightly less habitat being restored for SSLT associated species such as white-headed woodpecker, pygmy nuthatch, white-breasted nuthatch, and flammulated owl.

**Table 5 - Potential Source Habitat for goshawk, pileated, and marten.**

| Species | Existing Source Habitat Acres | Acres of source habitat remaining unaffected | | |
|---|---|---|---|---|
| | | Alternative 1 | Alternative 2 | Alternative 3 |
| Goshawk | 4,441 | 4,441 | 3,522 | 3,645 |
| Pileated WP | 4,743 | 4,743 | 3,824 | 3,947 |
| Marten | 3,000 | 3,000 | 2,700 | 2,800 |

## Cumulative Effects on LOS

No fewer than eleven timber sales or portions thereof have occurred within the analysis area between 1976 and the present. These projects have included combinations of intermediate and regeneration harvests that have fragmented and changed the structure of forested stands, particularly LOS. The extensive road networks built to facilitate these logging operations has left a long-term imprint on the area that continues to provide access for recreationists, permittees, and Forest Service personnel. About 1,100 acres of prescribed burning has taken place in the past decade. The Sugar project is considered in combination with these past management activities in the assessment of cumulative effects. The table at the beginning of the LOS effects section provides a comparison of key indicators for the alternatives in regard to LOS habitat.

### *ALTERNATIVE 1 - NO ACTION*

Alternative 1 does not represent an incremental effect to LOS habitat that would contribute to other past, present and reasonably foreseeable future actions. Indirectly this alternative will not contribute

to restoration of overstocked forested stands, resulting in increased time (approximately 40 years longer) to achieve LOS structure in UR stands. This alternative would perpetuate the current level of disturbance and loss of snags and logs from firewood cutting. This effect is expected to decrease following implementation of the access and travel management plan that will restrict motorized access to a limited number of designated routes.

Connectivity between MA 15 areas and LOS patches would not change in the short-term under the no action alternative. Structural complexity and canopy closure would only change as natural succession or disturbances dictate. This alternative would have no cumulative effect to connectivity during the short-term. Effects from this alternative on connectivity in the long-term are impractical to predict.

Species like pileated woodpecker and American marten may benefit slightly in the short-term by retaining higher canopy closure and greater structural complexity in drier forest stands. However, the risk to these stands from insects and wildfire will persist and increase over time. Species like white-headed woodpecker, pygmy nuthatch, white-headed nuthatch and flamulated owl will continue to find little suitable habitat in the Sugar area if thinning and burning opportunities are deferred.

***ALTERNATIVE 2***

Alternative 2 would contribute to cumulative effects by reducing canopy closure and structural complexity on 1,715 acres in addition to past regeneration harvest units that have not recovered to support LOS associated wildlife species. Wildlife species associated with SSLT in biogroups G5-G8 in the southern and western portions of the analysis area would benefit from the proposed treatments as more open ponderosa pine stands are restored. Species in group 1 (white-headed woodpecker, pygmy nuthatch, and white-breasted nuthatch) would benefit from treatments that restore or accelerate development of SSLT. Considered in combination with persistent effects from past regeneration harvests, this alternative initiates a slight improving trend for species in group 1. Conversely, in the northeastern portion of the analysis area where biogroup G4 predominates, simplifying structure and reducing canopy closure represents a short-term decrease in habitat quality for wildlife species that are associated with MSLT forest structure. Northern goshawk, pileated woodpecker, and American marten are examples of species that show a preference for higher canopy closure and generally more complex forest stands for at least parts of their life histories.

There would be a reduction in the quality of connective corridors that facilitate movement of animals between MA 15 areas and LOS patches. All or a portion of Units 1, 2, 5, 19, 31, 33, 35, 43A, 54, 56, 58, 60, 65, 66, 68, 76-78, 83, 87, and 90 occur within connective corridors in Alternative 3, and their quality would be reduced under Alternatives 2 and 3. Additional units (7, 34, 38, 43, 45, and 75) within connective corridors would also receive treatments under Alternative 2. Although prescriptions would retain basal areas within the upper half of the management zone in these connective corridor stands, there would be a short-term reduction in their quality as canopy closure, snags, logs and structural complexity are reduced. These effects are likely to persist through the short-term, but would neutralize some time during the mid or long-term. These effects combined with past road building and logging have necessitated addressing connectivity between specific stands. Eventually (long-term) stand conditions will recover to a point where all species of wildlife will have multiple options for moving between habitat patches without the need for corridors to be identified and managed.

***ALTERNATIVE 3***

Alternative 3 would contribute to cumulative effects by reducing canopy closure and structural complexity on 1,422 acres in addition to past regeneration harvest acres that have not recovered to support LOS associated wildlife species. Alternative 3 moves stands toward HRV while retaining more habitat values in the interim than Alternative 2. Retention of higher basal area in big game winter range cover stands would also benefit LOS associated species through higher canopy closure

and slightly more structural complexity. As SSLT structure becomes more common in the long-term, source habitats for species in group 1 will increase.

The more acres treated within a connective corridor, the greater the negative effect, at least during the short-term. Mid and long-term effects from treatments in these corridors are likely negligible. Effects from treatments in drier biogroups would not be as pronounced as in forest types that can sustain more complex structure. Drier ponderosa pine stands were historically more open and simple in structure so their value as connective corridors is less than in mixed conifer stands.

The potential negative effects of reducing canopy closure and structural complexity are the same as cumulative effects described for Alternative 2, but would occur on 293 fewer acres, and would occur to a lesser degree on 318 acres of winter range big game cover units. Mitigations were built into the prescriptions to ensure that connective corridors contain the structural elements that allow them to function as intended although a slight reduction in habitat quality would occur. Some units were modified in shape; some prescriptions were changed to retain basal area in the upper half of the management zone; and some were deferred altogether. Alternative 3 would have less of an effect on connectivity than Alternative 2 because fewer corridors would be treated. Cumulatively these unit modifications will lessen the negative effects to the connectivity network while moving the area closer to HRV objectives.

## B. Rocky Mountain Elk

Rocky Mountain elk, mule deer, white-tailed deer, black bear and cougar are the big game species that occur in the Sugar area. However, elk is recognized in the LRMP as a management indicator species and will be the focus of this big game habitat analysis. Historically many biologists believed that managing for quality elk habitat would also provide well for mule deer. This thinking has been challenged as researchers uncover more information on mule deer habitat selection and how elk and deer distribute themselves in relation to one another. Currently the most meaningful management standards exist for elk habitat, and it is commonly accepted that the other big game species are at least partially accommodated when high quality elk habitat is present. The analysis area for elk is the subwatersheds that overlap the project area.

The following key Indicators are used to compare effects of alternatives: 1) acres of satisfactory thermal cover that will be converted to marginal thermal cover or forage; 2) acres of marginal thermal cover converted to forage; and 3) percent of analysis area further than 0.90 km (moderate quality security habitat) from a motorized route. Other means of comparing alternatives include road densities and HEI values (Table 7). A distance band analysis was used to assess security habitat by calculating the percent of the analysis area that is further than specified distances from open motorized routes (Rowland et. al. 2005). A visual depiction of the existing condition (before any new roads, or road closures) distance band analysis is provided in the Wildlife Effects Analysis in the Sugar Analysis File.

**Table 6 - Comparison of key indicators for big game security habitat**

| Key Indicators | Alternatives | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| Acres of satisfactory cover converted to marginal cover | 0 | 0 | 0 |
| Acres of satisfactory cover converted to forage | 0 | 0 | 0 |
| Acres of marginal cover converted to forage | 0 | 905 | 333 |
| Percent of area >0.90 km from open motorized route | > 2% | >2% | >2% |

**Table 7 - Comparison of HEI for big game security habitat.**

| Habitat Effectiveness Indicators | Alternatives | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| HE r value using road density | 0.50 | 0.50 | 0.50 |
| HE r value using distance bands | 0.36 | 0.36 | 0.36 |
| Total HEI using road density* | 0.69 | 0.68 | 0.70 |
| Total HEI using distance bands* | 0.68 | 0.67 | 0.69 |

*HEI calculations do not include a forage variable because current, reliable forage data are not available.

The HEI model is relatively insensitive to minor differences between alternatives, which is evident in table W6.

Executive Order 13443 was signed by President Bush on August 13, 2007 which is intended to enhance hunting opportunities on federal public lands. The stated purpose of the Order is to "…direct Federal agencies that have programs and activities that have a measurable effect on public land management, outdoor recreation, and wildlife management, including the Department of the Interior and the Department of Agriculture, to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitats."

The Sugar project is generally neutral in regard to "enhancing hunting opportunities and management of game species and their habitats" in the short-term. A case could be built for how the restoration of long-term forest conditions would address the intent of Executive Order 13443. However, motorized access is the single most important issue in regard to hunting opportunities and game management in this area. The existing system of Forest Service roads provides ample access for hunting and related activities, but there are many more miles of road than are necessary for reasonable public access. The density of roads has not only removed habitat from production, but the use of those roads causes disturbance to wildlife and increases opportunities for poaching and unethical hunting practices. Unregulated cross country motorized travel has also contributed to reduced hunting opportunity by redistributing big game and creating conflicts between user groups.

The Forest's Travel and Access Management Plan (in progress) will be the single most important decision effecting hunter opportunity and quality of hunting experience. Some segments of the hunting public desire to have all existing roads and cross country available for motorized access. Others desire minimal motorized access and prefer to hunt on foot. The Sugar project will not affect the Travel and Access Management Plan, but will open up the vegetation on many acres of forested habitat which should be considered in combination with motorized access. Security habitat for elk primarily relates to distance from motorized disturbance and to a lesser degree topography and vegetative cover. The major plateau ridges that characterize the uplands in the Sugar area contain very little security habitat due to ease of access and lack of hiding cover. Reducing motorized access onto some of the major ridge systems in Sugar would enhance big game distribution, increase hunter opportunity, reduce conflicts between user groups, reduce opportunities for poaching and unethical hunting practices, and improve bull and buck escapement.

## Direct and Indirect Effects Elk Habitat

***ALTERNATIVE ONE***

Alternative 1 will not result in direct effects to big game security habitat, but will forego some opportunities to improve habitat conditions in the short and long-term. This alternative would be the least impacting to big game populations in the short-term. Current levels of cover will remain and continue to positively influence the distribution of elk and deer across available habitat. The areas that are poor to fair quality cover (marginal thermal cover) today are important to the elk population while created openings are growing back into a cover condition.

Unregulated ATV and full-sized vehicle use will continue to increase and compromise security habitat for elk until the Forest's Access and Travel Management Plan is in place (estimated 2010). The lack of secure habitat patches will continue to push elk onto adjacent private lands making them unavailable for viewing and hunting. Some elk may also respond to disturbance by moving into the Meacham drainage to the north. The current densities of roads open to motorized access results in < 2% of the analysis area further than 0.9km from a road. The bulk of this security area is within the confines of the Five Points Creek canyon. This means that less than two percent of the area meets the criteria for moderate quality security habitat, and the remaining 98 +% is low or poor quality habitat from a human disturbance standpoint.

Forage enhancement through prescribed burning would not occur in this alternative. Decadent shrubs and grasses that have been absent of fire for several decades will continue to provide marginal quantities and quality of forage.

***ALTERNATIVE 2***

Alternative 2 would result in the greatest negative effect to elk habitat and populations in the short and mid-term. Long-term effects from this alternative would likely be negligible in the absence of large disturbances. This alternative treats no satisfactory cover, but would convert 905 acres of marginal cover to forage. Approximately forty-four percent of the analysis area would remain in a thermal cover condition (17% marginal and 27% satisfactory). This reduction in cover would persist through the short-term, but many of these acres would recover to at least a marginal cover condition by the early part of the mid-term.

Commercial thinning in MA 3 winter range would reduce marginal thermal cover by nearly 500 acres which could reduce the ability of this winter range to support game during moderate and harsh winters. This would have a greater negative effect on winter range quality by reducing snow intercept and options for finding limited forage and shelter from weather. The conversion of cover to forage in MA 3 is not consistent with the LRMP standard that requires at least 80 percent of the treated area to be within 600 feet of a satisfactory cover patch at least 40 acres in size.

Prescribed burning on 4,200 acres would improve forage quality and quantity, particularly during the spring. Long et. al. (2008) found that fuels reduction treatments lead to higher percent nitrogen and improved palatability during the spring, but untreated areas had higher percent nitrogen and palatability during summer. Also, percent nitrogen and palatability were higher in treated areas during both spring and summer for two to five years following burning. "As a result of the interacting effects of fuels reduction and season on forage characteristics, treated stands provide better foraging opportunities for elk during spring (May – June), whereas control stands (untreated) provide better foraging opportunities during summer (July – August). Consequently, maintaining a mosaic of burned and unburned (late successional) habitat may be of greater benefit to elk than burning a large portion of the landscape" (Long, et. al. 2008).
Both alternatives two and three would result in a mosaic of burned and unburned habitat which would benefit elk and deer.

Low level cover provided by shrubs and small trees would be set back in the short-term, but would return in three to ten years, depending on the species. The benefits to big game habitat from burning often outweigh the negatives in relatively open timber and grasslands like those found in much of this analysis area. Effects of burning would not differ between the action alternatives.

Less than 2% of the analysis area would be further than 0.90 km from an open motorized route. This means that more than 98% of the area is in poor to marginal quality condition in regard to human disturbance. This does not change between alternatives since the Sugar project does not change motorized access. The outcome of the Travel and Access Management Plan will potentially improve security habitat for big game by eliminating unregulated cross country motorized travel and reducing road densities. However, the effects can not be evaluated in detail until completion of the Travel and Access Management Plan (estimated 2010).

***ALTERNATIVE 3***

Alternative 3 would have a slightly less negative effect to elk habitat than alternative 2 in the short and mid-term. Effects from the two action alternatives would be the same in the long-term. Alternative 3 would not covert any satisfactory cover to marginal or forage, and would convert 303 acres of marginal cover to forage. In the winter range area (MA 3) 119 acres (subset of the 303 total acres) of marginal cover would be converted to forage, but these stands currently exhibit poor crowns and would fade out of cover within a decade if left untreated. Alternative 3 addresses cover in winter range commercial thinning, but maintaining at least marginal cover quality on 318 acres. This will be accomplished by retaining additional basal area that will keep canopy closure at or above 40% when averaged across the stand. By retaining cover quality on these 318 acres, this alternative meets the LRMP standard regarding converting cover in winter range.

The effects of setting marginal cover stands back to forage marginal cover would persist through the short-term, but would recover to a cover condition by the early part of the mid-term. Approximately forty-nine percent of this analysis area would remain in a thermal cover condition (22% marginal and 27% satisfactory). This exceeds the minimum standard of 30% thermal cover required in the LRMP.

This alternative proposes to burn the same amount of acres (approximately 4,200 acres) as alternative 2. The positive effects to forage described for alternative 2 would be the same for alternative 3, and would persist for one to five years following burning. Shrub species may benefit from the burning through new sprouting and setting back decadent woody plants. This effect could persist well into the short-term.

## Cumulative Effects for Elk Habitat

***ALTERNATIVE ONE***

Alternative 1 will not contribute to the cumulative effects of past management in this analysis area. Ample acres have been treated through regeneration harvest, planting and non-commercial thinning to provide adequate cover in the long-term. Prescribed fire will not be used to promote higher forage quality and persistence later into the summer as with the action alternatives. Ponderosa pine stands in biogroups G5-G8 will continue to be overstocked and susceptible to stress and mortality from insects and wildfire. Grazing by cattle will continue in this analysis area. Grazing by cattle throughout August, September, and part of October could reduce available forage for elk and deer prior to going into the rut. These effects can lead to elk and deer going into breeding and winter seasons with less body fat than necessary to survive or successfully reproduce. These effects will persist and will not change as a result of Alternative 1.

***ALTERNATIVES 2 and 3***

Cumulative effects from Alternative 2 would be greater than Alternative 3 in regard to elk and their habitat; however the significance of the difference is difficult to determine. The primary difference is that alternative 3 retains more cover and some specific cover stands that are important to elk and deer. A better interspersion and juxtaposition of cover to forage will be attained by alternative 3.

By 2010 this area will be under the Forest Travel and Access Management Plan that eliminates unregulated cross country motorized travel. This would create some patches of security habitat with low levels of human intrusion. The presence of security areas would have a positive effect on elk distribution and bull escapement during hunting seasons. These effects can not be evaluated in detail until completion of the Plan.

Prescribed burning in all action alternatives will generally benefit big game through forage enhancement. Periodically burned grasslands typically provide higher quality forage later into the year

than stagnant grasslands that have missed several years of fire. Fire would also regenerate some shrub communities that are decadent and currently functioning only as low cover. Fire would create a mosaic of cover and forage that closer represents historical conditions. Effects to forage from prescribed fire are the same for the action alternatives. Prescribed fire would be scheduled out over multiple years to avoid depleting forage over such a large area at one time.

Grazing by cattle will continue in this analysis area. Grazing by cattle throughout August, September, and part of October could reduce available forage for elk and deer prior to going into the rut and winter. These effects can lead to elk and deer going into breeding and winter seasons with less body fat than necessary to survive or successfully reproduce. The effect of adequate forage not being available to deer and elk is localized and not widespread enough to affect herd productivity. Many years of monitoring and observations by the range specialist and wildlife biologist do not indicate a broad scale problem of cattle over-utilizing the forbs and graminoids in this area. These effects, although relatively small in scale, will not change as a result of either action alternative.

Release thinning included in all action alternatives would result in a short-term reduction in hiding cover, but hiding cover would be restored in these stands within 10 years. The nature and scale of this activity is negligible in terms of habitat effectiveness for big game, but does change hiding cover which can influence how elk use an area at a localized scale. Approximately 1,087 acres of release thinning (release and cleaning inside and outside of commercial harvest units) would occur with both action alternatives.

Effects to big game habitat are similar between the action alternatives, but Alternative 3 retains some specific cover patches that are locally important to elk. By deferring treatment of some key cover stands and retaining marginal cover in MA 3 winter range, negative effects on elk distribution will be reduced.

## Fire and Fuels Management

### Introduction

This analysis addresses the effects of implementing the proposed alternatives for the Sugar project area in relation to the key issue “Modify Fire Behavior**”** on National Forest Lands. Modified Fire Behavior was analyzed in terms of Fire Behavior Potential and Ecological Risk associated with the presence or absence of fire.

For the purpose of this analysis, mechanical treatments include tree removal, small diameter thinning, stand cleaning, pruning, mastication, and hand piling. These are all methods of mechanically pre-treating areas that are overstocked, have a ladder fuel component, and/or have heavy concentrations of standing dead and down fuels. Prescribed fire would follow all mechanical activities in both action alternatives.

The analysis area for direct, indirect, and cumulative effects is the same as the project area shown on the maps in the appendices and incorporates information on activities described in Appendix D of this EA. Direct effects would be those that generally occur within 1-10 years following implementation. Indirect effects would most likely extend upward of 20 years following implementation. Cumulative effects would be those actions that include past, present, and proposed in the reasonably foreseeable future (up to 50 years) following implementation.

### Method of Analysis

Fuels Management Analysis Plus ***(Carlton, 2005***) was used to predict the fire behavior in the project area for the vegetation conditions that would exist for each alternative. Environmental/Historical Weather data was obtained from the Black Mountain (RAWS) and analyzed with Fire Family Plus. A ninety seventh-percentile

fire danger day (only 3% of weather and environmental conditions are worse) was used for the wildfire predictions.

Stand exam data backed up by field recon were used to determine stand characteristics used in the fire behavior modeling. The fuels models (Scott and Burgan's "Standard Fire Behavior Fuel Model and GTR INT-122, Anderson, 1982) were assigned based on the existing or proposed treatment vegetation types. The Fire behavior fuel models were then input to the Rothermel's (1972) fire spread model, which is used in Fuels Management Analyst Suite (FMA+) to make fire behavior predictions. The modeling results show how the proposed alternatives would change both surface and crown fire behavior within the project area.

A number of factors including crown and canopy bulk density, crown base heights, torching indices, crowning indices, crown fire potential, spotting potential, and flame lengths were analyzed in determining differences between alternatives (reference detailed modeling results in the analysis file). Crown fire potential and flame length were selected as the best measurements. Many of the other factors listed above are functions of crown fire potential. Fire managers are interested in flame lengths, crowning indices and torching indices because it affects how and where to fight a wildfire. Reducing crown fire potential to a surface fire and flame lengths that allow direct attack of a wildfire would meet the purpose and need of the project.

**Table 8 – Weather Inputs**

| Weather Inputs at 97 Percentile | |
|---|---|
| 1hr Fuel Moisture | 5% |
| 10 hr Fuel Moisture | 6% |
| Wind Speed (20ft) | 25mph |
| Relative Humidity | 18% |
| Temperature | 85˚ F |

Key Indicators used to compare the alternatives are as follows:

**Fire Behavior Potential**

- Crown Fire Potential
- Flame Length

**Fire Regime Departure**

- Number of Acres treated within Fire Regimes One and Three that are in Condition Class Two or Three

## Effects Analysis

### No Direct, Indirect, or Cumulative Effects

The following activities associated with the Sugar project are of such limited and constrained nature that they would have no effect on Fire or Fuels Management resources or activities.

- Hand planting
- Road Reconstruction
- Large Wood Placement in 5 Points Creek
- Invasive Species Treatment

These activities and their effects will not be discussed further in the Fire/Fuels section.

## A. Fire Behavior Potential

The structure and fuel loading within the project area has changed considerably during the past century. Fire exclusion, forest harvest, and various land use practices have reduced the frequency of fires, especially in low severity fire regimes, resulting in high accumulations of canopy and surface fuel (PNW-GTR-628). Crown characteristics that lead to crown fire are described by (Finney, 1996) "A surface fire may make the transition to some form of crown fire depending on the surface intensity and crown characteristics (Van Wagner, 1977 and 1993). The crown characteristics that are used to compute crown fire activity are;

- Crown base height
- Crown height
- Crown bulk density

Lower crown base height (including ladder fuels) facilitates ignition of the crown fuels by the surface fire and then, transition to some form of crown fire. Crown bulk density is used to determine threshold values for active crown fire, which spreads much faster than a surface fire. Crown height is used as the upper level of the crown space for determining crown fuel loading and the starting height of lofting embers".

The earth has entered an area of rapid environmental changes. The warming and drying trend predicted under the climate change scenarios will also increase the likelihood of fires. These fires will be larger and more severe, especially at higher elevations. There will be fewer trees regenerating after a fire due to increased regeneration mortality from higher insect and pathogen activity (Forest, Insect & Pathogens and Climate Change: Workshop Report, Beukema 2007).

Resource managers will need to integrate adaptation strategies (actions that help ecosystems accommodate changes adaptively) and mitigation strategies (actions that enable ecosystems to reduce anthropogenic influences on global climate) into project design (Climate change and Forest of the Future: Managing in the Face of Uncertainty, et al Milar, 2007). Adaptive strategies include managing forest ecosystems and resources so that they are better able to resist the influence of climate change or to stall undesired effects of change, promote forest resilience to change that accommodate gradual changes related to climate but tend to return toward a prior condition after disturbance either naturally or with management assistance. Promoting resilience is the most commonly suggested adaptive option discussed in a climate-change context (Dale et al. 2001, Price and Neville 2003, Spittlehouse and Stewart 2003). Forest management techniques such as prescribed burning or thinning dense forest, can make a forest more resilient to wildfire and decrease fire emissions.

Strategies/actions that would enable ecosystems to reduce anthropogenic influences on global climate are as follows:

**1.** Sequester carbon
   - Restore healthy forest so that carbon can be efficiently stored in live trees.
   - Reduce potential for carbon loss from severe wildfire.
   - Transferring biomass out of forest and into wood products or biofuel to replace fossil fuel-based products.

**2.** Reduce emissions – Wildfire and extensive forest mortality as a result of insect and disease are primary sources of unintentional carbon emissions from forests in the western United States (Stephens 2005).
   - Reduce density of small diameter trees. One means of slowing the release of sequestered carbon is to increase forest resistance to fire, drought, and disease, by reducing the density of small trees (Stephens and Moghaddas, 2005).
   - Reduce emissions from wildfires and prescribed burns by reducing surface fuel loading.

**Fire Behavior Potential Comparison** – Fire type, rate of spread and flame length were used to compare the relative difference between the alternatives. The following table displays the differences by alternative.

**Table 9 - Measure of Fire Behavior Potential by Alternative**

| Fire Behavior Potential | | | |
|---|---|---|---|
| | **Alt 1** | **Alt 2** | **Alt 3** |
| Fire Type | Passive Crown Fire | Surface | Surface |
| Flame Length (feet) | 7 | 0.6 | 0.6 |
| Rate Of Spread (chains/hr) | 17 | 1 | 1 |

**Table F3:**
**Table 10 - Measure of Alternative Fuels Reduction Effectiveness**

| Alternative Effectiveness | | | |
|---|---|---|---|
| | **Alt 1** | **Alt 2** | **Alt 3** |
| Reduces surface fuels | NO | YES | YES |
| Increase crown and canopy base heights | NO | YES | YES |
| Increased Torching Index | NO | YES | YES |
| Increased Crowning Index | NO | YES | YES |
| Reduces canopy densities | NO | YES | YES |
| Retains largest trees | YES | YES | YES |
| Bio Mass Utilized | NO | YES | YES |
| Reduced potential for carbon loss from severe wildfire. | NO | YES | YES |
| Increase forest resiliency to wildfire and decrease fire emissions. | NO | YES | YES |
| Increase forest resistance to fire, drought, and disease, by reducing the density of small trees | NO | YES | YES |

Fine fuel loadings (3 inch minus size classes) in harvest units in the action alternatives are expected to experience a short-term increase immediately following harvest activities. In general, these fuel loadings are expected to range in the 15-20 tons per acre which are slightly above the desired ranges for fuels reduction activities and the minimum levels required for site productivity. In all of these stands, post harvest burning is planned with a landscape prescribed burn to follow. Fire hazards immediately following harvest activities are not severely elevated due to the green nature of the slash. Depending on the weather, the slash could cure rapidly and present a short-term (several months) elevated hazard risk in the late summer before fall rains/snows arrive. A curing period is required to achieve desired fuel consumption when prescribed burning. Fuel loadings generally are crushed closer to the ground by winter snows (reducing the potential for the fire to get up into the reserve tree crowns) and after a period of drying in the late spring/early summer they are generally ready for prescribed burning.

Therefore, if the prescribed burning takes place in the fall of the year following harvest as planned, there is a short term (3 months) period of elevated potential for high intensity burning conditions in the event of a wildfire during this period. This occurrence depends largely on weather conditions and the relatively low potential for a lightning strike in that exact same area. This risk would be immediately removed following the completion of the burning activities. Should burning be delayed – this risk would remain in place for the hottest four months each summer for a 2 year period after which the fine fuels will be on the ground and decomposed to the point that they are no longer a flash fire hazard.

These effects are the same for each action alternative and will not be discussed further on an individual basis.

## Direct/Indirect Effects on Fire Behavior Potential

***ALTERNATIVE ONE***

Within the analysis area, multi-layered stand structures, tree densities, and live vegetation continue to grow, and dead wood continues to accumulate, creating conditions that allow fire to move vertically from the ground level to the forest crown. Overstocked stand conditions continue to increase the susceptibility of the stands to insects and disease (reference Silvicultural Effects) resulting in increased surface and crown fuel loadings and associated fire behavior potential. These conditions continue to limit fire fighting opportunities, increase risk to private property, firefighter and public safety, and increase the risk of damaging impacts to natural resources.

Alternative One would provide for no reduction in surface fuel loadings, flame lengths would exceed direct attack with hand crews, and equipment in most instances. Crown base heights would remain low under this alternative while canopy bulk densities would remain high. For these reasons there would be a continuation of heavy surface and canopy fuel loadings that have passive and/or active crown fire potential, and flame lengths that exceed four feet in length. There would be an increased risk of a crown fire initiating and spreading to private property and homes, and decreased opportunities to fight fire direct with hand tools. This would result in firefighting forces having to back off to a safer location or using heavy equipment. Not having the opportunity to direct attack a fire combined with the limited access in the project area, increases the potential for a large, high intensity fire, the potential for resource damage from heavy equipment, and risk to firefighter and public safety. Higher intensity fires bring with them an increased risk of damaging impacts to soils, vegetation, watersheds. Costs for wildfire suppression would continue to increase without treatment of hazardous fuels.

The Sugar project area is located approximately 5 air miles west of La Grande and approximately 25 miles west of the Eagle Cap Wilderness, a high visual quality area. The City of La Grande is designated as a PM 2.5 health sensitive area. Potential impacts from smoke generated from a wildfire continue to increase as fuel loadings increase. The direct effects of a wildfire burning under the existing conditions has the potential to produce smoke levels that exceed visual and health standards within the Grande Ronde Valley. Nearby sensitive areas that may be affected by wildfire smoke includes:

- I-84, Highway 82 and 244, Forest Roads 3100, 3120 and 2100.
- Communities: La Grande and Cove
- Eagle Cap Wilderness Area (Class I Air-shed)

Under Alternative One there are potential impacts on climate change due to: a) the continued potential for carbon loss from severe wildfire; b) limited/low forest resiliency/resistance to wildfires, drought, and disease from increasing density of trees; and c) no utilization of biomass.

***ALTERNATIVES 2 and 3***

Fuels treatments in Alternatives 2 and 3 target reduction of canopy, ladder, and surface fuels with silvicultural operations and prescribed burning and as can be seen in the fire behavior tables above, there is no measurable difference between the two action alternatives in terms of fire behavior post-treatment. Treatments would maximize managing towards large trees that are resistant to insects, disease, and fire. Surface fuels would be reduced by prescribed fire and/or a variety of mechanical treatments that remove and reduce fuel (e.g. pile-and-burn, and mastication). Reducing surface would reduce crown fire potential and potential flame length. Crown and canopy base heights would be increased through the thinning of the understory and the removal of the low limbs (pruning) from selected leave trees. Prescribed burning will also increase crown base heights by removing live limb wood in the lower portions of the crowns.

The majority of the scientific literature supports the effectiveness of the proposed fuel treatments in reducing the probability of crown fire (e.g. Agee 1996; Edminster and Olsen 1996; Helms 1979; Kilgore and Sandro 1975; Martinson and Omi 2002; Omi and Martinson 2002; Pollet and Omi 2002; Scott 1998a, 1998b; van Wagtendonk 1996; Wagle and Eakle 1979; Weatherspoon and Skinner1995).

Thinning combined with (often multiple) prescribed-fire or other surface fuels treatments, or both is necessary to effectively reduce potential fire behavior and crown fire hazard (PNW-GTR-628). Because stand structure and wildfire behavior are clearly linked (Biswell 1960, Cooper 1960, Dodge 1972, McClean 1993, Rothermel 1991, van Wagner 1977***)***, fuels reduction treatments utilized in Alternatives 2 and 3 reduce extreme fire behavior. The principle goal of these fuels reduction treatments was to reduce fireline intensities, reduce the potential for crown fires, and improve the ability of forest stands to survive a wildfire (Agee 2002). Silvicultural treatments in Alternatives 2 and 3 that target canopy closure have the potential to reduce the development of all types of crown fires (Cruz et al. 2002, Rothermel 1991, Scott and Reinhart 2001, van Wagner 1977) because surface fuels are being concurrently treated. This approach reduces canopy, ladder and surface fuels, thereby reducing both the intensity of potential wildfires (Graham, McCaffery and Jain. 2004. RMRS-GTR-120).

Reduction of hazardous fuels in Alternatives 2 and 3 through biomass removal, stand thinning/cleaning, pruning, hand piling, pile burning, and /or prescribed fire would reduce crown fire potential from passive to surface. Reducing crown fire potential to a surface fire would reduce the potential for long range spotting to occur. Treatment effectiveness would last for 20 to 30 years in terms of recommended stocking levels (ladder and crown fuels) and associated crown fire potential.

Vegetation in the treated areas after both mechanical and prescribed fire would be best represented by fuel model TL1 - spread rate is very low: flame length very low (RMRS-GTR-153, Scott and Burgan, 2005).

Flame lengths would be reduced to approximately 1 foot on treated acres (reference table 9). Hand crews can use direct fire suppression tactics when flame lengths do exceed four feet. Engines and dozers (where roads and terrain allow) can directly fight fire with 4-8 foot flame lengths. Having the opportunity to utilize direct suppression tactics decreases the potential fire size, the risk to public and firefighter safety, and private property (including homes).

Thinning treatments in Alternatives 2 and 3 were designed to leave the largest/healthiest trees on site to provide shading of surface fuels and partial sheltering surface wind speeds (Fireline Handbook Appendix B Fire Behavior, 2006). Smaller diameter tree densities would be reduced to minimize the potential for crown fire initiation. This partially shaded gap between the surface and crown fuels would be increased through pruning and prescribed fire, minimizing the potential for crown fire.

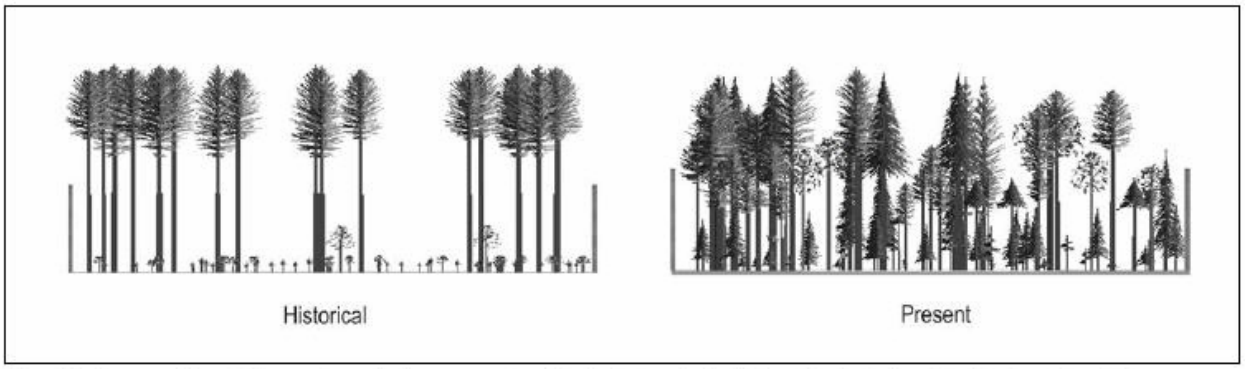
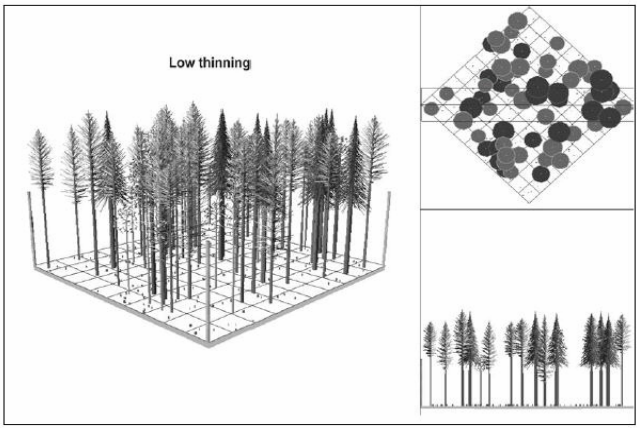



*Figure 2—Representation of changes in vertical arrangement and horizontal continuity in forest stand structure. Today's forests tend to have more fuel strata, higher densities of fire-sensitive species and suppressed trees, and greater continuity between surface and crown fuel.*

This kind of treatment mimics mortality caused by surface fire (Graham et al 1999). The following diagram shows a stand that has been thinned from below leaving the larger trees to provide shade.




Long range spotting potential decreases as crown fire potential and flame lengths decrease, potential flame lengths are reduced, and fire fighting opportunities to direct attack a fire within the corridor are increased under Alternatives 2 and 3.

Firefighter and public safety is increased under these alternatives as well and the potential of high intensity fire spreading onto private lands that contain homes would be decreased. The risk of damaging impacts to soils, vegetation, and visuals in the communities of Perry and Hilgard from severe burning conditions is decreased as well.

Direct effects of prescribed fire under the action alternatives include reducing surface fuel loadings and potential flame lengths to lessen the extent of wildfire impacts to natural resources. Surface fuels treatments would be expected to last 25 years. A maintenance level burn would be required in 20-25 years to maintain surface fuel loads. Surface fuel loading would be maintained at 10 tons per acre.

Cost of firefighting would be reduced with smaller, less intense wildfires. Fuel treatment costs over the next 20 to 30 years are also expected to be reduced under the action alternatives.

Removal and utilization of small diameter trees and dead standing and down trees would decrease the amount of pollutants generated during a prescribed burn or wildfire. Smaller less intense fires would produce less smoke**.** Potential smoke impacts from wildfires to the sensitive areas (I-84, Highway 244, Forest Roads 3100, 3120, and 2100, communities of La Grande, Union, and Cove, and Eagle Cap Wilderness Area) would be reduced. Smoke impacts due to wildfire are greater than prescribed fire (reference Ottmar's research paper titled Immediate Fire Effects and Air Quality Tradeoffs).

Due to the treatments in Alternatives 2 and 3, there would be a reduced potential for carbon loss from severe wildfire, increased forest resiliency to wildfire and decrease fire emissions, increased forest resistance to fire, drought, and disease, due to the reduction of small tree density, and biomass is transferred out of forest and into wood products or biofuel to replace fossil fuel-based products. All of these reduce potential impacts on climate change.

## Cumulative Effects on Fire Behavior Potential

***ALTERNATIVE ONE***

The analysis area has an above average occurrence of both lightning and human caused fires that are scattered across all ownership boundaries. This risk combined with heavy accumulations of surface, ladder, and crown fuels increases the potential for a large, high intensity wildfire to occur and spread across ownership boundaries.

Currently, vegetation and fuel treatments are being planned and implemented on private and industrial land. Completed treatments such as thinning, piling, pile burning have reduced fuel loadings. Not treating the heavy surface, ladder, and crown fuels on the public lands adjacent to private and industrial lands increases the risk of a wildfire originating on forest land and spreading across these boundaries.

Limited vegetation management, aggressive wildfire suppression, and insects and disease mortality would continue the trend of fuel loadings accumulating in the form of dead and down trees, small diameter trees growing into the overstory, and dense crown conditions. These conditions would continue to increase the potential for a ground fire to transition into a crown fire. Heavy accumulations of surface fuels and/or crown fires would continue to increase the potential for spotting to occur.

These conditions would continue to limit fire fighting opportunities, increase risk to private property and homes, firefighter and public safety, and increase the risk of damaging impacts to natural resources and the visuals. These vegetation conditions and associated risks would continue to escalate until action is taken to reverse the trend, or a stand replacement fire event occurs.

Firefighting cost trends would continue to increase as fires become larger and more explosive and difficult to control. In addition, regeneration and restoration projects following a wildfire would add more cost.

Hazardous fuel treatment costs would continue to increase over time as utilization opportunities decrease and methods available to treat vegetation decrease (steep ground, limited access, soundness of dead material, small diameter trees, etc.) especially with poor markets for this type of material.

There would be no reduction in the severity or intensity of wildfire under this alternative.

***ALTERNATIVES 2 and 3***

The combined and continued fuel reduction efforts of all ownerships will reduce the potential for a large, high intensity wildfire to spread through the area. Fuel reduction efforts would reduce potential crown fire and flame lengths and increase opportunities to safely attack a wildfire. Treatments that maximize removal and utilization have less chance of damagingly impacting air quality.

Implementing either action alternative would reduce the potential for a large, high intensity wildfire to spread from the National Forest onto private and industrial lands by reducing flame lengths, rates of spread and crown fire potential.

Managing fuels on all ownerships within the analysis area would result in less long term risks to private property, homes, firefighter and public safety, and damaging impacts to natural resources including visuals.

Grazing livestock from the Five Points and Spring Mountain allotments would reduce the grass component in predominantly natural openings. Overstocked forested areas are generally not heavily

grazed by livestock. Livestock grazing is expected to slightly reduce fire behavior and cumulatively contribute to decreasing the fire behavior potential within the project area.

Firefighting costs would decrease as opportunities to direct attack a fire increase.

Hazardous fuel treatment costs would decrease for the next 20 to 30 years and involve only maintenance level costs.

Potential smoke impacts from a wildfire are decreased.

**Summary -** In summary, the other past/present projects within the project area have very similar treatments to those in Sugar (commercial and non-commercial thinning, improvement cuts, and fuels reduction). Prescribe fire would occur in natural openings and in forested areas following mechanical treatment. The cumulative effects of previous burn projects, combined with Sugar, provide for several thousand acres of fire adapted plant communities (fire regimes 1 and some of 3) to return to historic fire return intervals of 1 to 35 years.

Mechanical pre-treatment under each action alternatives would allow for more opportunities to re-introduce low intensity prescribed fire during late summer and fall (when historical fires would have occurred). Resources could be better protected from high intensity crown fires, including riparian areas, late/old structure, and regeneration. The action alternatives provide management the opportunity to manipulate fuels prior to burning. The purpose and need, and desired condition would more likely be met than when compared to alternative one.

Since weather and topography can not be manipulated, alternatives two and three manipulate the one component (fuels) that could assist management to re-introduce frequent intervals of low intensity fires and steer away from potentially damaging high intensity wildfires.

## B. Fire Regime Departure

Fire has been an important natural disturbance process in the Blue Mountains for millions of years. It has favored certain species over others, recycled nutrients, and had a large influence on the landscapes that were first described in writing by the pioneers on the Oregon Trail *(*Historical Fire Regimes of the Blue Mountains, James K. Agee and Kathleen R. Maruoka). Records from early explorers and on many older trees suggest that fires burned at frequent intervals in many Blue Mountain forest and grasslands (Fire in the Blue Mountains: A History, Ecology and Research Agenda, J. Agee).

Most fire history data and much of our understanding of fire in the West are from forests with low-severity (high-frequency) fire regimes. These forests are the ones whose (increased) fuels and (decreased) fire frequency have changed the most during the past century. The concept of Fire Regime Condition Class (sensu Schmidt et al.2002) uses current fuel conditions to represent the degree of departure from historical fire regimes and fuel conditions at a broad spatial scale. As a result, many arid and semiarid forests that historically were in Condition Class 1 are now in Condition Class 2 or 3. Fires were frequent and low severity in the past, but they now have greater potential to be both large and severe. Forests with mixed severity (moderate-frequency) fire regimes may have changed somewhat, but not as much as forests with low-severity regimes. Approximately 59 percent of Fire Regime 1 forests in the Western United States have higher fuel accumulations (currently Condition Classes 2 and3) than they would have historically, and about 43 percent of Fire Regime 2 forests have higher fuel accumulations (currently Condition Class 3) than they would have historically (Schmidt et al.2002).

Vegetation conditions within the Sugar project area have evolved to a density and complexity outside the historical range in fire regimes one and three within the project area. The following table display proposed treatment acres by fire regime and condition class for each alternative.

**Table 11 - Fire Regime/Condition Class Treatment Acres by Alternative**

| Treatment acres in Fire Regime 1 or 3 and Condition Class 2 or 3 | | | |
|---|---|---|---|
| **Treatment** | **Alternative 1** | **Alternative 2** | **Alternative 3** |
| Harvest (acres) | 0 | 1,676 | 1,384 |
| PCT (acres) | 0 | 912 | 912 |
| FFU (acres) | 0 | 317 | 338 |
| Rx Fire - Outside Mechanical Units (acres) | 0 | 2,000 | 2,000 |
| **Total** | **0** | **4,905** | **4,634** |

## Direct/Indirect Effects on Fire Regime Departure

***ALTERNATIVE ONE***

The analysis area currently has approximately 9,733 acres in fire regimes one and three identified as having moderate or high departures from historical fire return intervals. This alternative would not treat any acres within fire regimes one, two, or three that are in a condition class two or three. The current heavy fuel loadings (i.e., ladder fuels, overstocked stands, and heavy concentrations of standing and down dead) would limit the re-introduction and maintenance of low intensity fire because of potential extreme fire behavior.

Alternative one does not restore fire adapted ecosystems within a range of historic conditions. Fire exclusion would continue to extend the fire return interval, increase fuel loadings, change vegetation profiles, and increase the gap between historical conditions and current conditions. True fir establishment would continue in the absence of low intensity “thinning fires.” These vegetative conditions have placed Late and Old structure, wildlife habitat, and riparian areas at risk to severe wildfire impacts.

***ALTERNATIVES 2 and 3***

Treatments (mechanical and/or prescribed fire) would target fire regimes one and three that are in a condition class two or three. These acres would be treated mechanically through removal, small diameter thinning, stand cleaning prescriptions, and piling to reduce surface, ladder, and crown fuels. Low to moderate intensity prescribed fire entries would occur within the next one to three years following mechanical treatments. Prescribed fire would be used to thin suppressed overstocked regeneration, remove ladder fuels and reduce surface fuel accumulations. These acres would be moved towards more historic conditions (Condition Class One) following treatments. Prescribed fire would be the primary tool used to maintain the project area in this desired condition.

Maintaining soil productivity over the long term generally requires presence of soil organic material and fire effects characteristic of the natural fire regime. Most fires characteristic of the historic fire regime or moderate severity prescribed fires are likely to enhance soil development” (Brown, Reinhardt, and Kramer, RMS-GTR-105, 2003). Under this alternative hazardous fuel would be reduced to levels that would decrease wildfire intensity and severity.

While Alternatives 2 and 3 meet the purpose and need of the project by moving approximately 50% of the vegetation and fuels characteristics within an identified need towards more historic conditions. Alternative 2 treats approximately 300 more acres than does Alternative 3 (approximately 2% of the identified need within the project area). Those areas treated are expected to last indefinitely with light maintenance level treatments at 20-25 years intervals.

### Cumulative Effects on Fire Regime Departure

***ALTERNATIVE ONE***

Acres in condition class one or two would transition to condition class three. Acres currently in a condition class three would continue to be at high risk. Movement towards historical conditions in disturbance patterns across the landscape would be delayed until a stand replacement event occurs.

Heavy concentrations of dead standing and down trees and multi-layered structure and tree densities continue to be at risk to intense, stand replacing fire events, which could result in the loss of late and old structure, wildlife habitat cover, and consumption of large woody material and structure in riparian areas.

***ALTERNATIVES 2 and 3***

The proposed mechanical treatments would provide increased opportunities to use prescribed fire as the primary maintenance tool in the future. Fuels can be manipulated prior to burning (where as weather and topography cannot) to reduce the potential for high intensity burning and damaging impacts to natural resources during prescribed fire operations. Mechanical pre-treatment would reduce the amount of smoke emissions generated during wildfires or prescribed burning by reducing the amount of fuels available for combustion.

Maintaining fire return intervals within Fire Regimes One and Three would help move existing vegetative condition in terms of vegetation composition and structural stages, and disturbance patterns towards historical conditions.

The effects of the Sugar action alternatives contribute to the trend toward a decrease in fire risk begun by previous treatments in the area. The other past/present projects within the project area have very similar treatments to those proposed for Sugar (commercial and non-commercial thinning, improvement cuts, and fuels reduction). Prescribed fire would be used to reduce surface fuel loading following mechanical treatment. The cumulative effects of past projects, combined with the proposed activities, move several thousand of fire adapted plant communities (fire regimes 1 and 3) closer to historic conditions. Fuels treatments on private land have been successful and contribute to the pattern of changed condition classes across fire adapted plant communities. Three major landowners have thinned, logged, or removed brush on 680 acres thus far and there is a potential for more acres to be treated within the foreseeable future.

## Economic Effects

**Introduction**

The Sugar project will produce a quantifiable product through the timber sale that will be used to determine the “net value” of this project in terms of dollars and cents. Benefits in terms of dollars and cents especially in natural resource management where the benefit may be increased resiliency to pathogens, increased mean annual increment, and reduced fire hazard on acres that are pre-commercial thinned, are hard to define, and outside the scope of this analysis. In addition to use values, existence values otherwise referred to as passive, nonuse or preservation values may capture important economic value to the public (Swanson and Loomis 1996). Although these benefits are important components of the ecosystem services provided to humans, the production relationship between ecosystem functions and ecosystem services (such as changes in recreation visitor days, fishing days, animal units months, or fish population) is not well defined or measurable at the project level in terms that provide meaningful comparisons of commensurate dollar values (Flagtail Fire recovery EIS economic analysis). This is why these work items only show as a cost with no monetary benefit in the analysis, and why the cost to benefit ratio for this project is less than “1”.

**Cost**

Measurable and quantifiable costs at the project level include direct costs to the Forest Service for preparing and administering the commercial timber and implementing other restoration activities including reforestation, decommissioning roads, rehabilitation of skid trails. Refer to Chapter 2, Alternatives At a Glance, for a complete list of activities.

This analysis is an attempt to assess how the alternatives relate to timber sale viability, economic efficiency and socio-economic impacts to communities. It should also be emphasized that the timber values used here represent a "snap shot" in time, of a constantly fluctuating lumber market.

Timber sale contracts are commonly used to achieve vegetation management objectives identified as part of the project. In this case it will be the tool used in addressing these key issues: Reducing fuel hazards, moving more acres into late old structure, and promoting satisfactory wildlife cover. This work will also provide revenue to the county and jobs to the local work force. Service work may account for the remainder of the key issues: Fuel loadings outside harvest units, stalking levels in non-commercial stands, road densities (obliteration or closures.) Both action alternatives address these issues to different degrees that will be assessed by the same criteria.

Key Indicators used to compare the alternatives are as follows:

- Timber Sale Viability – Predicted high bid
- Economic Efficiency – Present net value
- Socioeconomic Impacts to Communities – Payments to counties, and number of jobs.

## Direct/Indirect Economic Effects

**Timber Sale Viability**

The timber sale portion of this project (harvest units) was analyzed to determine the value that can be used to help off set the cost of work in other units and to help determine the economic viability of the harvest units based on projected MBF volumes at current market conditions. There is potential to accomplish a large portion of vegetation management needs of any given project through a timber sale contract. In this case projected volumes saw log by species, and non saw log with in the harvest units were valued. The true value was netted by costing out estimated stump to truck work, haul and other contractual obligations. The valuation, costing and predicted advertised, bid and base rates per MBF were determined using the Region 6 TEAECON economics program and experienced local costs for sale preparation and administration.

Timber value was determined by species/product from a compilation and averaging of all species from all timber sales sold with in our appraisal zone 3 during the last year. All aspects of costing are derived the same way and averaged and used to make the adjustments to the base period prices that determine predicted bid rate.

The following table displays the predicted bid rates, advertised rates, and base rates by alternative derived from the Sale Evaluation Spreadsheet version 1.0. All alternatives that harvest timber will produce positive bid rates indicating that the project would provide a viable harvest proposal. Based on this analysis, bid rates for the two action alternatives were similar.

**Table 12 – Appraisal Entries**

| Appraisal Entries | Alt 2 | Alt 3 |
|---|---|---|
| Volume (MBF Sawlog Volume) | 4,668 | 3,794 |
| Acres (harvest) | 1746 | 1422 |
| | | |
| Predicted High bid | 97.91 | 101.36 |
| Advertised Rate | 88.12 | 91.22 |
| Base Rate | 13.02 | 13.32 |

**Economic Efficiency**

Forest Service Handbook 2409.18 provides direction to analyze financial efficiency and, if needed, economic efficiency to identify the most efficient alternative that achieves the desired objectives of the project. Consideration of the proposal that maximizes net public benefits is an important consideration of the decision-making process.

An economic efficiency analysis was completed that focused on identifiable and quantifiable ecosystem benefits and costs for each alternative in terms of the present net value (benefits minus costs) to assess which alternative comes nearest to maximizing net public benefits (36 CFR 219.3).

Sugar is characterized by there being very little difference in acres treated between Alternatives 2 and 3. Alternative 2 is the maximum acres treated regardless of access, alternative. Alternative 3 has 1.3 fewer miles of new temporary road construction and 50% less cable logging.

Benefits/value includes priced and non-priced outputs. Priced outputs are those that can be exchanged in the market place (saw logs and pulp). Non priced outputs are those for which there is no reasonable basis for estimating value comparable to the market values associated with priced outputs. Dollars of benefits for this analysis is the revenue from timber volume harvested. Total value is calculated by multiplying the advertised bid rate/MBF by the total estimated MBF sale volume.

There are other benefits such as water, recreation, fish and wildlife that are dollar quantified in an economic analysis: but were not in this analysis because they were not expected to vary significantly among alternatives, or values are not available for the local area.

Costs include those associated with timber sale support budget estimations, which includes preparation and administration. Over-all anticipated costs are based on Forest-wide historical average. Post sale costs represent those activities that are required post harvest mitigation (stand cleaning, under burning harvest units, sub soiling and slash busting). The following table illustrates to what extent the harvest related revenues off set expected costs by alternative, (figures are program outputs and don't compute in a linear fashion on the table). It also demonstrates that Alternative 2 and 3 have much the same economic efficiency based on results from the Econ analysis program.

**Table 13 – Appraisal Entries II**

| Appraisal Entries | Alt 2 | Alt 3 |
|---|---|---|
| Total Timber Value | 447,647 | 384,454 |
| FS Costs - Prep/Admin | 402,336 | 333,784 |
| FS Costs – Post-Sale | 173,925 | 169,663 |
| Net Sale Value | -128,614 | -118,993 |
| **Total Costs** | **576,261** | **503,447** |
| **Total Benefits (discounted timber value)** | **421,950** | **362,385** |

| | | |
|---|---|---|
| Net Present Value (NPV) | -172,788 | -161,267 |
| Benefit Cost Ratio | .71 | .69 |
| NPV with non-timber activities | -702,398 | -690,877 |
| BC ratio w/burn blocks | .38 | .34 |

Based on current values, estimated sawlog volumes, and projected costs, both alternatives are "below cost".

Benefit/cost ratio indicates the amount of present value revenue per unit of present value cost. This is an index of the relative productivity of dollars spent. A benefit/cost ratio greater than 1 indicates that revenues will exceed the invested costs. Ratios less than 1 indicate that costs will exceed revenues. Traditional timber sales of the past were typically planned to have ratios exceeding 1. Restoration/ forest health projects commonly are unable to produce benefit/cost ratio greater than 1.

Resource values that may be achieved as a result of the implementation of an alternative (non-priced outputs) are not included since dollar values cannot be quantified. Timber value to cost comparison can be made to give a relative efficiency of the alternative. The present net sale value line in the above table provides a similar comparison.

Cost for planned activities that are over and above revenues collected from the timber sale portion of the project would require appropriated dollars to implement and carry out all of the objectives of the Sugar project. Historically, balances in the trust fund accounts (SSF, K-V) and from budget appropriations were available to use as projects occurred. Forest trust fund deposits have diminished significantly over time, leaving appropriated funds as the only available option to cover project costs not covered by the bid premium. How much funding will be available for any given project is generally not known during the planning process. It is up to the Interdisciplinary Team to prioritize projects by need for when funding becomes available, but not to the extent needed to cover all costs.

Project work identified that is not associated with a timber sale, would be accomplished through appropriated funds and could provide work via service contracts. Cost estimates for the non-timber sale activities listed in the table below were derived from Forest and District estimates and program manager's estimates.

**Table 14 - Non-Timber Sale Work Costs by Alternative**

| Indicator | Alt 1 | Alt 2 | Alt 3 |
|---|---|---|---|
| Slashbusting | 0 | $184,750 | $184,750 |
| Hand Cleaning | 0 | $12,600 | $12,600 |
| Prescribed Burning | 0 | $480,610 | $480,610 |
| | | | |
| | | | |
| **Totals** | **0** | **$677,960** | **$677,960** |

**Socio-Economic Effects**

The primary effect on timber-harvest related employment would occur from commercial harvesting associated with the alternatives over the next two years. Financially viable sales would be necessary to provide opportunities for timber-harvest related employment. Levels of harvest volume by alternative would affect employment and income in several ways:

- directly - (effects attributable to employment associated with harvesting, logging, mills and processing plants for sawtimber, pulp, chips, veneer and plywood)
- indirectly - (effects attributable to industries that supply materials, equipment, and services to these businesses)

- induced - (effects attributable to personal spending by the business owners, employees, and related industries).

Employment and income effects were derived from response coefficients from the input-output model, IMPLAN (Impact Analysis for Planning) for the Roadless Social Economical Report, for the Wallowa-Whitman National Forest impact zone and from the forest-level Timber Sale Program Information Reporting System (TSPIRS) analysis in fiscal years 1996 to 1998 (USDA 1998, USDA 2000). Job estimates include temporary and permanent full-time, part-time employment. The estimates do not include unpaid family workers or sole-proprietors.

This analysis assumes that all harvesting would occur over the next two years. Employment effects from recreation and domestic-livestock grazing activities were not analyzed. The estimates provide a relative comparison of jobs supported by the alternatives to communities and counties in the regional impact zone and not necessarily to any one county.

The socio-economic effects were analyzed in terms of payments to counties and jobs and income. Payment to counties is based upon receipts obtained through stumpage payments. Payments are 25 percent of the stumpage paid to the U.S. Treasury. Employment and income generated as a result of timber harvest is based upon the amount of timber harvested by product, either saw timber or non-saw timber.

The following table helps summarize the projected receipts, jobs and income from this project.

**Table 15 - Projected Receipts, Jobs And Income**

| Indicators | Alt 1 | Alt 2 | Alt 3 |
|---|---|---|---|
| County receipts | 0 | $111,912 | $96,114 |
| Employment (# of jobs) | 0 | 26 | 21 |
| Direct Income generated | 0 | $613,000 | $487,940 |
| Indirect and Induced | 0 | $368,555 | $292,950 |

1. Sawtimber direct jobs @5.65/mmbf; indirect and induced jobs 3.39/mmbs = total 9.04 jobs/mmbf (Wallowa-Whitman)
Sawtimber direct jobs @5.58/mmbf; indirect and induced jobs 3.34/mmbs = total 8,92 jobs/mmbf (Umatilla)

2. Sawtimber direct income $157,400/mmbf (2001$), indirect and induced $94,500/mmbf (W-W)

Sawtimber direct income $155,400/mmbf (2001$), indirect and induced $93,300/mmbf (Umatilla)
3. From Forest Plan FEIS Appendix B, updated by TSPIRS 1996-98, Roadless Socioeconomic Report, pg. 56

The cumulative effect of Alternatives 2 and 3 are basically the same, they will both provide the county with receipts which otherwise would be dollars out of the taxpayers pocket. They all will provide a similar number of jobs related to harvesting, transporting, processing, marketing and distributing a valuable product. They all reduce fuel loadings and promote forest health over a similar number of acres, acres that will be treated and provide seasonal work/benefits for a projected 8-10 year period.

## Cumulative Economic Effects

The cumulative effect of Alternatives 2 and 3 are basically the same, they would both provide the county with receipts which otherwise would be dollars out of the taxpayers pocket. They all would provide a similar number of jobs related to harvesting, transporting, processing, marketing and distributing a valuable product. The income generated by this project contributes to family wage earners and local industries which in turn support other local businesses, hospitals, and services contributing to the overall economic vitality of the County. The products produced from this project

would not support the local mills alone, however, when added to the wood products being removed from other private and corporate lands, it contributes to the overall viability and sustainability of local mills and businesses.

Each of the action alternatives reduce fuel loadings and promote forest health over a similar number of acres, acres that will be treated and provide seasonal work/benefits for a projected 8-10 year period. The difference between Alternatives 2 and 3 is that acres were deferred from treatment until the next entry or beyond.

# C. Alternative Evaluation as They Respond to the Other Issues

## Fisheries and Watershed Management

**Introduction**

The Sugar project area is primarily located within the Lower Five Points Creek subwatershed (170601040403) within the Grande Ronde River-Five Points Creek Watershed (1706010404). A small portion of the project is located in the East Meacham Creek subwatershed (170701030202) within the Meacham Creek Watershed. The East Meacham Creek subwatershed has very few project acres and does not contain any stream channels and will therefore not be analyzed further in regard to fisheries and watershed resources.

The description of watershed/fisheries resources, along with the analysis of the expected and potential effects for each alternative were assessed using field surveys, water quality databases, supporting literature, and professional judgment. Refer to the Fisheries and Watershed Effects Analysis in the Sugar Vegetation Project Analysis File for additional information.

Several management directives/recommendations apply to this project. The Management directives from the Wallowa-Whitman Land and Resource Management Plan (LRMP) 1990, the Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH 1994); and the LRMP Biological Opinions (1998) will be followed. In addition, the PACFISH amendments add further interim management direction in the form of Riparian Management Objectives (RMOs), Riparian Habitat Conservation Areas (RHCAs) and standards and guidelines.

Three alternatives were analyzed for this project, Alternative 1 (no action), Alternative 2 (proposed action), and Alternative 3 to determine the magnitude of direct, indirect and cumulative effects on the following resources:

1. Water Quality
2. Fish Habitat and Populations

### EFFECTS ANALYSIS

#### No Direct, Indirect, or Cumulative Effects

The following activities associated with the Sugar Project have been analyzed and are of such limited context and constrained nature that they would have little to no measurable effect on watershed and fisheries resources. These activities and their effects will not be discussed further in the Watershed and Fisheries section.

- Forage Enhancement
- Invasive Species Treatments

Forage enhancement consists of seeding upland areas on ridgetops with native bunchgrass. These areas are far removed from stream channels and RHCAs and will have no effect on water quality or fisheries resources.

There is no herbicide treatment proposed within RHCAs, and therefore will be no potential effects to water quality or fisheries resources from this activity.

## 1. Watershed Resources

### Direct Effects on Water Quality

***ALTERNATIVE 1 - NO ACTION***

There are no direct effects on water quality as a result of the No Action Alternative. Effects related to this alternative on water quality are primarily indirect in nature. These indirect effects relate to the continued condition of overstocked stands with diseased and poor growing trees that can suppress conifers in the RHCA. This can reduce the effectiveness of the conifers in producing a future source of large wood recruitment to stream channels and adjacent hillslopes, and decrease resiliency of stands to insects, disease, and wildfire.

***ALTERNATIVES 2 and 3***

The addition of large wood to Five Points Creek, included in both action alternatives, is the only activity proposed that could potentially cause direct effects to water quality. Large wood will be added to 20 selected sites within an approximate four mile reach from Camp One downstream to increase habitat diversity and complexity and enhance steelhead spawning and rearing habitat. Down trees on surrounding ridgetops and other upland locations outside of RHCAs will be transported and placed instream using a helicopter. Size of trees will range from an average 18 to 24 inches in diameter, and where possible will include rootwad and branches. Trees will be placed in accumulations simulating log jams and will not be anchored.

Direct effects to water quality from placement of large wood will be limited since there will be no excavation or “keying in” of pieces of large wood, and there will be no mechanized equipment adjacent to or within the stream channel. Large wood placed by helicopter may generate some sediment from outside of the stream channel or the resuspension of sediment present in the substrate. There will be very little ground disturbance from this activity and effects from the resuspension of sediment during placement, and what sediment is introduced from outside of the stream channel during placement will be short term (30 days). Sediment will settle quickly and the small amount of sediment potentially generated from outside of the stream channel by helicopter placement will not adversely affect water quality in Five Points Creek.

For the remainder of project activities, there are no direct effects to water quality in downstream perennial or fishbearing streams from the implementation of either action alternative. The only in channel work, with the exception of large wood placement, is the development of temporary roads that cross the headwaters of three intermittent non-fishbearing streams. These stream channels will be dry during temporary road crossings and therefore will not result in direct effects to water quality.

### Indirect Effects on Water Quality

The primary effects to water quality that could arise as a result of the Sugar Project are increases in sediment delivery rates.

## Sediment Delivery Rates:

The definition of accelerated sediment delivery for the Sugar Project includes any increase over and above the natural sediment rates of the watershed. It is difficult to equate soil erosion directly to sedimentation rates. Obstructions in the path (i.e. downed wood, grass/forb cover) between the sediment source and the stream reduce the risk of indirect sediment delivery to the stream. Therefore, adequate filter strips (in terms of size, ground cover and downed material) are necessary to slow or prevent sediment movement downslope of disturbed areas. The use of riparian buffers has long been recognized as a mitigation measure to reduce sediment transport to streams. The structural complexity of roots and herbaceous vegetation, in addition to the absorption capability of the duff layer, limits excess sedimentation to the aquatic system. Surface runoff slows down when it comes in contact with herbaceous shrubs, mature trees and the duff layer on the forest floor and sediment is deposited within the riparian buffer before it reaches the watercourse (Decker 2003).

### *ALTERNATIVE 1 - NO ACTION*

Non-treatment of stands within RHCAs could increase sediment yield to stream channels above existing levels under this alternative due to an increase in fire severity and intensity, and reduction in long term wood recruitment due to insects and disease.

*Stands proposed for commercial thinning:*

There are two types of stands in the Sugar Vegetation Management Project that include RHCAs. These are Cool Grand Fir and Warm Grand Fir/Douglas-fir-Ponderosa Pine Group.

Stands/RHCAs in the Cool Grand Fir type:

If left untreated, trees will continue to die creating stands/RHCAs, in the short term, that will be clumpy in nature with overstocked patches of fir perpetuating existing conditions. Many of these stands/RHCAs will remain in a condition of low vigor, because of overstocking, which increases the risk of poor stand/RHCA health for the future. Dead trees and remnant green trees will provide shade for a short time, and the accumulation of litter on the forest floor from limbs and tree boles falling down will decrease the amount of exposed soil. Shading and a decrease in exposed soil will reduce the success of seral species regeneration, which would delay the desired future condition for the area. Climate-induced change where precipation is reduced and temperatures elevated will increase stress to these grand fir dominated stands. As the canopy naturally opens, ground vegetation will increase and begin to occupy the site delaying natural regeneration. Natural openings will occur and remain that way for approximately 25-30 years.

Fuel conditions in these stands/RHCAs, both fuel loading and accumulation, will be excessive and the likelihood of a high intensity fire occuring is high. Fires have the potential to damage adjacent stands/RHCAs some of which are not now heavily infected or where fir is a minor component; and may create stand openings equal to or greater than those openings due to mortality from insects. Excessive heat from fires has the potential to cause soil sterility, thereby reducing future regeneration success.

Stands in the Cool Grand Fir type:

Without some type of disturbance these stands/RHCAs would continue to have an excessive understory component. If left untreated these stands/RHCAs would continue to exhibit reduced growth rates and become more susceptible to disease and insects. Fire and insect/disease risks will not be reduced and structural stages would be largely understory re-initiation and multi-stratum with large trees until a wildfire creates stand initiation conditions. The grand fir component in these stands will be maintained at higher levels then present historically.

Non-treatment of stands/RHCAs would result in a continued decline in overall forest health, including health of RHCAs, due to climate- induced change and overstocking which increases susceptibility to insects and diseases, as well as, an increase in fire intensity. Fuel loadings will continue to be excessive and contribute to higher fire intensities than those that would have occurred historically. Overstocked stands/RHCAs would continue to be selected for haphazard stocking reduction by future insect/disease outbreaks. The dryer biophysical groups would continue to be in an overstocked, low vigor condition; the risk of losing those stands/RHCAs to mountain or western pine beetle would increase (Sartwell and Stevens 1975; Hessburg, Mitchell and Filip 1994). Additional growth to trees would be reduced and movement towards larger diameter trees would be delayed until densities are reduced. Moisture biophysical groups would continue to be at risk to insect/disease damage and stand/RHCA replacement fires.

Non-treatment of stands within RHCAs could result in a long term loss of large wood recruitment to stream channels and hillslopes needed for sediment retention and channel structure, increased loss of RHCAs to wildfire, and could increase sediment yield to stream channels in the event of a high intensity wildfire.

*Stands Proposed for pre-commercial Thinning:*

Stands/RHCAs proposed for precommercial thinning are overstocked. Overstocking can lead to an increase in beetle populations, reduced health of the stand, decreases in production of both the overstory and understory, and alter stand structures and compositions. In many instances, stress, particularly drought stress is compounded by overstocking (Fiddler, et.al., 1995). This stress can lead to losses in tree growth and increases in insect and disease caused mortality.

If left untreated, overstocked stands/RHCAs would stagnate, and tree diameters would remain in lower size classes (an average of less than eight inches dbh) until a disturbance occurs such as fire, insect infestation or disease. The risk associated with insects and disease is that these could cause an epidemic in adjacent stands/RHCAs resulting in an increased risk of wildfire, increase in sediment yield to perrenial and fishbearing streams in the event of a high intensity fire, and long term loss of wood recruitment and structure to stream channels and hillslopes.

*Fire/Fuels Units, Prescribed Fire, and Burn Piles*

Without fuels treatment, tree health and vigor would decline, and ladder fuels would continue to increase the risk of damaging crown fires and insect outbreaks. Excessive fuel loadings that contribute to higher fire intensities than would have occurred historically would continue.

***ALTERNATIVES 2 and 3***

## *A. Indirect Benefits of RHCA Treatments on Water Quality*

The primary benefit of RHCA treatment is a long term source of large wood recruitment for sediment retention, and reduced risk of a high intensity fire that could lead to sediment yield in perennial and fishbearing streams.

May and Gresswell (2003) found that the primary function of wood in small colluvial channels was sediment storage and small wood storage.

Duncan et al. (1987) found that the largest sediment accumulations invariably occurred behind debris and suggests that debris is performing an important role in sediment retention and may, potentially, be protecting fish populations and water quality in downstream reaches.

As concluded by Graham et al. 1999, “Thinning and other thinning-like stand treatments can substantially influence fire behavior at the stand level by either increasing or decreasing fire intensity

and severity of effects. Depending on intensity, thinning from below and possibly free thinning can most effectively alter fire behavior by reducing crown bulk density, increasing crown base height, and changing species composition to lighter crowned and fire adapted species. Such intermediate treatments (intermediate treatments are proposed for RHCAs) can reduce the severity and intensity of wildfires for a given set of physical and weather variables."

Elliot and Robichaud (2001) concluded that "Sediment delivery following forest operations and prescribed fire with forested buffers are a magnitude or more lower than following wildfire" and "The increased number of disturbances from active forest management result in lower long term average sediment delivery rates than would occur following less frequent wildfire disturbances".

Appropriate stocking levels can help to increase tree growth and increase resistance of stands to fire, insect, and disease (Lambert, 1994).

*Stands/RHCAs proposed for commercial thinning:*

The majority of RHCA treatments are along Category 4 streams (intermittent, non-fishbearing) so benefits are related to a long term source of large wood recruitment to hillslopes and stream channels for sediment retention, a reduced risk of insect and disease infestation that could reduce the long term recruitment of large wood, and a reduced potential for increased sediment yield to fishbearing and perennial stream channels in the event of a high intensity fire. While the present condition of stands may contribute to wood sources on hillslopes and to stream channels in the short term, treatment can maintain/enhance large wood recruitment for the long term.

*Stands/RHCAs Proposed for Non-commercial Thinning:*

Non-commercial thinning will reduce stocking densities in overstocked stands to reduce risk of disease and insect infestation leaving the healthiest and most vigorous trees that meet species and stocking requirements. This will result in larger trees in the RHCA for recruitment to stream channels and hillslopes for sediment retention and channel structure. In addition, there will be a decreased risk of insect and disease infestation in adjacent stands, including those portions of stands in the RHCA, which could contribute to higher fire intensities than those that would have occurred historically leading to a long term reduction of a large wood recruitment and potetnial increase in sediment yield to streams.

Pothier (2002) states "The most documented effect of precommercial thinning is increased diameter growth caused by the redistribution of the environmental resources among a smaller number of selected trees"…..and "When the number of stems per hectare is very large, the leaf area of each tree could be so limited that few carbohydrates are available for height development and stagnation of growth occurs".

Homyack et al. (2004) found that stands thinned six to 11 years prior to the study had a greater overstory structure than similar untreated stands. In contrast, unthinned stands gained little overstory structure indicating that the application of pre-commercial thinning was responsible for the accelerated height and diameter growth.

*Fire/Fuels Units, Prescribed Fire, and Burn Piles*

Fuel reduction and fire reintroduction in these drier plant associations would reduce encroaching fir and overstocked pine. Fire reintroduction would help restore the area to historic conditions relative to the condition class and amount of understory. Fuel reduction within the project area will maintain the long term recruitment of wood material to hillslopes and stream channels by reducing the risk of a high intensity fire and reducing the risk for increased sediment yield to perennial and fishbearing streams in the event of a high intensity fire.

## *B. Indirect Effects of Project Activities on Water Quality*

Those project activities with the greatest potential for an increase in sediment delivery to stream channels are:

- Commercial removal within RHCAs
- Temporary roads through RHCAs
- Prescribed Fire
- Pile burning within RHCAs
- Mechanical fuels treatment within RHCAs

**Commercial Removal – Ground Based Equipment**

Ground based equipment, such as tractor or forwarder harvester, will be used on ground with slopes of less than 35%. Commercial harvest RHCA treatment units will have minimum no activity buffers of 50 feet on Class 3 streams (perennial, non-fishbearing), and minimum no activity buffers of 30 feet on Class 4 streams (intermittent, non-fishbearing). No ground based treatment of Class 1 streams is proposed. Table 16 shows the timber harvest units for Alternative 2 and 3 containing stream channels and miles of stream within units. The majority of units are associated with Class 4 streams. All ground based RHCA treatments are associated with headwater streams.

Alternative 2 proposes approximately 11 additional acres of ground based RHCA treatment than does Alternative 3. Therefore, Alternative 2 has a greater potential for an increase in sediment yield to streams than Alternative 3. However, the implementation of either action alternative would result in a non-measurable amount of sediment to perennial and fishbearing stream channels.

No treatment buffers were determined from site visits and supporting literature. Rashin et al. (2006) found that stream buffers were most effective where timber falling and yarding activities were kept at least 10 meters (approximately 33 feet) from streams and outside of steep inner gorges. This 10 meter buffer for ground disturbing activities was found to prevent sediment delivery to streams from about 95% of harvest related erosion features. Of 193 erosion features located 10 meters from the stream channel, 95% did not deliver sediment. In addition, Rashin et al. found that virtually all chronic sediment delivery was associated with skid and shovel trails that crossed streams.

Site specific inspection of RHCAs within and adjacent to harvest units found heavy ground cover in the form of grasses and shrubs, and/or numerous pieces of large wood on slopes adjacent to streams in combination with smaller woody debris and duff layer that will prevent sediment movement to streams. Surface runoff slows down when it comes in contact with herbaceous shrubs, mature trees and the duff layer on the forest floor and sediment is deposited within the riparian buffer before it reaches the watercourse (Decker 2003).

The majority of sediment from harvest activities will be entrained in the minimum 30 and 50 foot no activity buffers. What little sediment does reach stream systems as a result of harvest activities will be trapped and retained locally within the stream system before reaching fishbearing streams due to the small size of streams, numerous pieces of large wood in stream channels, and numerous depositional areas. The 50 foot no activity buffer on Class 3 streams (units 65 and 66) will trap more sediment than the 30 foot stream buffers due to the additional 20 feet of forested buffer. In addition, the RHCA in units 65 and 66 is relatively flat with an average gradient of 4% reducing the chance of sediment movement towards the stream channel. A non-measurable amount of sediment is expected to reach the Class 3 stream associated with units 65 and 66 due to the reasons stated above. Woody debris surveys in Class 4 streams across the planning area found an average of 204 pieces of large wood >12 inches in diameter per mile. Pieces of large wood >12 inches in diameter ranged from a low of 102 pieces per mile (unit 51 stream channel) to a high of 276 pieces per mile (unit 58 stream channel). Only those pieces of wood that actually interacted with the stream channel were enumerated. Pieces of wood suspended above the stream channel or on the stream margin that are potential sources of woody debris were not counted. Smaller pieces that also function to

trap and store sediment were also not enumerated. May and Gresswell (2002) found that small pieces of wood were more frequently associated with sediment storage as stream size decreased. Channel widths in Class 4 streams, within and adjacent to harvest units, averaged 3.2 feet in width and ranged from 2.0 feet (units 49 and 51) to 6.0 feet (unit 58). Class 4 channel surveys also found that Class 4 stream channels in the planning area with channel widths equal to or less than 3.0 feet have a vegetation component within the stream channel consisting of grasses, snowberry, and currant. Vegetation within a headwater stream channel can also filter, trap and retain sediment.

Numerous studies have documented the retention of sediment in headwater streams. Swanson and Lienkemper (1978) state "that by increasing the sediment storage capacity of the channel, large wood buffers the sedimentation impacts on downstream reaches when pulses of sediment enter headwater streams". Gomi et al. (2003) states "because stream channels are narrow (in headwater streams), a range of LWD (Large Woody Debris) orientations can effectively store sediment and form channel steps". Bilby and Ward (1989) found that debris-associated depositional areas occurred more frequently in smaller streams because there were both more pieces of wood and a higher proportion of those pieces that formed sediment accumulations. Duncan et al. (1987) found that the largest sediment accumulations invariably occurred behind debris and suggests that debris is performing an important role in sediment retention and may, potentially, be protecting fish populations and water quality in downstream reaches. Logjams (in headwater systems) often store sediment for 40 to 50 years until the structures collapse or channel course change (Hogan et al. 1995). Sequences of steps and pools alter the transport of bedload sediment in headwaters channels because they wedge, jam, and store material (Whitaker, 1987). Woody debris typically stores sediment and alters substrate composition (Smith et al. 1993). May and Gresswell (2003) state that" large wood may be the cornerstone for storing sediment in steep headwater streams because it provides a physical obstruction to transport in high energy environments". Sediment delivery from headwater to downstream is often interrupted because sediment is temporarily stored in or along the streambed, banks, terraces, and debris fans (Hey 1979, Benda and Dunne 1997a, Nakamura et al. 2000). Sediment movement (in headwater streams) may be modified by channel gradient, tributary junction angle, and reach constraints (Benda and Cundy 1990, Nakamura et al. 2000). Beaver Ponds, wetlands, and intermittent channel reaches also alter the connectivity between headwater and downstream systems; intermittent channel reaches also disrupt this connectivity.

Due to the sediment storing capabilities of headwater streams, a non-measurable amount of sediment will be introduced to downstream perennial and fish bearing streams as a result of RHCA treatments using ground based equipment.

**Table 16 - Ground based logging units for Alternatives 2 and 3 with proposed RHCA treatments and associated stream class.**

| Alt. 2 Units | Alt. 2 *Stream Class | Alt 2. Miles Stream Within Unit | Alt. 2 Acres RHCA Treatment | Alt. 3 Units | Alt. 3 *Stream Class | Alt. 3 Miles Stream Within Unit | Alt. 3 Acres RHCA Treatment |
|---|---|---|---|---|---|---|---|
| 3 | 4 | 0.21 | 3.6 | 6 | 4 | 0.19 | 3.3 |
| 6 | 4 | 0.19 | 3.3 | 8 | 4 | 0.07 | 1.3 |
| 8 | 4 | 0.07 | 1.3 | 14 | 4 | 0.09 | 1.6 |
| 14 | 4 | 0.09 | 1.6 | 25 | 4 | 0.23 | 4.0 |
| 25 | 4 | 0.23 | 4.0 | 26 | 4 | 0.15 | 2.5 |
| 26 | 4 | 0.15 | 2.5 | 29 | 4 | 0.03 | 0.4 |
| 29 | 4 | 0.03 | 0.4 | 30 | 4 | 0.08 | 1.3 |
| 30 | 4 | 0.08 | 1.3 | 33 | 4 | 0.03 | 0.5 |
| 33 | 4 | 0.03 | 0.5 | 35 | 4 | 0.02 | 0.3 |
| 35 | 4 | 0.02 | 0.3 | 46 | 4 | 0.05 | 0.9 |
| 46 | 4 | 0.05 | 0.9 | 49 | 4 | 0.24 | 4.0 |

| 49 | 4 | 0.24 | 4.0 | 51 | 4 | 0.11 | 1.9 |
|---|---|---|---|---|---|---|---|
| 51 | 4 | 0.11 | 1.9 | 52 | 4 | 0.17 | 2.9 |
| 52 | 4 | 0.17 | 2.9 | 54 | 4 | 0.14 | 2.3 |
| 54 | 4 | 0.14 | 2.3 | 55 | 4 | 0.18 | 3.0 |
| 55 | 4 | 0.18 | 3.0 | 57 | 4 | 0.09 | 1.5 |
| 57 | 4 | 0.09 | 1.5 | 58 | 4 | 0.51 | 8.6 |
| **Alt. 2 Units** | **Alt. 2 *Stream Class** | **Alt 2. Miles Stream Within Unit** | **Alt. 2 Acres RHCA Treatment** | **Alt. 3 Units** | **Alt. 3 *Stream Class** | **Alt. 3 Miles Stream Within Unit** | **Alt. 3 Acres RHCA Treatment** |
| 58 | 4 | 0.51 | 8.6 | 61 | 4 | 0.08 | 1.3 |
| 61 | 4 | 0.08 | 1.3 | 65 | 3 | 0.02 | 0.5 |
| 65 | 3 | 0.02 | 0.5 | 66 | 3 | 0.10 | 2.4 |
| 66 | 3 | 0.10 | 2.4 | 70 | 4 | 0.03 | 0.6 |
| 70 | 4 | 0.03 | 0.6 | 76 | 4 | 0.07 | 1.1 |
| 75 | 4 | 0.36 | 6.1 | 77 | 4 | 0.03 | 0.6 |
| 76 | 4 | 0.07 | 1.1 | 86 | 4 | 0.37 | 6.3 |
| 77 | 4 | 0.03 | 0.6 | 87 | 4 | 0.12 | 2.1 |
| 86 | 4 | 0.37 | 6.3 | 88 | 4 | 0.01 | 0.2 |
| 87 | 4 | 0.12 | 2.1 | | | | |
| 88 | 4 | 0.01 | 0.2 | | | | |
| **TOTAL** | | **3.8** | **65.1** | **TOTAL** | | **3.2** | **55.4** |

*Stream Class 1=Fishbearing,Class 3=non-fishbearing perennial, Class 4= non-fishbearing intermittent

**Timber Harvest – Skyline Yarding**

Skyline yarding systems will be used on ground with slopes >35%. In Alternative 2, there are seven skyline units where RHCA treatments are proposed, and in Alternative 3, there are three skyline units where RHCA treatments are proposed (see Table 17 and 18). Alternative 2 has a portion of one unit (unit 7) that encompasses a short segment (0.04 miles) of Class 1 stream (fishbearing), and the remaining portion of the unit encompasses a Class 4 stream immediately upstream of the Class 1 stream. All other skyline yarding units are associated with Class 4 streams. Nunamaker Creek is primarily a seasonally flowing stream with a short perennial segment near the confluence with Five Points Creek. Unit 7 is approximately 1.5 miles upstream of this perennial segment. No fish use has been documented in Nunamaker Creek, although it is considered fishbearing and is designated critical habitat for steelhead. A minimum 100 foot buffer will be implemented on the Class 1 stream while a minimum 30 foot buffer will be implemented on Class 4 streams. A corridor approximately 12 feet in width every 150 feet will be needed to accommodate skyline yarding, and may require the felling of trees within this corridor. Natural openings will be taken advantage of whenever possible. Full suspension will be required when yarding across stream channels, and through the 100 foot and 30 foot buffers. No ground disturbance will be created within the corridor so ground cover and down woody debris will remain intact to trap sediment before reaching the stream channel. The corridor will only have trees to accomodate the skyline.

Due to the greater area of RHCA treatment, Alternative 2 has a greater potential for sediment yield to stream channels than Alternative 3. However, a non-measurable amount of sediment is expected to reach downstream perennial and fishbearing and perennial streams from the implementation of either action alternative due to the following:

1) Operation during dry or frozen conditions.

2) Use of 100 foot buffer on the Class 1 stream and 30 foot buffers on Class 4 streams.

3) Skyline units are primarily along intermittent, non-fishbearing streams (Class 4).

4) The small amount of sediment reaching intermittent streams as a result of harvest activities will be trapped and retained locally within the stream system before reaching fishbearing streams due to the small size of streams, woody material in stream channels, and numerous depositional areas.

As described above under ground based equipment, numerous studies have documented the capability for retention of sediment in headwater streams. Due to the sediment storing capabilities of headwater streams, a non-measurable amount of sediment will be introduced to downstream perennial and fish bearing streams as a result of RHCA treatments using skyline equipment.

In addition, a soil disturbance assessment by Thompson et al. 1998, found that skyline cable yarding results in less soil impacts than other common systems for steep slopes (average slope of 46% for this study) and flat, wet site harvesting. This is due in part to the lack of heavy equipment on slopes, and greater amount of skid trails that would be needed. Also, with skyline yarding on steeper slopes there is greater deflection that can minimize the amount of ground disturbance by achieving a greater amount of suspension and reducing tree/soil interaction. In contrast, a study conducted by McIver et al. (2003) found that skyline yarding created less soil compaction than forwarder units (0.2% and 1.8% respectively), and that skyline yarding created more soil displacement than did forwarder units (7.0% and 4.3% respectively). However, average slopes in the McIver et al. study were 12%, which does not allow the amount of deflection that would minimize soil displacement. Cable yarding units in the Sugar Vegetation Management Project have slopes greater than 35%.

**Table 17 - Skyline yarding units for Alternative 2 with proposed RHCA treatments and associated stream classes.**

| Alternative 2 Units | *Stream Class | Miles Stream In Unit | Acres of RHCA Treatment | Approximate Number of Corridors |
|---|---|---|---|---|
| 7 | 1 | 0.04 | 1.9 | 1 |
| 7 | 4 | 0.25 | 4.2 | 4 |
| 34 | 4 | 0.30 | 5.1 | 11 |
| 45 | 4 | 0.12 | 2.0 | 4 |
| 56 | 4 | 0.08 | 1.4 | 3 |
| 59 | 4 | 0.33 | 5.6 | 12 |
| 74 | 4 | 0.02 | 0.3 | 0 |
| 85 | 4 | 0.08 | 1.4 | 3 |
| **TOTAL** | | **1.22** | **21.9** | **38** |

*Stream Class 1= fishbearing, Class 4= non-fishbearing intermittent
Note: A large portion of unit 7 lies on one side of a Class 4 stream reducing the number of yarding corridors.

**Table 18 - Skyline yarding units for Alternative 3 with proposed RHCA treatments and associated stream classes.**

| Alternative 3 Units | *Stream Class | Miles Stream In Unit | Acres of RHCA Treatment | Approximate Number Of Corridors |
|---|---|---|---|---|
| 56 | 4 | 0.08 | 1.4 | 3 |
| 59 | 4 | 0.33 | 5.6 | 12 |
| 74 | 4 | 0.02 | 0.3 | 0 |
| **TOTAL** | | **0.43** | **7.3** | **15** |

*Stream Class 1= fishbearing, Class 4= non-fishbearing intermittent
Note: A large portion of unit 7 lies on one side of a Class 4 stream reducing the number of yarding corridors.

**Helicopter Removal**

Alternative 2 proposes the use of helicopter logging in one unit (unit 80) with proposed RHCA treatment where the slopes are greater than 35%. No helicopter logging is proposed in Alternative 3. Unit 80, the proposed helicopter unit in Alternative 2, contains 0.42 miles of Class 4 stream, and includes 7.1 acres of RHCA treatment. The helicopter unit will have a no activity buffer of 30 feet along the Class 4, non-fishbearing, intermittent stream.

Helicopter logging creates much less ground disturbance than logging with ground based equipment, and therefore there is less potential for sedimentation to the stream than ground based logging. Ground disturbance is created from felling of the tree and can occur when the helicopter lifts the tree. Helicopters attempt to lift the load straight up, but occasionally one end will drag somewhat. Directional falling of trees and removal of trees by helicopter will reduce the potential for sediment yield. Helicopter removal would result in a non-measurable amount of sediment yield to stream channels.

**Roads**

For commercial removal, the project will reconstruct 0.20 miles of road in both action alternatives. In Alternative 2, the project will use 9.5 miles of closed road, and use 5.4 miles of temporary road. In Alternative 3, the project will use 8.3 miles of closed road, and use 4.1 miles of temporary road. No new road construction is proposed in either of the action alternatives. No draw bottom roads will be opened or used for this project. No closed roads opened for the project or temporary roads cross fishbearing streams.

Two proposed temporary road segments (T-2 and T-19) included in both of the action alternatives cross the RHCA of three Class 4 streams. There is no difference in effects to water quality from the implementation of either action alternative in respect to temporary roads.

Temporary road segment T-2 is needed to access unit 76. This temporary road would cross two Class 4 streams near the headwaters. These crossings are approximately 0.6 miles from the nearest fishbearing stream, which is Little John Day Creek. The route of the temporary road follows the contours and is relatively flat. A temporary culvert will be needed in each of the two intermittent stream crossings.

Temporary road segment T-19 is needed to access unit 25. This temporary road would cross one Class 4 stream near the headwaters. This crossing is approximately 1.0 mile from the nearest fishbearing stream, which is Five Points Creek. All temporary roads would be built, used, and restored during the dry season and during the same season of use. For restoration of these temporary roads, the culverts will be removed and the stream channels and approaches returned to original contours. The remainder of the temporary roads will be subsoiled where appropriate, returned to original contours where needed, debris scattered across the footprint of the temporary road where debris is available, and seeded with native grasses.

Temporary road development, use, and restoration of temporary roads would occur when stream channels are dry. Use of BMPs such as conducting activities during dry conditions, delineating impact areas and confining work to the noted area, and rehabilitation of disturbed areas and seeding with native grasses will minimize sedimentation to downstream perennial and fishbearing waters. Sediment introduced to stream channels in the short term (0-2 years) will initially be isolated to the immediate area since the intermittent stream channels would be dry during development and use.

Intermittent stream channels in the project area typically do not recharge with surface flow until spring runoff. With the recharge of stream channels the primary sediment plume would be retained in the intermittent stream channel due to the small stream size, channel structure such as large wood to trap and retain sediment, and numerous depositional areas. Sediment within stream channels will slowly be released over time without causing adverse effects to downstream water quality.

Two closed road segments that will be used for the project and are included in both action alternatives cross through the RHCA of a Class 3 and Class 4 stream. There is no difference in effects to water quality from the implementation of either action alternative in respect to the use of closed roads.

The 3100078 road is needed to access portions of units 65 and 66. This closed road segment crosses a Class 3 stream near the headwaters. This crossing is approximately 1.5 miles from the nearest fishbearing waters, which is the fishbearing portion of Little John Day Creek. The second closed road segment that crosses an RHCA, is the 3112028 road, which is needed to access unit 86. This road crosses a Class 4 stream at the headwaters approximately 1.5 miles from the nearest fishbearing stream, which is Five Points Creek. Closed roads used for the project will be reclosed after use and would consist of closing and locking of gates where present and replacing earthen barricades.

No reconstruction of closed roads opened for use is proposed in either action alternative, but some maintenance may be required. Maintenance, such as brushing, spot rocking, or blading of the road surface, may be required on closed roads including stream crossings. Blading consists of pulling material from the sides of the road inwards to redevelop the road crown. All material would remain on the road surface. Roads will be used only under dry or frozen conditions to minimize sedimentation to stream channels. Use of and maintenance (blading) of closed roads adjacent to and across stream channels has the potential to increase sedimentation above existing levels in the short term (0-2 years) due to disturbance of the road surface. However, road maintenance could potentially reduce sediment delivery to stream channels through improved drainage and reduced erosion of the road surface by directing water off of the road surface. Road maintenance is necessary to keep roads in good condition, minimize erosion, and identify and correct problems promptly (Furniss et al. 1991). The degree of sedimentation to stream channels above existing levels is expected to be low since the majority of approaches to stream channels are relatively flat and established vegetation on the road margins, sides of the road prism, and ditches will be retained to filter and trap sediment. Maintaining well vegetated ditches on forest roads has been shown to be an effective means to minimize sediment production (Luce and Black 1999, Bilby et al. 1989).

A study conducted by Duncan et al. (1987), discusses the sediment retention in headwater streams. These experiments demonstrate the effectiveness of small headwater streams at retaining, at least temporarily, the coarser size sediments (>0.063 mm) from washed roads. By acting as storage areas, small tributary streams reduce the immediate input of sediment of this size to larger streams during storms of moderate intensity. This research suggests that the small tributaries leading to areas potentially occupied by listed fish and having potential to introduce sediment will likely be able to retain some amount of sediment from road run-off due to hauling if the streams downhill contain woody debris and vegetation.

Sedimentation to stream channels due to use of closed roads would be retained locally in the intermittent streams, and would not be of an amount that would adversely affect water quality throughout stream systems.

**Prescribed Fire**

Both action alternatives propose 4,200 acres of prescribed fire. There is no difference in the effects to water quality from the implementation of either action alternative from prescribed fire.

The use of prescribed fire is not expected to increase sediment delivery rates to stream channels over and above the natural sediment rates of the subwatershed. There will be no direct ignition within PACFISH RHCAs, but fire will be allowed to back into RHCAs. The fire intensity is expected to be low in riparian areas, having little effect on riparian conditions. Prescribed fire within RHCAs typically results in a mosaic burn pattern with areas of undisturbed ground and less than 15% soil disturbance. These areas recover quickly and are usually revegetated within one year (Personal Communication, Trish Wallace, Jay Rasmussen, and Mike Johnson, Fuels Specialists, USDA Forest Service, La Grande Ranger District, La Grande Oregon, 2003). Prescribed fire is not expected to be a source of erosion or sediment delivery.

Control Lines

Control lines would include roads, natural barriers, and brush removal rather than bare mineral soil line construction where possible. However, three main control lines from ridgetop to Five Points Creek may be required and are included in both action alternatives. These control lines would be 18 inches wide down to bare mineral soil. One control line would come off of the 3106180 road and continue down the ridge in an easterly direction and terminate on the edge of the floodplain of Nunamaker Creek near the confluence with Five Points Creek. Another control line would come off of the 3107 road and continue down the ridge in a southerly direction and terminate on the edge of the floodplain of Five Points Creek approximately 0.20 miles upstream of Nunamaker Creek. The third control line would come off of the 3100131 road and continue down the ridge in a southerly direction and terminate on the edge of the floodplain of Five Points Creek at or near the confluence with Little John Day Creek. Control lines would be constructed and restored in the same season. Restoration of control lines include: installation of waterbars or drainage control structures on slopes > 30%, mineral soils restored to pre-disturbance contours, and available woody material will be placed on the restored control line.

Sedimentation to fishbearing streams from bare mineral soil control lines will be minimized due to the following: control lines will terminate at the floodplain and not the stream channel enabling vegetation, down wood, and landform to intercept sediment; control line construction and use would occur during the dry and during the same season; and restoration of control lines will create roughness to prevent erosion and sediment movement. The small amount of sediment that could potentially be generated would not be of an amount that would adversely affect water quality throughout stream systems.

**Pile Burning**

Piling and burning of slash may occur in RHCAs with both action alternatives if the level of slash generated during thinning is determined to be detrimental to soils and remaining trees during prescribed burning. There is no difference in the effects to water quality from the implementation of either action alternative from pile burning.

Slash could potentially be generated from commercial thinning, pre-commercial thinning, and fire/fuels units. Piling and burning would occur outside of the minimum no activity buffers of 100 feet for fishbearing streams (fuel reduction unit 503 along Five Points Creek and unit 7 along Nunamaker Creek, see Table 19), 50 feet for non-fishbearing perennial streams, and 30 feet for non-fishbearing intermittent streams. Burn piles would not exceed eight feet in diameter, and would number up to 20 piles per acre depending on slash density. Piles would be burned when there would be a high soil moisture content and would result in a low intensity burn to minimize effects to soils and vegetation. The footprint of piles after burning typically revegetate within one season. No sediment is expected to reach streams from pile burning due to no activity buffers to trap and retain sediment, and small footprint of piles that revegetate rather quickly.

**Mechanical fuels treatment within RHCAs (Fire/Fuels Units)**

In Alternative 2, approximately 317 acres will receive fuels treatment in eight units prior to prescribed burning, and in Alternative 3 approximately 337 acres will receive fuels treatment in nine units prior to prescribed burning. In both action alternatives three units (500, 503, and 507) contain the RHCA of Class 1 and Class 4 streams (Table 19). Since the same fire fuels units that will receive RHCA treatments are present in both action alternatives, there is no difference in the effects to water quality from the implementation of either action alternative from mechanical fuels treatment. Three units (503, 506 and 507) are within the Perry/Hilgard Wildland Urban Interface (WUI). Fuels treatment within fire/fuels units includes: thinning and cleaning of trees less than nine inches dbh; mechanical slashbusting on slopes less than 30%; lopping and scattering of thinning slash (handwork); hand piling of thinning slash and excess natural fuels; and pruning of leave trees greater than seven inches dbh. There is no commercial removal of trees in fire/fuels units. Except for the mechanical slashbuster, all activities will be accomplished by hand. No grapple piling will occur within RHCAs. A no activity buffer of 100 feet will be implemented on Class 1 streams (Five Points Creek, which is a perennial fishbearing stream), and no activity buffers of 30 feet will be implemented on Class 4 streams. Within fire/fuels unit 503, which borders Five Points Creek, all work within the RHCA will be done by hand, and includes thinning and cleaning of trees less than nine inches dbh (handwork); lopping and scattering of thinning slash (handwork); hand piling of thinning slash and excess natural fuels (handwork); and pruning of leave trees greater than seven inches dbh (handwork). Due to the railroad that runs through the unit and distribution of fuels, an approximate 600 feet of RHCA bordering Five Points Creek will be treated. Table 19 reflects the miles of Five Points within the fuels unit (0.51 miles) and not the actual area to be treated.

No activity buffers will prevent or minimize potential sediment yield to streams due to heavy ground cover in the form of grasses and shrubs within RHCAs, and/or numerous pieces of large wood on hillslopes. Surface runoff slows down when it comes in contact with herbaceous shrubs, mature trees and the duff layer on the forest floor and sediment is deposited within the riparian buffer before it reaches the watercourse (Decker 2003).

**Table 19 - Fire/Fuels units containing RHCAs for Alternatives 2 and 3.**

| Alternative 2 and 3 Units | *Stream Class | Miles Stream Within Unit |
|---|---|---|
| 503 | 1 | 0.51 |
| 500 | 4 | 0.19 |
| 503 | 4 | 0.57 |
| 507 | 4 | 0.86 |
| **TOTAL** | | **1.6** |

*Stream Class 1= fishbearing, Class 4= non-fishbearing intermittent

**Other Project Activities:**

**Non-commercial Thinning**

Both action alternatives propose 64 acres of non-commercial thinning in RHCAs. There is no difference in the effects to water quality from the implementation of either action alternative.

Non-commercial thinning in RHCAs will reduce stocking densities in overstocked stands to reduce risk of disease and insect infestation and leave the healthiest and most vigorous trees that meet species and stocking requirements. No activity buffers of 25 feet will be delineated on non-fishbearing intermittent streams (Class 4), and no activity buffers of 50 feet will be delineated on non-fishbearing perennial streams (Class 3). Trees to be cut are less than nine inches dbh, and trees will be thinned to a spacing of 14 to 16 feet. Trees will

be cut by hand (chainsaw) and left on site. There will be no ground disturbance and no risk of sedimentation to streams as a result of this activity.

**Roadside Danger Trees**

Danger trees will be cut along all haul routes in both action alternatives. There is no difference in the effects to water quality from the implementation of either action alternative.

Danger trees present a hazard to people due to conditions such as, but not limited to, deterioration or physical damage to the root system, trunk, stem, or limbs, and the direction of the lean of the tree would allow that tree to reach the roadway if it fell. There is an estimated 15 danger trees per mile. If trees are within the 30 foot no activity buffer along non-fishbearing intermittent streams or 50 foot no activity buffer along non-fishbearing perennial streams trees, will be cut and left on site. Outside of the no activity buffers trees may be removed. Equipment would work from the roadway in these situations, and effects of sedimentation to the stream would be the same or less than those associated with commercial removal using ground based equipment. Effects would be less if equipment works from the roadway, and when compared to commercial removal in treatment units this activity is much smaller in size.

## Stream Temperature:

### *ALTERNATIVE 1 - NO ACTION*

No change in existing stream temperatures will take place under this alternative.

### *ALTERNATIVES 2 and 3*

This project will not have an effect on maximum summer stream temperatures in the project area with the implementation of either action alternative. No shade producing vegetation will be removed from fishbearing streams or perennial non-fishbearing streams in the project area. The majority of project activities are associated with Class 4 streams (intermittent, non-fishbearing). Intermittent non-fishbearing streams within the project area are typically dry by mid June and do not contribute to summer stream temperatures in perennial streams and are therefore not an issue for maximum stream temperatures.

Alternative 2 has one Class 3 (perennial, non-fishbearing) stream segment and two Class 1 (fishbearing) stream segments where project activities are proposed within RHCAs. Alternative 3 has one Class 3 and one Class 1 stream segment where project activities are proposed within RHCAs (see Tables 16, 17, 18 and 19 for units and stream class).

Project activities associated with the Class 3 stream segment (included in both action alternatives) include mechanical treatment and commercial removal along 0.12 miles of stream (2.4 acres of RHCA treatment), and use of a closed road through the RHCA. A no activity buffer of 50 feet will be implemented along this Class 3 stream. This Class 3 stream flows into a Class 4 stream (headwaters of Little John Day Creek) approximately 1.2 miles upstream of the perennial, fishbearing portion of Little John Day Creek. Since this perennial stream has no surface flow connection to fishbearing or other perennial streams connected to fishbearing during periods of elevated stream temperatures, there is no potential for the modification of maximum summer stream temperatures. . In addition, a study conducted by Wilkerson et al. (2006) in headwater streams in Maine found that 11 meter (36 feet) buffer widths with clearcuts on either side and partial harvest within the buffer had moderate, but statistically insignificant increases in stream temperature while 23 meter (76 feet) buffer widths with clearcuts on either side and partial harvest in the buffer had no observable increases in temperature. Both treatments retained >60% of the canopy. Moore et al. (2005) found

that temperature increases in headwater streams are unlikely to produce substantial changes in the temperature of larger streams into which they flow, unless the total inflow of clear-cut heated tributaries constitutes a significant proportion of the total flow in the receiving stream. No clearcut or regeneration harvests are proposed along perennial streams and no harvest is proposed within no activity buffers. All shade producing vegetation will be retained within the minimum 50 foot no treatment buffer, and a fully stocked stand will remain beyond the 50 foot buffer to provide streamshade.

One of the Class 1 stream segments, included in both action alternatives and located along 0.51 miles of Five Points Creek (perennial and fishbearing), is within a Fire/Fuels unit (unit 503). Within fire/fuels unit 503, which borders Five Points Creek, all work within the RHCA will be done by hand, and includes thinning and cleaning of trees less than nine inches dbh (handwork); lopping and scattering of thinning slash (handwork); hand piling of thinning slash and excess natural fuels (handwork); and pruning of leave trees greater than seven inches dbh (handwork). Due to the railroad that runs through the unit and distribution of fuels, an approximate 600 feet of RHCA bordering Five Points Creek will be treated. There is no commercial removal within this unit. A 100 foot no activity buffer will be implemented on Five Points Creek retaining all shade producing vegetation. Outside of this 100 foot no activity buffer, no shade producing conifers will be removed since the overstory will remain. These activities will not modify maximum summer stream temperatures.

The other Class 1 stream segment, included in Alternative 2 only, is within a commercial thinning unit (unit 7). This is a very short stream segment approximately 0.04 miles in length (211 feet), and is located in upper Nunamaker Creek. Nunamaker Creek in this area is a seasonally flowing stream (intermittent) that is typically dry by mid June and does not contribute to summer stream temperatures in perennial streams. This unit is approximately 1.5 miles upstream of the perennial portion of Nunamaker Creek. There is no documented presence of fish use in this stream, but is considered fishbearing and is designated critical habitat for steelhead.

Both action alternatives propose 4,200 acres of prescribed fire. The use of prescribed fire is not expected to increase stream temperatures. There will be no direct ignition within PACFISH RHCAs, but fire will be allowed to back into RHCAs. The fire intensity is expected to be low in riparian areas, having little effect on riparian vegetation or the conifer overstory providing stream shade. Prescribed fire is not expected to remove vegetation to the point that stream temperatures are increased.

**Flow Regimes:**

The Matrix of Diagnostics, Pathways and Indicators used in consultation with NOAA Fisheries and the United States Fish and Wildlife Service (USFWS) use an Equivalent Clearcut Acres (ECAs) recommended value of >15% to indicate potential changes in peak and base flows. ECAs will be used only as an indicator of overall disturbance in the Sugar project area, and will not be used to describe hydrologic response. The change in ECA values that would occur from the implementation of the action alternatives for the Sugar Project are presented in Table 20. Both values are below the recommended value of <15%. Effects to flow regimes are similar for both action alternatives.

**Table 20 - ECA values by alternative for the Grande Ronde River-Five Points Creek subwatershed.**

| SWS | Existing ECA % | Alternative 1 ECA % | Alternative 2 ECA % | Alternative 3 ECA % |
|---|---|---|---|---|
| Grande Ronde River-Five Points Creek | 4.5 | 4.5 (% increase=0.0) | 9.6 (% increase =5.1) | 8.8 (% increase =4.3) |

**Summary of Direct and Indirect Effects to Water Quality -** Alternative 2 has a greater number of acres of RHCA treatment, there is a greater potential for sediment yield to stream channels. Both alternatives have potential short-term (0-2 years) indirect effects to water quality due to ground disturbing activities from harvest and the use of temporary and closed roads through RHCAs. However, a non-measurable amount of sediment is expected to reach perennial and fishbearing streams due no activity buffers, ground cover, and woody debris on hillslopes to prevent or minimize sediment yield to streams. The majority of project activities within RHCAs are along intermittent non-fishbearing streams. What little amount of sediment is introduced to stream channels will be retained within the intermittent non-fishbearing streams due to woody debris that can trap and store sediment, numerous depositional areas, and the small size of streams. Neither alternative will have an effect on stream temperatures. Recruitment of large wood to hillslopes and stream channels will be maintained or enhanced in the long term (20 plus years), and a reduced risk from insects, disease, and wildfire will result from the treatment of stands within RHCAs.

The use of prescribed fire is not expected to increase sediment delivery rates to stream channels over and above the natural sediment rates of the subwatershed. There will be no direct ignition within PACFISH RHCAs, but fire will be allowed to back into RHCAs. The fire intensity is expected to be low in riparian areas, having little effect on riparian conditions. Prescribed fire within RHCAs typically results in a mosaic burn pattern with areas of undisturbed ground and less than 15% soil disturbance. These areas recover quickly and are usually revegetated within one year (Personal Communication, Trish Wallace, Jay Rasmussen, and Mike Johnson, Fuels Specialists, USDA Forest Service, La Grande Ranger District, La Grande Oregon, 2003). Prescribed fire is not expected to be a source of erosion or sediment delivery.

## 2. Fish Habitat and Populations

### Direct Effects on Fish Habitat and Populations

***ALTERNATIVE 1 - NO ACTION***

There are no direct effects on instream fish habitat or populations as a result of the No Action alternative. Effects related to this alternative on fish habitat and populations are indirect.

***ALTERNATIVES 2 and 3***

The addition of large wood to Five Points Creek, included in both action alternatives is the only activity proposed that could potentially cause direct effects to fish habitat and populations. Large wood will be added to 20 selected sites within an approximate four mile reach from Camp One downstream. Down trees on surrounding ridgetops and other upland locations outside of RHCAs will be transported and placed instream using a helicopter. Size of trees will range from an average 18 to 24 inches in diameter, and where possible will include rootwad and branches. Trees will be placed in accumulations simulating log jams and will not be anchored. The addition of large wood will benefit fish habitat and fish populations by increasing habitat diversity and complexity, and enhancing steelhead and redband trout spawning and rearing habitat. Large wood additions would take place during the Oregon Department of Fish and Wildlife (ODFW) recommended timing for instream work, which will minimize direct effects to listed and sensitive fish species. Working within the ODFW recommended timing for instream work will prevent effects to spawning fish and eggs/larvae incubating in the gravel. Steelhead and redband trout in Five Points Creek spawn in April and May, and fry have emerged from the gravel by the first of July. Large wood placement would occur anytime from the first of July through October 15, which is the ODFW recommended work window. One to two pieces of large wood would be placed at a time by helicopter. During placement of large wood, fish will exhibit avoidance behavior and move either upstream or downstream a short distance escaping harm.

For the remainder of project activities, there will be no direct effects on fish or fish habitat from the implementation of either action alternative described with this project. With Alternative 2, with the exception of one Fire/Fuels unit (unit 503) and one RHCA harvest treatment unit (unit 7) there are no activities adjacent to fishbearing streams. The Fire/Fuels unit is located along Five Points Creek, and the RHCA harvest treatment unit is located in upper Nunamaker Creek. A 100 foot no activity buffer on both units will prevent direct effects to fish and fish habitat. With Alternative 3, with the exception of one Fire/Fuels unit (unit 503), there are no activities adjacent to fishbearing streams. This is the same Fire/Fuels unit included in Alternative 2.

## Indirect Effects To Fish Habitat and Fish Populations

***ALTERNATIVE 1 - NO ACTION***

RHCAs would be maintained in their current condition. Restoration of conifer stands within RHCAs would not occur. These stands are subject to infestation, disease and risk of a damaging wildfire. The condition of overstocked stands, suppressed tree growth, and diseased trees would persist and could result in a reduction of large wood recruitment and sediment retention in headwater streams in the long term (>20 years).

Non-treatment of stands within RHCAs could increase sediment yield to stream channels above existing levels under this alternative due to an increase in fire severity and intensity, and reduction in long term wood recruitment to stream channels due to insects and disease.

An increase in sediment yield to streams resulting from wildfire can have potential negative effects to the growth and survival of salmonids such as steelhead that spawn and rear in Five Points Creek. Increased concentrations of sediments and increased sedimentation rates can negatively affect spawning habitat, rearing habitat, overwintering habitat, and cause lethal effects to salmonids through increased egg mortality, reduced egg hatch, a reduction in the successful emergence of larvae (fry), and sediment induced death of juvenile and adult fish (Anderson, 1996).

***ALTERNATIVES 2 and 3***

### *A. Indirect Benefits of RHCA Treatments to Fish Habitat and Fish Populations*

The primary benefit to fish habitat and fish populations is the long term maintenance/enhancement of large wood recruitment to stream channels needed for sediment retention in headwater streams, and reduced risk of a high intensity wildfire in RHCAs that could increase sediment yield to fishbearing streams.

May and Gresswell (2003) found that the primary function of wood in small colluvial channels was sediment storage and small wood storage.

Duncan et al. (1987) found that the largest sediment accumulations invariably occurred behind debris and suggests that debris is performing an important role in sediment retention and may, potentially, be protecting fish populations and water quality in downstream reaches.

As concluded by Graham et al. 1999, “Thinning and other thinning-like stand treatments can substantially influence fire behavior at the stand level by either increasing or decreasing fire intensity and severity of effects. Depending on intensity, thinning from below and possibly free thinning can most effectively alter fire behavior by reducing crown bulk density, increasing crown base height, and changing species composition to lighter crowned and fire adapted species. Such intermediate treatments (intermediate treatments are proposed for RHCAs) can reduce the severity and intensity of wildfires for a given set of physical and weather variables.”

Elliot and Robichaud (2001) concluded that “Sediment delivery following forest operations and

prescribed fire with forested buffers are a magnitude or more lower than following wildfire" and "The increased number of disturbances from active forest management result in lower long term average sediment delivery rates than would occur following less frequent wildfire disturbances".

Appropriate stocking levels can help to increase tree growth and increase resistance of stands to fire, insect, and disease (Lambert, 1994).

*Stands/RHCAs proposed for commercial thinning:*

The majority of RHCA treatments are along Category 4 streams (intermittent, non-fishbearing) so benefits to fish and fish habitat are related to a long term source of large wood recruitment to hillslopes and stream channels for sediment retention, a reduced risk of insect and disease infestation that could reduce the long term recruitment of large wood, and a reduced potential for increased sediment yield to fishbearing streams in the event of a high intensity fire. While the present condition of stands may contribute to wood sources on hillslopes and to stream channels in the short term, treatment can maintain/enhance large wood recruitment for the long term.

*Stands/RHCAs Proposed for Non-commercial Thinning:*

Non-commercial thinning will reduce stocking densities in overstocked stands to reduce risk of disease and insect infestation leaving the healthiest and most vigorous trees that meet species and stocking requirements. This will result in larger trees in the RHCA for recruitment to stream channels and hillslopes for sediment retention and channel structure. In addition, there will be a decreased risk of insect and disease infestation in adjacent stands, including those portions of stands in the RHCA, which could contribute to higher fire intensities than those that would have occurred historically leading to a long term reduction of a large wood recruitment and potential increase in sediment yield to fishbearing streams.

Pothier (2002) states "The most documented effect of precommercial thinning is increased diameter growth caused by the redistribution of the environmental resources among a smaller number of selected trees".....and "When the number of stems per hectare is very large, the leaf area of each tree could be so limited that few carbohydrates are available for height development and stagnation of growth occurs".

Homyack et al. (2004) found that stands thinned six to 11 years prior to the study had a greater overstory structure than similar untreated stands. In contrast, unthinned stands gained little overstory structure indicating that the application of pre-commercial thinning was responsible for the accelerated height and diameter growth.

*Fire/Fuels Units, Prescribed Fire, and Burn Piles*

Fuel reduction and fire reintroduction in these drier plant associations would reduce encroaching fir and overstocked pine. Fire reintroduction would help restore the area to historic conditions relative to the condition class and amount of understory. Fuel reduction within the project area will maintain the long term recruitment of wood material to hillslopes and stream channels by reducing the risk of a high intensity fire and reducing the risk for increased sediment yield to fishbearing streams in the event of a high intensity fire.

## *B. Indirect Effects of Project Activities on Water Quality*

The following activities within RHCAs have the greatest potential for indirect effects to fishbearing streams and will be discussed at length below.

- Commercial removal within RHCAs
- Temporary roads through RHCAs

- Prescribed Fire
- Pile burning within RHCAs
- Mechanical fuels treatment within RHCAs

**Commercial Removal – Ground Based Equipment**

Ground based equipment, such as tractor or forwarder harvester, will be used on ground with slopes of less than 35%. Commercial harvest RHCA treatment units will have no activity buffers of 50 feet on Class 3 streams (perennial, non-fishbearing), and no activity buffers of 30 feet on Class 4 streams (intermittent, non-fishbearing). No ground based treatment of Class 1 streams is proposed. Twenty eight timber harvest units for Alternative 2 and 26 units for Alternative 3, the majority of the units are associated with Class 4 (non-fishbearing) streams. All ground based RHCA treatments are associated with headwater streams. These timber harvest units range from 0.1 miles to 1.7 miles (averaging 0.8 miles) to the nearest fishbearing stream.

Potential indirect effects to fish and fish habitat would be sediment yield to fishbearing streams. Since Alternative 2 proposes an additional 11 acres of ground based RHCA treatment than does Alternative 3, Alternative 2 has a slightly greater potential for an increase in sediment yield to streams than Alternative 3. However, the implementation of either action alternative would result in a non-measurable amount of sediment yield to stream channels.

Rashin et al. (2006) found that stream buffers were most effective where timber falling and yarding activities were kept at least 10 meters (approximately 33 feet) from streams and outside of steep inner gorges. This 10 meter buffer for ground disturbing activities was found to prevent sediment delivery to streams from about 95% of harvest related erosion features. Of 193 erosion features located 10 meters from the stream channel, 95% did not deliver sediment. In addition, Rashin et al. found that virtually all chronic sediment delivery was associated with skid and shovel trails that crossed streams.

Site specific inspection of RHCAs within and adjacent to harvest units found heavy ground cover in the form of grasses and shrubs, and/or numerous pieces of large wood on slopes adjacent to streams in combination with smaller woody debris and duff layer that will prevent sediment movement to streams. Surface runoff slows down when it comes in contact with herbaceous shrubs, mature trees and the duff layer on the forest floor and sediment is deposited within the riparian buffer before it reaches the watercourse (Decker 2003).

What little sediment does reach stream systems as a result of harvest activities will be trapped and retained locally within the stream system before reaching fishbearing streams due to the small size of streams, numerous pieces of large wood in stream channels, and numerous depositional areas. Woody debris surveys in Class 4 streams across the planning area found an average of 204 pieces of large wood >12 inches in diameter per mile. Pieces of large wood >12 inches in diameter ranged from a low of 102 pieces per mile (unit 51 stream channel) to a high of 276 pieces per mile (unit 58 stream channel). Only those pieces of wood that actually interacted with the stream channel were enumerated. Pieces of wood suspended above the stream channel or on the stream margin that are potential future sources of woody debris were not counted. Smaller pieces that also function to trap and store sediment were also not enumerated. May and Gresswell (2002) found that small pieces of wood were more frequently associated with sediment storage as stream size decreased. Channel widths in Class 4 streams, within and adjacent to harvest units, averaged 3.2 feet in width and ranged from 2.0 feet (units 49 and 51) to 6.0 feet (unit 58). Class 4 channel surveys also found that Class 4 stream channels in the planning area with channel widths equal to or less than 3.0 feet have a vegetation component within the stream channel consisting of grasses, snowberry, and currant. Vegetation within a headwater stream channel can also filter, trap and retain sediment.

Numerous studies have documented the retention of sediment in headwater streams. Swanson and Lienkemper (1978) state “that by increasing the sediment storage capacity of the channel, large

wood buffers the sedimentation impacts on downstream reaches when pulses of sediment enter headwater streams". Gomi et al. (2003) states "because stream channels are narrow (in headwater streams), a range of LWD (Large Woody Debris) orientations can effectively store sediment and form channel steps". Bilby and Ward (1989) found that debris-associated depositional areas occurred more frequently in smaller streams because there were both more pieces of wood and a higher proportion of those pieces that formed sediment accumulations. Duncan et al. (1987) found that the largest sediment accumulations invariably occurred behind debris and suggests that debris is performing an important role in sediment retention and may, potentially, be protecting fish populations and water quality in downstream reaches. Logjams (in headwater systems) often store sediment for 40 to 50 years until the structures collapse or channel course change (Hogan et al. 1995). Sequences of steps and pools alter the transport of bedload sediment in headwaters channels because they wedge, jam, and store material (Whitaker, 1987). Woody debris typically stores sediment and alters substrate composition (Smith et al. 1993). May and Gresswell (2003) state that" large wood may be the cornerstone for storing sediment in steep headwater streams because it provides a physical obstruction to transport in high energy environments". Sediment delivery from headwater to downstream is often interrupted because sediment is temporarily stored in or along the streambed, banks, terraces, and debris fans (Hey 1979, Benda and Dunne 1997a, Nakamura et al. 2000). Sediment movement (in headwater streams) may be modified by channel gradient, tributary junction angle, and reach constraints (Benda and Cundy 1990, Nakamura et al. 2000). Beaver Ponds, wetlands, and intermittent channel reaches also alter the connectivity between headwater and downstream systems; intermittent channel reaches also disrupt this connectivity.

Due to the sediment storing capabilities of headwater streams, a non-measurable amount of sediment will be introduced to downstream fish bearing streams.

Although Alternative 2 proposes approximately 293 more acres of ground based logging and 32 more acres of RHCA treatment, both alternatives will have the same effect to fish habitat and fish populations. A negligible, non-measurable amount of sediment will reach fishbearing streams due to the following: use of no activity buffers; ground cover and large wood within no activity buffers to trap and retain sediment; the majority of units are not adjacent to fishbearing streams; and woody debris in non-fishbearing stream channels will trap and store sediment before reaching fishbearing streams.

Timber Harvest – Skyline Yarding

Skyline yarding systems will be used on ground with slopes > 35%. In Alternative 2, there are seven skyline units where RHCA treatments are proposed, and in Alternative 3, there are three skyline units where RHCA treatments are proposed (Table 21 below). Alternative 2 has a portion of one unit (unit 7) that encompasses a short segment (0.04 miles) of Class 1 stream (fishbearing), and the remaining portion of the unit encompasses a Class 4 stream immediately upstream of the Class 1 stream. All other skyline yarding units are associated with Class 4 streams. Nunamaker Creek is primarily a seasonally flowing stream with a short perennial segment near the confluence with Five Points Creek. Unit 7 is approximately 1.5 miles upstream of this perennial segment. No fish use has been documented in Nunamaker Creek, although it is considered fishbearing and is designated critical habitat for steelhead. A minimum 100 foot buffer will be implemented on the Class 1 stream while a minimum 30 foot buffer will be implemented on Class 4 streams. A corridor approximately 12 feet in width every 150 feet will be needed to accommodate skyline yarding, and may require the felling of trees within this corridor. Natural openings will be taken advantage of whenever possible. Full suspension will be required when yarding across stream channels, and through the 100 foot and 30 foot buffers. No ground disturbance will be created within the corridor so ground cover and down woody debris will remain intact to trap sediment before reaching the stream channel. The corridor will only have trees felled to accommodate the skyline.

Due to the greater number of yarding corridors and location of one unit adjacent to what is considered a fishbearing stream, Alternative 2 has a greater potential for effects to fish and fish

habitat than Alternative 3. These effects would be an increase in sediment yield. However, these effects would not be considered as adverse effects to fish or habitat. As discussed under Water Quality effects specific to sedimentation a non-measurable amount of sediment is expected to reach fishbearing streams.

As discussed under ground based yarding systems above there are numerous studies have documented the retention of sediment in headwater streams. Due to the sediment storing capabilities of headwater streams, a non-measurable amount of sediment will be introduced to downstream fish bearing streams as a result of RHCA treatments using ground skyline equipment.

In addition, a soil disturbance assessment by Thompson et al. 1998, found that skyline cable yarding results in less soil impacts than other common systems for steep slopes (average slope of 46% for this study) and flat, wet site harvesting. This is due in part to the lack of heavy equipment on slopes, and greater amount of skid trails that would be needed. Also, with skyline yarding on steeper slopes there is greater deflection that can minimize the amount of ground disturbance by achieving a greater amount of suspension and reducing tree/soil interaction. In contrast, a study conducted by McIver et al. (2003) found that skyline yarding created less soil compaction than forwarder units (0.2% and 1.8% respectively), and that skyline yarding created more soil displacement than did forwarder units (7.0% and 4.3% respectively). However, average slopes in the McIver et al. study were 12%, which does not allow the amount of deflection that would minimize soil displacement. Cable yarding units in the Sugar Vegetation Management Project have slopes greater than 35%.

**Table 21 - Alternative 2 and 3 skyline yarding units with proposed RHCA treatments, associated stream classes, and distance to fish bearing streams.**

| Unit Number | Alternatives | *Stream Class | Miles Stream In Unit | Approximate Number Of Corridors | Miles To Fishbearing | Fishbearing Stream |
|---|---|---|---|---|---|---|
| 7 | 2 | 1 | 0.04 | 1 | 0.0 | Nunamaker |
| 7 | 2 | 4 | 0.25 | 4 | 0.0 | Nunamaker |
| 34 | 2 | 4 | 0.30 | 11 | 0.2 | Five Points |
| 45 | 2 | 4 | 0.12 | 4 | 0.2 | Nunamaker |
| 56 | 2 and 3 | 4 | 0.08 | 3 | 0.4 | Five Points |
| 59 | 2 and 3 | 4 | 0.33 | 12 | 0.5 | Five Points |
| 74 | 2 and 3 | 4 | 0.02 | 0 | 1.3 | Little John Day |
| 85 | 2 | 4 | 0.08 | 3 | 1.2 | Five Points |

*Stream Class 1= fishbearing, Class 4= non-fishbearing intermittent
Note: A large portion of unit 7 lies on one side of a Class 4 stream reducing the number of yarding corridors.

**Helicopter Logging**

Alternative 2 proposes the use of helicopter logging in one unit (unit 80) with proposed RHCA treatment where the slopes are greater than 35%. No helicopter logging is proposed in Alternative 3. Unit 80, the proposed helicopter unit in Alternative 2, contains 0.42 miles of Class 4 stream, is located approximately 0.3 miles from a fishbearing stream (Five Points Creek), and includes 7.1 acres of RHCA treatment. The helicopter unit will have a no activity buffer of 30 feet along the Class 4, non-fishbearing, intermittent stream.

As discussed under Water Quality above, helicopter logging creates much less ground disturbance than logging with ground based equipment, and therefore there is less potential for sedimentation to the stream than ground based logging. Helicopter removal would result in a non-measurable amount of sediment yield to stream channels. A negligible, non-measurable amount of sediment will reach fishbearing streams due to the following: use of no activity buffers; ground cover and large wood within no activity buffers to trap and retain sediment; the one unit proposed for helicopter removal of

trees is not adjacent to fishbearing streams; and woody debris in non-fishbearing stream channels will trap and store sediment before reaching fishbearing streams.

**Roads**

In both action alternatives, two proposed temporary road segments (T-2 and T-19) cross the RHCA of three Class 4 streams. Temporary road segment T-2 is needed to access unit 76. This temporary road would cross two Class 4 streams near the headwaters. These crossings are approximately 0.6 miles from the nearest fishbearing stream, which is Little John Day Creek. The route of the temporary road follows the contours and is relatively flat. A temporary culvert will be needed in each of the two intermittent stream crossings. Temporary road segment T-19 is needed to access unit 25. This temporary road would cross one Class 4 stream near the headwaters. This crossing is approximately 1.0 mile from the nearest fishbearing stream, which is Five Points Creek. All temporary roads would be built, used, and restored during the dry season and during the same season of use. For restoration of these temporary roads, the culverts will be removed and the stream channels and approaches returned to original contours. The remainder of the temporary roads will be subsoiled where appropriate, returned to original contours where needed, debris scattered across the footprint of the temporary road where debris is available, and seeded with native grasses.

Temporary road development, use, and restoration of temporary roads would occur when stream channels are dry. Use of BMPs such as conducting activities during dry conditions, delineating impact areas and confining work to the noted area, and rehabilitation of disturbed areas and seeding with native grasses will minimize sedimentation to downstream fishbearing waters approximately 0.6 miles downstream. Sediment introduced to stream channels is discussed at length under the Water Quality section above, for fish habitat sediment within stream channels will slowly be released over time without causing adverse effects to downstream listed fish or designated critical habitat.

In both action alternatives, two closed road segments that will be used for the project cross through the RHCA of a Class 3 and Class 4 stream. The 3100078 road is needed to access portions of units 65 and 66. This closed road segment crosses a Class 3 stream near the headwaters. This crossing is approximately 1.5 miles from the nearest fishbearing waters, which is the fishbearing portion of Little John Day Creek. The second closed road segment that crosses an RHCA, is the 3112028 road, which is needed to access unit 86. This road crosses a Class 4 stream at the headwaters approximately 1.5 miles from the nearest fishbearing stream, which is Five Points Creek. Closed roads used for the project will be reclosed after use and would consist of closing and locking of gates where present and replacing earthen barricades.

No reconstruction of closed roads opened for use is proposed, but some maintenance may be required. Possible sediment produced during these activities are discussed under the sediment portion of Effects to Water Quality above. The degree of sedimentation to stream channels above existing levels is expected to be low since the majority of approaches to stream channels are relatively flat and established vegetation on the road margins, sides of the road prism, and ditches will be retained to filter and trap sediment.

Sedimentation (discussed in detail under Water Quality Effects above) to stream channels due to use of closed roads would be localized in the intermittent streams. A negligible, non-measurable amount of sediment will reach fishbearing streams, and would not be of an amount that would have a negative affect on fish habitat or populations.

**Prescribed Fire**

Both alternatives propose approximately 4,200 acres of prescribed fire. As discussed under the sedimentation section of Water Quality above, the use of prescribed fire is not expected to increase

sediment delivery rates to stream channels over and above the natural sediment rates of the subwatershed. Sedimentation to fishbearing streams from bare mineral soil control lines will be minimized due to their extremely limited nature, location, implementation of filter strips, and timing of construction. A negligible, non-measurable amount of sediment will reach fishbearing streams from this activity and will not adversely affect fish habitat or fish populations.

**Pile Burning**

In both action alternatives, piling and burning of slash may occur in RHCAs if the level of slash generated during thinning is determined to be detrimental to soils and remaining trees during prescribed burning. No sediment is expected to reach streams from pile burning due to no activity buffers to trap and retain sediment, and small footprint of piles that revegetate within one season.

**Summary of Effects to Fish Habitat and Populations -** Alternative 2 has a greater number of acres of RHCA treatment, there is a greater potential for effects to fish habitat and fish populations from sediment yield to stream channels. A non-measurable amount of sediment is expected to reach fishbearing streams due no activity buffers, ground cover, and woody debris on hillslopes to prevent or minimize sediment yield to streams. The majority of project activities within RHCAs are along intermittent non-fishbearing streams. What sediment is introduced to stream channels will be retained within the intermittent non-fishbearing streams due to woody debris that can trap and store sediment, numerous depositional areas, and the small size of streams. Neither alternative will adversely affect fish habitat or fish populations. Recruitment of large wood to hillslopes and stream channels will be maintained or enhanced in the long term (20 plus years), and a reduced risk from insects, disease, and wildfire will result from the treatment of stands within RHCAs.

Landscape-scale interim RMOs describing good habitat for anadromous fish were developed using stream inventory data for pool frequency, large woody debris, bank stability, and width to depth ratio. Mechanized treatment of stands within RHCAs will not slow or retard the attainment of RMOs due to the no activity buffers and silvicultural thinning prescriptions that will retain trees needed for maintenance of large wood recruitment to stream channels, and large wood for structure on hillslopes for sediment retention. No activity buffers will prevent or minimize sediment to stream channels. Silvicultural objectives will accelerate the attainment of RMOs by reducing stand densities in overstocked stands, removing diseased and poor growing trees resulting in the accelerated growth and vigor of healthy trees leading to larger trees for future recruitment of large wood in the long term (20 plus years).

There are no proposed instream activities that will degrade streambanks or increase the width to depth ratio. There are no instream activities proposed that would remove large wood or other structure needed for pool formation. No activities are proposed that would result in sedimentation to the point that pools would be filled in. In perennial and intermittent non-fishbearing streams adjacent to harvest units, PACFISH riparian goals will be met (refer to Water Quality and Fisheries Effects in the Sugar Project File).

## Cumulative Effects for Water Quality, Fish Habitat and Populations

Potential cumulative effects are analyzed by considering the proposed activities in the context of past, present and reasonably foreseeable actions. For the Sugar Project, activities are considered in the Lower Five Points Creek subwatershed. This is the area where cumulative effects have occurred or may occur.

The tables in Appendix D of this EA summarize the past management activities that have occurred in the cumulative effects analysis area.

***ALTERNATIVE ONE (No Action)***

The potential cumulative effect to the subwatershed from the non-treatment of stands is an increase in sediment yield to downstream perennial and fishbearing streams. Non-treatment of stands would result in a continued decline in overall forest health due to climate- induced change and overstocking which

increases susceptibility to insects and diseases, as well as, an increase in fire intensity. Fuel loadings will continue to be excessive and contribute to higher fire intensities than those that would have occurred historically.

As concluded by Graham et al. 1999, "Thinning and other thinning-like stand treatments can substantially influence fire behavior at the stand level by either increasing or decreasing fire intensity and severity of effects. Depending on intensity, thinning from below and possibly free thinning can most effectively alter fire behavior by reducing crown bulk density, increasing crown base height, and changing species composition to lighter crowned and fire adapted species. Such intermediate treatments (intermediate treatments are proposed for RHCAs) can reduce the severity and intensity of wildfires for a given set of physical and weather variables."

Elliot and Robichaud (2001) concluded that "Sediment delivery following forest operations and prescribed fire with forested buffers are a magnitude or more lower than following wildfire" and "The increased number of disturbances from active forest management result in lower long term average sediment delivery rates than would occur following less frequent wildfire disturbances".

***ALTERNATIVES 2 and 3***

The following activities have the greatest risk to contribute to cumulative effects (those with a measurable, negative or positive cumulative effect) with the implementation of the Sugar Project. These activities are livestock grazing, current and future OHV use, roads, fisheries and watershed restoration projects, and activities on private land and will be discussed below.

**Livestock Grazing**

Improved management (primarily fencing and grazing strategies) on domestic livestock grazing have reduced impacts to riparian areas and stream channels due to the implementation of PACFISH standards and guidelines. Some cumulative effects could occur on a limited basis due to more open stands post harvest allowing limited access by livestock to riparian areas which has the potential to introduce minor amounts of sedimentation to stream channels, cause streambank damage, and removal of riparian vegetation. Effects will be scattered, small in scale, localized, and will not be of an extent that will adversely affect water quality, fish, or fish habitat throughout stream systems.

**OHV Use**

OHV use on closed and decommissioned roads as well as cross country travel have the potential to add to cumulative effects in the subwatershed in regard to an increase in sediment yield to streams. In addition, a user trail crosses Five Points in the Camp One area, and continues up and downstream on Five Points Creek as well as an unnamed tributary to Five Points Creek. This user trail has contributed sediment to Five Points Creek, impacted streambanks at crossing sites, contributed to removal of vegetation and prevented establishment of riparian vegetation at crossing sites. Use is not of an extent that water temperatures will be altered.

The Wallowa-Whitman Travel Management Plan is planned for completion in 2010. OHV use will be regulated and will prevent impacts to water quality and fisheries resources resulting in beneficial effects such as a reduction of sediment yield to streams and recovery of streambanks and riparian vegetation. Regulating OHV use will also prevent damage to perennial and seasonal wetlands.

**Roads**

The road density within the subwatershed will not increase or decrease with the implementation of the Sugar Project. The current open road density for the subwatershed is 2.2 miles per square mile of subwatershed. Cumulative effects could occur in regard to sediment delivery and the use of closed roads, temporary roads, and road maintenance which could increase sediment delivery above existing levels. However, road maintenance could potentially reduce sediment delivery to stream

channels through improved drainage and reduced erosion by directing water off of the road surface. The degree of sedimentation to stream channels above existing levels is expected to be low since the majority of approaches to stream channels are relatively flat and established vegetation on the road margins, sides of the road prism, and ditches will be retained to filter and trap sediment. Stream channels associated with roads in the Sugar Project area are small, and have numerous pieces of large wood and depositional zones to trap and retain sediment on site. Sedimentation to stream channels due to road use would be localized in the small non-fishbearing perennial and non-fishbearing intermittent streams associated with roads, and would not be of an amount that would adversely affect water quality throughout stream systems.

**Fisheries and Watershed Restoration Projects**

Fisheries and watershed restoration projects add to beneficial cumulative effects in the subwatershed. Some restoration projects, such as road obliteration and recontouring, culvert removal, and channel reconfiguration can have short term (0-2 years) effects primarily an increase in sediment yield. In the long term (> 2 years and beyond) there will be a net reduction in sediment yield as a result of these restoration projects. Combined with the large wood additions, restoration projects have enhanced water quality and fish habitat in the subwatershed.

**Private Land Activities**

The potential cumulative effects from private land activities and implementation of the Sugar Project includes ECA modification and sediment delivery. The ECA value for the subwatershed after implementation of the Sugar Project will be 9.6% for Alternative 2 and 8.8% for Alternative 3, which are below 15% and therefore will not contribute to cumulative effects. Sedimentation to stream channels will be prevented or minimized due to no activity buffers, ground cover, and numerous pieces of large wood on hillslopes to filter, trap, and retain sediments before reaching stream channels. The numerous pieces of large wood in stream channels will trap and retain any sediment that does reach stream channels. Cumulative effects in regard to an increase in sediment yield will be minimized and will not be measurable on the subwatershed scale.

**Water Quality Compliance Statement, Floodplains and Wetlands Executive Orders**

**Compliance Statement**

The Sugar Project will not degrade water quality. Planning and application of BMPs will maintain or improve water quality. This includes monitoring of BMPs and effectiveness. The majority of project activities are away from stream channels, and RHCA treatments are located primarily on intermittent, non-fishbearing streams. Site specific analysis of RHCAs to be treated found that heavy ground cover and large wood within no activity buffers will prevent sediment from reaching stream channels. Neither of the action alternatives will have an effect on stream temperature. The use of closed roads and temporary roads through RHCAs are very small points compared to the size of the subwatershed. Sediment generated by these activities will be retained locally within the non-fishbearing, intermittent stream channels due to in channel woody debris, and would not have a negative affect on downstream perennial or fishbearing stream reaches. Neither of the action alternatives will have an effect on stream temperature. The Sugar Project is in accordance with the Clean Water Act and complies with the Clean Water Act requirements of the 1990 Forest Plan.

**Floodplains, Executive Order 11988**

Executive Order (EO) 11988 requires the Forest Service to “avoid to the extent possible the long and short term adverse impacts associated with the occupation or modification of floodplains. The Sugar Project is consistent with this EO because it does not propose to occupy or modify any floodplain.

**Wetlands, Executive Order 11990**

Executive Order (EO) 11990 requires the Forest Service to "avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands". The Sugar Project is consistent with this EO because it does not propose to destroy or modify any wetlands.

## Soil Quality and Productivity

**Introduction**

This following is an analysis of the effects on soil resources for the proposed 10,621 acre Sugar Vegetation Management project area (herein referred to as Sugar). The analysis area is within NFS subwatershed 170601040403 (Lower Five Point Creek) within NFS watershed 1706010404 (Grande Ronde-Five Points Cr.). A small portion of the project is located in subwatershed 170701030202 (East Meacham Creek) within the watershed 1707010302 (Meacham Creek).

Specific analysis of effects to soil resources is further detailed to the treatment unit (e.g. Unit 72 for thinning or fuels reduction) as necessary in order to provide site specificity. Treatment units are used for analysis since these are the areas where measurable effects to soil resources occur, including cumulative effects. Unit of measure is typically by the acre, a percentage of the unit in question and miles of road.

Effects to soils can be short-lived (one to three years) in the case of erosion hazard; soil exposure depends on revegetation processes to determine how long risk of erosion is a concern. Erosion control measures and/or revegetation normally occur immediately with full effectiveness of new vegetation occurring in the first year or two. Other effects to soils such as compaction, rutting, and displacement tend to be longer term impacts that are cumulative in nature if these types of impacts have not fully recovered when new activity occurs in the same location.

Management activities can result in direct, indirect and cumulative effects on soil productivity and soil stability (WWNF 1990, Soils S&G #1). Effects may be positive or negative. Effects may include alteration of physical, chemical, and/or biological characteristics or properties of soils. Many standard and guidelines in the Forest Plan, in addition to the five in the soils section, relate to soil function, soil productivity and soil stability.

The most adverse effects of management activities on soils are described as detrimental compaction, detrimental puddling, detrimental displacement, detrimental burning, detrimental erosion, and detrimental mass wasting; other concerns include adverse changes in vegetation and organic matter on the soil surface, and adverse changes in water table (USFS 1998). Soil compaction, puddling, displacement, severe burning, and impacts to ground cover (vegetation and organic matter) are direct effects; soil erosion, mass wasting, and changes in water table are indirect effects. Cumulative effects are the sum of incremental changes in past, present, and reasonably foreseeable future direct/indirect effects on the soil resource that overlap both in time and space. Recent past, ongoing, and foreseeable future effects are discussed under cumulative effects.

The *magnitude* of the effects of an activity on soil function, soil productivity and soil stability are described by the *speed*, *direction* (upward/downward*)*, *extent*, and *duration* of change. Minimizing productivity losses associated with any action can be accomplished by managing the magnitude of detrimental soil conditions within activity areas through prescription and/or mitigation.

Planned management activities must minimize new soil damage and must provide for restoration measures when and where they are appropriate (WWNF 1990, Soils S&Gs).

Cumulative effects are rated as negligible, minor, moderate or major based on professional judgment. Negligible means the effect of an activity on an indicator was so small it was not measurable, or caused a

change of less than 1%, or less than 1% of an area was affected. Minor means the effect was a change equal to less than one-half of the flexibility for a standard, or 1-10% of an area was affected. Moderate means the effect was a change equal to more than one-half of the flexibility for a standard, or 11-20% of an area was affected. Major means a standard was exceeded or more than 20% of an area or resource was affected; e.g. the detrimental soil condition threshold is 20% (USFS 1998).

Three alternatives are analyzed for this project to determine the magnitude of direct, indirect and cumulative effects on the soil resource. In the following discussion, the degree of impact, of compaction, puddling, displacement, severe burning, erosion, mass wasting, organic matter loss and drainage class change is severe enough to classify effects as detrimental soil conditions (DSCs). Extent is described generally as affected area and duration is noted as years. The effects outlined below are based on soil mitigation measures being implemented in full.

**Description of Soils**

Soils in the Sugar project area developed over layers of basalt, andesite, volcanic breccias, and Columbia River bedrock. In the majority of the area the soil is buried under a layer of volcanic ash deposited from the eruption of Mount Mazama approximately 6000 years ago. Soil depths in the project area range from very shallow (less than 10 inches) to deep (40 to 60 inches).

The soils in the area are generally stable. The forest management practices to be used in project are not expected to precipitate mass soil movement in either mineral or ash soil types. The mantle of soil formed by the ash is usually stable and slumps are uncommon under natural conditions. Approximately ninety percent of the treatment acres support soil complexes that are generally deep, stable and on slopes less that 30%. Table 22 summarizes the amount of acres proposed to be treated on each Landtype Association (LTA, Sasich 2006) that support soil complexes. Specific characteristics of each LTA and dominant soil complexes are described in the Soils Existing Conditions document for the Sugar project.

**Table 22 - Treatment acres proposed for each Landtype Association Soil in the Sugar Project**

| Landtype Association | Treatment Acres | |
|---|---|---|
| | Alternative 2 | Alternative 3 |
| 116 | 1224 | 1074 |
| 117 | 36 | 19 |
| 118 | 3 | 3 |
| 127 | 90 | 90 |
| 133 | 121 | 121 |
| 216 | 380 | 349 |
| 217 | 95 | 38 |
| 218 | 84 | 68 |

## EFFECTS ANALYSIS

### No Direct, Indirect, or Cumulative Effects on Soils

The following restoration activities associated with the Sugar Vegetation Management project have been analyzed and are of such limited context and constrained nature that they would have little to no measurable effect on Soils resources.

- Pre-commercial thinning, including release treatments
- Forage enhancement
- Invasive species treatments
- Large wood placement

These activities and their effects will not be discussed further in the Soils section.

## Direct Effects on Soil Quality

***ALTERNATIVE 1 – NO ACTION***

This is the no action alternative, which means that all actions authorized by current management plans, permits, easements, and contracts would continue. Authorized actions on National Forest lands in the project area include agency actions, such as, road maintenance and noxious weed treatments, and public actions, such as livestock grazing, fuelwood cutting, mining, and various types of recreation.

All current detrimental soil conditions would continue to exist, with some conditions improving, others remaining static, and still others deteriorating over time. Plus some new detrimental soil conditions are likely to occur from the above listed ongoing activities.

Ongoing activities effects on soil quality would include:

Compacting and Puddling: These soil impacts are associated with skid trails, landings and non-surfaced roads, ATV trails, livestock trails and dispersed campsites. Effects include reduced water holding capacity, infiltration and permeability, reduced ability of soil to support vegetation and organisms in and on the soil, increased runoff and in extreme cases, a change in drainage class.

Reoccurring uses by livestock, wildlife, ATVs, vehicles and equipment could potentially re-compact or re-puddle these areas. Where reoccurring impacts are low to non-existent, existing compaction, and puddling would improve over time in the top 4 inches, due to beneficial effects of frost heaving, root establishment of vegetation, and rodent activity. Compaction deeper than 4 inches could persist 20 to potentially 100+ years.

Displacement: These soil impacts are associated with roads, landings, skid trails and rockpits. Effects include reduced water holding capacity, loss of ground cover, nutrients and soil microorganisms and increased runoff due to an increased amount and condition of bare ground exposed. Duration of effects is permanent, unless soils are replaced with equipment, however some soil mixing will still occur.

Severe Burning & Organic Matter Loss: These soil impacts are associated with areas with soil displacement, discussed above, plus areas that experience prescribed fire and wildfire. Effects include short-term to long-term loss of organic ground cover (duff, litter, coarse wood, basal area of herbaceous plants) and canopy cover (herbaceous plants, shrubs, trees). Severely burned soils experience nutrient loss, microorganism mortality, increased water repellency, runoff and erosion hazard.

Organic matter would continue to accumulate and recycle in rangeland and forestland plant communities. Organic matter accumulations would be slowest in rangelands and in forestlands where the canopy has been removed. In areas where the canopy cover is present, organic matter accumulations on the forest floor would equal or exceed historic accumulation rates due to current fire control activities, which would continue to maintain or improve soil productivity. Existing disturbed areas such as skid trails, landings, and decommissioned roads would continue to have lower than normal accumulations of organic matter on the soil surface. Moderate to severe burn effects would decrease as trees, herbaceous plants, and soil flora and fauna recolonize burned sites and organic matter accumulates.

The potential for high intensity wildfires increases every year in the absence of forest density management and surface soil organic matter management. In the event of a wildfire, the potential effects upon soil productivity, extent of post-fire soil erosion, and the length of time needed for soil recovery from those impacts would depend primarily upon the fire intensity, mosaic, and fire size. The length of time needed for soil recovery would depend upon residual post-fire surface soil organic matter, soil erosion, and the length of time needed for ground cover reestablishment. Stand replacing wildfires could reduce long-term soil productivity by removing litter, humus, and large downed woody material from the soil surface, by consuming soil organic matter, and by killing soil flora and fauna essential to the nutrient recycling process to a 9 to 16 cm soil depth. Surface soils and their associated nutrient reserves could also be lost through increased erosion due to loss of ground cover and due to soil crusting and water repellency, which reduces infiltration.

Drainage Class (Soil Moisture Regime): Changes in soil drainage class exist where rockpits store water, where water collects in puddles on native surface roads, and where road fills have covered riparian wetlands. No change in soil drainage class is expected over time under this alternative.

### Commercial Timber Harvest

Alternatives 2 and 3 have both direct and indirect effects of the harvest activities. Table 23 displays the logging system acres within the commerical timber harvest acres.

**Table 23 - Summary of the Commercial Timber Harvest Acres and the Logging System Acres per Alternative**

| Action | Acres | |
|---|---|---|
| | Alternative 2 | Alternative 3 |
| Total Commercial Harvest | **1715** | **1422** |
| Tractor Logging | 1141 | 1012 |
| Forwarder Logging | 365 | 331 |
| Skyline Logging | 138 | 79 |
| Helicopter Logging | 71 | 0 |

## Direct Effects on Soils Quality

***ALTERNATIVE 2 and 3***

The most important direct effects of harvest activities on soils are compaction and displacement of litter, duff and topsoil by harvest equipment. Most of these effects would be in ground based yarding areas (1506 acres, alternative 2; 1343 acres, alternative 3); some effects would occur in skyline and helicopter yarding areas (209 acres, alternative 2; 79 acres, alternative 3) that are in the table above.

Assumptions:

Tractor Logging Model:

Project design allows skid trails an average of 60 feet apart on tractor ground. At this spacing, for a processor with 2-foot wide tracks and 12-foot wide total width, one pass would disturb 4 feet of each 72 feet or 5.6%. Multiple passes, including use of a forwarder, would widen skid trails and disturb about twice that width or about 12%. For a tractor/skidder operation, soil disturbance from skid trails would be 12-14 feet wide or 14 out of 74 feet or 19%. Landings typically occupy about 1% of a unit. So, total disturbance for the above equipment would be in the 13-20% range.

As noted in the soils existing condition report, ground transects of older tractor logging impacts in the project area indicate that an average of approximately 50% of the soil disturbance found

along transects (other than roads) qualifies as detrimental soil conditions (DSCs).

Using the results of this survey, 13-20% new disturbance would be equivalent to an average range of 7-15% potential DSCs. Several factors would influence actual effects, such as equipment type, operator skill, coarse woody debris, slope gradient, use of existing skid trail network and landings, and soil moisture, rockiness and density. With 60-foot skid trail spacing on volcanic ash soils, potential DSCs could be in the upper half of the 7-15% DSC range, or about 15% DSCs. For this analysis, 10-15% DSCs will be used for analyzing tractor units.

Soil effects resulting from the use of a forwarder instead of a tractor would be less. Studies that analyze soil effects from the operation of forwarders and post-harvest monitoring indicated that post harvest DSC's range from 5-8%. For the Sugar Project analysis, 8% will be used for analyzing forwarder units.

Skyline Logging Model:

Potential DSCs from skyline logging are lower than from tractor logging. Skyline yarding on 0-20% slope gradients produce about 7% DSCs (McIver 1998). Effects should be less on steep slopes in the project area where deflection is better for partial to full suspension systems. For this analysis, 5% DSCs will be used for skyline units.

Underburn Effects Model

Burn effects are based on definitions in DeBano et. al (1998) and USFS (1998). Underburn effects qualify as detrimental soil conditions if they are severe burns and occupy an area of at least 100 square feet (USFS 1998). Local data (Bliss 2003a) indicates there would be 0-4% severe burn effects in prescribed fire underburn areas, but no DSCs because severe burn areas would be under 100 square feet. Severe burn effects typically occur adjacent to and under logs and in burned out stump holes. Underburn effects may range from low-severity burn class to high-severity burn class, based on percent moderate fire severity, but do not qualify as detrimental soil conditions.

The above models were used in analyzing potential detrimental soil compaction conditions from project activities. In addition to logging effects, roads and potential burning effects were also analyzed to determine the total potential to affect soil quality within the project area. Rationale for burn effects is discussed in the burn effects section.

As a result of site-specific surveys and the above analysis, the sixteen units (5, 17, 19, 20, 22, 23, 26, 32, 35, 36, 37, 41, 49, 50, 73, and 92) previously harvested under another sale and four additional units (4, 39, 69, and 90) were identified as a high priority for monitoring to ensure that project design and mitigations are properly implemented to ensure DSC levels remain below Forest Plan minimums.

For tractor, forwarder, skyline, and helicopter logging, methods such as operating seasons, use of existing landings and skid trails, subsoiling, seeding skid trails, etc. are effective measures for minimizing or rehabilitating potential soil impacts. Utilizing these methods is expected to maintain DSC levels well within Forest Plan standards and guidelines for all three action alternatives.

***ALTERNATIVE 3***

Harvest area would be reduced by 293 acres compared with Alternative 2. Tractor yarding area would be reduced by 129 acres, forwarder yarding area would be reduced by 34 acres, and skyline and helicopter yarding area would be reduced by 130 acres. This would result in less potential for compaction and displacement of litter, duff and topsoil by harvest equipment. Effects would be the same for all units common to Alternatives 2 and 3.

## Indirect Effects on Soils Quality

***ALTERNATIVE 1***

This alternative would leave the greatest amount of organic matter in the system. It also has the greatest risk of wildfire which could result in an unpredictable reduction of organic matter, increase in surface erosion, and possible soil damage from heat. Erosion on open road travelways and ditches would not be expected to change over time, except as influenced by heavy rainfall and snowmelt, or by climatic variables of drought or wet cycles. With this alternative, no additional compaction would occur. Selection of this alternative would reduce the opportunity to rehabilitate pre-existing compaction.

***ALTERNATIVE 2***

Long term soil productivity of forested ecosystems relies on a continual flux of coarse woody material. Important nutrients to the soil ecosystem, such as sulfur, phosphorus and nitrogen, are supplied by decaying coarse woody material (Graham 1994). Timber harvest, slash disposal and site preparation can reduce the amount of organic material in the forest floor to below what is needed to ensure soil productivity (Harvey et al. 1987). Recent publications have provided information on appropriate levels of coarse wood required to protect long term soil productivity (Agee 1994, Harvey et al. 1994, Graham 1994).

One indirect effect of harvest activities on soils would be the loss of nutrients by removing trees from the ecosystem that would naturally recycle into the soil over the long-term if they were left on site. However, the harvest of trees in units will reduce the N-capital by only about 1-2% because only a portion of trees will be removed from each unit and only the stems will be removed. Alternative 2 proposed to remove 4.56 MMBF.

Another effect is increased soil erosion hazard in areas where ground cover is removed by equipment over a large enough area to pose a hazard of long-term accelerated erosion. Vegetation protects the soil surface from raindrop impact, dissipates the energy of overland flow, and binds soil particle together. Soils on steep slopes with poor vegetative cover and lack of structural development are more susceptible to erosion than soils present on flatter terrain.

***ALTERNATIVE 3***

Nutrient loss from timber harvest would be reduced by 16% (0.71 MMBF) compared with Alternative 2. Erosion hazard would also be reduced by foregoing harvest in 163 acres compared with Alternative 2.

## Cumulative Effects on Soils Quality

Appendix D summarizes the management activities that have occurred in the cumulative effects analysis area, which includes the subwatersheds ($6^{th}$ field HUCs) within the Sugar project area.

***ALTERNATIVE 1***

The cumulative effects of all current and foreseeable direct and indirect effects of detrimental soil conditions on soil quality, soil function, soil productivity, and soil stability over the next 10 years would be a static to improving trend, with potential for a downward trend due to increasing potential for wildfire or flood damage.

The combination of the past harvest activities, extensive road network built to facilitate the logging operations that provide continued access, organic matter reductions from prescribed fire and livestock, and recreational use will be considered to assess cumulative effects of this project.

Analysis of the cumulative effects of detrimental soil conditions indicates that soil quality is being maintained on about 98% of the project area, in comparison to the Forest Plan guideline of maintaining at least a minimum of 80% of the project area in a non-detrimental soil condition.

On that 2% of the project area considered in a detrimental condition ground cover, fine organic matter, and coarse woody material is below potential. The remaining 98% has adequate levels and since the project area has been protected from wildfire and rangelands appear to be properly grazed, there are satisfactory accumulations of ground cover, fine organic matter, and coarse woody materials on forestland and rangelands.

***ALTERNATIVE 2 and 3***

Implementation of Alternative 2 would increase DSCs in the project area about 3.2% and 2.9% respectively. Alternative 2 and 3 do not include any actions that would decrease existing DSCs. **Table 24** summarizes the potential detrimental soil conditions (DSCs) with the implementation of Alternative 2.

**Table 24 - DSC's wit Implementation of Alternatives 2 and 3 in Sugar Project Area**

| Actions | Estimated Acres of Current DSCs | Estimated Percent of current DSCs | Estimated Maximum Acres of New DSCs | Estimated Maximum Percent Increase in New DSCs | Estimated Maximum Percent Post-Project DSCs |
|---|---|---|---|---|---|
| Alternative 2 | 206 | 1.9 | 344 | 3.2 | 5.8 |
| | 202 | 1.9 | 312 | 2.9 | 5.2 |

It is important to keep in mind that DSCs naturally change over time. Certain DSCs recover in a few years to decades, while other DSCs require recovery times of 100 or more years without restoration treatments. DSCs with long recovery rates are often considered for restoration treatments, where environmentally and economically feasible.

## Prescribed Fire

### Direct Effects on Soils from Rx Fire

***ALTERNATIVES 2 and 3***

In general, the estimated percent additional detrimental soil conditions that maybe be expected from prescribed fire range from 1-2% of the actual area burned.

Prescribed fire usually results in a mosaic of low, moderate and high fire severity that would be classified mostly as low severity burn class. Low-severity burn class effects include up to 2% high fire severity, up to 15% moderate fire severity, and at least 83% low fire severity and unburned. There is potential for fall burns and for heavier fuel areas to experience the low end of the moderate-severity burn class.

High fire severity effects are what Region 6 standards define as a detrimental soil condition (FSM 2520). The top of the mineral soil would be reddish to orange. Soil organisms would be killed to a depth of 9 to 16 cm. All organic materials in color-altered soil near the soil surface, plus all litter and humus and most woody debris on the soil surface would be consumed. There would be up to about 1% high fire severity from spring burns and about 2-3% from fall burns.

There would be an additional 2-15% moderately fire severity, with about 2-5% for spring burns, and higher percentage for fall burns. Soil organisms would be killed to a depth of 3 to 5 cm. Litter would

be consumed and duff would be charred to consumption. For low severity fire areas, soil organisms would be killed to a depth of only 1 cm, and duff would be largely intact with scorching to consumption of litter.

### Indirect Effects on Soils from Rx Fire

***ALTERNATIVES 2 and 3***

Erosion hazard would increase in moderate and high fire severity areas due to loss of litter and duff on the soil surface. However, change in erosion hazard would be small in low-severity burn class (and low end of moderate-severity burn class) areas where a minimum of 60-70 percent total effective ground cover still exists, there is a good mosaic burn pattern, and a residual forest canopy has the potential to replace litter burned by the fire.

## Roads

### Direct Effects of Roads on Soils

***ALTERNATIVE 1***

No new road or temporary road construction miles are proposed for Alternative 1.

***ALTERNATIVE 2 and 3***

The primary direct effect of road work on soil quality is detrimental soil displacement. Table 25 summarized the miles of road work that would occur for each alternative in the Sugar Project. Reconstruction of 0.2 miles of road would involve repair road surface structure to prevent the accelerated erosion on open road travelways influenced by heavy rainfall and snowmelt. Reconstruction would involve negligible new cuts and fills.

**Table 25 - Miles of Road Work Proposed for Alternatives 2 and 3**

| Road Work | Alternative 2 | Alternative 3 |
|---|---|---|
| Reconstruction | 0.2 mi | 0.2 mi |
| Temporary Road Construction | 5.42 mi | 4.13 mi |
| Closed Roads to be Re-opened | 9.5 mi | 8.26 mi |

Temporary road construction for Alternative 2 would cause approximately 16 acres of new soil displacement and closed roads reopened would cause approximately 4 acres of new soil displacement. The effects are the same for Alternative 3 as Alternative 2, except there would be less soil displacement by about 4 acres less temporary road construction and relatively the same amount of acres of road reconstruction. Placement of road closure barriers would not cause new soil disturbance outside of the existing roadway.

### Indirect Effects of Roads on Soils

***ALTERNATIVE 1***

Alternative 1 proposes that no new or temporary road construction occur, which would result in no increase in soil erosion.

***ALTERNATIVE 2 and 3***

The primary indirect effect of road work on soil quality is soil erosion. Soil erosion would increase on

proposed acres of reconstructed, temporary and decommissioned roads. The amount of road work proposed for the project is less for Alternative 3 versus Alternative 2 (approximately 1.6 miles). Thereby soil erosion would be less in the proposed acres from Alternative 3. There would be a decrease in soil erosion over time from the miles of road closed through the proposed area closure.

## Proposed, Endangered, Threatened, and Sensitive Species (PETS)

Evaluation of effects to terrestrial PETS species is discussed below and covered in the biological evaluations for PETS wildlife and plant species, residing in the analysis file of this project. Evaluation of effects to plants and aquatic PETS species has been covered earlier under "Water Quality, Fisheries, and Riparian Habitat" and in the Plants PETS discussion below.

This project is not within a lynx analysis unit and will therefore have no effect on lynx or lynx habitat. This project will have no effect on bald eagles or their habitat. Impacts to sensitive species will be non-existent to minor in scale and duration, and will not lead to federal listing of any of these species (reference the Wildlife Biological Assessment/Evaluation in the analysis file).

## Sensitive Plant Species

**Introduction**

The following discussion addresses the effects on Region – 6 Sensitive Plant Species for the Sugar project. The description of resources, along with the analysis of the expected and potential effects was assessed using field surveys, documented site information, revisits, as well as professional judgment.

The impacts to sensitive plants are based on the level of disturbance; consider the likelihood of project activities, and the consequence of the effects. Activities under analysis are associated with, or in close proximity to one newly discovered sensitive plant species, as well as a number of areas identified (on the ground) as having high potential habitat for several sensitive plants. Due to the locations for these activities, there is an inherent risk for impacting plants or habitat for these sites.

The degree of disturbance to the habitat and potential impact to plants of concern varies by type of project or activity. A comparative measure of the level of disturbance is used to predict impacts. The following assumptions were made in determining the potential impacts and the extent and duration of those impacts to sensitive plants and habitat from the activities proposed in this project.

**Table 26 - Potential Impact assumptions by project activities for PETS Plants**

| Activity | Potential Impacts | Damage | Effect | Extent | Duration |
|---|---|---|---|---|---|
| Timber Harvest | Canopy removal | Changes in Sun /shade | Degradation of habitat Damage to plant | Varies by Alternative | Moderate to Long Term |
| Prescribed Fire | Heat / flame | Scorch | Possible Death of Plant | Similar under all action alternatives | Long Term |
| Prescribed Fire | Heat / flame | Sterilize soil | Degradation Of habitat | Similar under all action alternatives | Moderate to Long term |
| Equipment (Road work) (Harvest/Fuels Reduction) Off-Highway Vehicles | Soil disturbance Soil compaction Erosion | Damage / Removal | Death or damage to plant Degradation of habitat | Limited in nature and extent; varies little by alternative | Moderate to Long term |
| Grazing | Herbivory | Removal | Death of plant Reduced regeneration | Ongoing, adds to CE | Moderate to Long Term |
| Grazing | Trampling | Compaction Erosion | Damage or displacement to plant Degradation of habitat | Limited in nature and extent | Moderate |
| Noxious Weeds | Competition Herbicides | Damage / Removal | Decreased vigor or Displacement of plant Death to plant | Ongoing, adds to CE | Moderate to Long term |
| Fire Suppression | Increased Fuels | Change in Burn Intensity | Increased woody vegetation | Contributes to CE | Long term |
| Fire Suppression | Increased Canopy | Change in understory shade | Increased fire severity | Unknown | Long term |
| Decking and Burning | Soil disturbance Soil compaction Heat/Flame | Damage / Removal | Displacement of plant Death to plant | Limited in nature and extent; adds to cumulative effects | Moderate |

In this analysis, short term effects are considered to last from one to three years. Moderate effects are those which last for three to ten years, and long-term effects will last for 10+ years. The current existing condition will be used as the reference baseline for the comparison of alternatives.

## Effects Analysis

### No Direct, Indirect, or Cumulative Effects

The following activities associated with the Sugar project are of such limited and constrained nature that they would have no effect on PETS Plants species.

- Road Reconstruction
- Road Maintenance
- Precommercial thinning in RHCA areas
- Planting
- Timber harvest units which utilize forwarder and helicopter removal systems
- Large Wood Placement in 5 Points Creek
- Forage enhancement
- Invasive Species treatments
- Danger Tree Removal

There will be no direct, indirect or cumulative effects to PETS plant species from the reasonably foreseeable action of the Wallowa-Whitman National Forest Travel Management Project, or the Region – 6 Invasive Species Environmental Impact Statement (EIS).

The Regional Invasive species EIS will allow for the use of new chemical treatments that are expected to be more effective and less toxic, than most. (Refer to Appendix G. of the Invasive Plant EIS, for the list of herbicides and surfactants analyzed.)

Under the Travel Management Project, which is currently being analyzed, cross country motorized use is expected to be restricted or eliminated, resulting in a corresponding decrease in the potential for any impacts to sensitive species.

These activities and their effects will not be discussed further in the Plants PETS section.

### Direct and Indirect Effects on Plant PETS

Surveys within the project area found that habitat and/or plants for sensitive species of *Botrychium* and *Carex, Phacelia minutissima* and *Trifolium Douglasii* may be impacted by this project. Therefore, they will be the only species discussed in terms of Direct, Indirect and Cumulative effects. The remaining plant species listed in Appendix A of the Sugar Botanical Resources Reports in the Sugar project file would not be affected by activities proposed in the Sugar Vegetation Management project, and will not be discussed further. (refer to the Effects Information for Sensitive Plants, July 2008 in the project Analysis File).

Direct effects are assumed to be associated with physical impacts directly to the plant(s) or habitat from the actions of machinery, animals, or humans, and thermal impacts from fire. Indirect effects are most often associated with changes in habitat and stand characteristics or conditions, and the resulting changes in community interactions.

This project will have no direct or indirect effect to any proposed, threatened or endangered plant species. There is no high potential habitat within the area for either *Mirabilis macfarlanei* or *Silene spaldingii*, both of which are documented on the northern portion of the forest. There is no known potential habitat within the analysis area for the following three federally listed species: *Spiranthes diluvialis, Howellia aquatilis or Thelypodium howellii ssp. spectabilis*; which could possibly occur on the forest.

Habitat for nonvascular plant PETS species is limited to the RHCAs of the major streams (Little John, Five Points Creek) within the Sugar Project. It is unlikely that fire would impact these species, as the habitat for

these plants would be found in the wettest, most humid sites along the creeks if present. It is not expected that prescribed fire would reach these habitats. Prescribed burns scheduled for fall and spring are not likely to reach these habitats. Riparian buffers are adequate to protect these species habitat from timber management actions, and fire is not expected to be of measurable impact. Therefore, the project is expected to result in "No Impact " to *Dermatocarpon luridum, Leptogium burnetiae* var. *hirsutum, Leptogium cyanscens, Peltigera neckeri, Rhizomnium nudum, Shistostega pennata Scouleria marginata* and *Tetraphis geniculata.* These species will not be discussed any further.

No plants for any of these species or any nonvascular PETS species were located during any of the botanical surveys, and it is unlikely that they occur. Thus it is concluded that there would be no effect to any listed plant species or habitat under any of the alternatives. There would be no direct, indirect or cumulative effect to any proposed, threatened, or endangered plant species from project implementation, since no plants occur within the project analysis area. The federally listed threatened and endangered plants will not be discussed any further in this alternative comparison.

***ALTERNATIVE 1 - No Action***

This alternative would not impact individuals or habitat and would not contribute to a trend towards federal listing, or cause a loss of viability to any plant species. There would be no direct or indirect effect to any proposed, threatened, endangered or sensitive plant species because no activities would be implemented.

***ALTERNATIVES 2 and 3***

Alternative 2 includes silviculture and fuel reduction treatments to reduce stand density and potential fuels within high priority stands. Prescriptions include commercial thinning, pre-commercial thinning (SPC), Release treatments (with and without harvest), prescribed fire and mechanical treatments, within RHCA and LOS stands. Road management activities include temporary road construction and road reconstruction, with some closed and decommissioned roads to be re-opened to facilitate implementation of project activities. These roads would then be closed and rehabilitated after use.

Alternative 3 includes silviculture treatments to reduce stand density and potential fuels within high priority stands, as described above under Alternative 2. Road management activities are also included. There is not a great difference between the two action alternatives, with respect to sensitive plant species. There will be little to no difference between the impacts from activities under either of the action alternatives for the Sugar Vegetation Management Project. The primary difference between the two action alternatives is in the miles of road utilized, and a slight difference in tractor acres associated with units 1 and 2. However, the riparian buffers would be the same, and therefore the potential for impacts are the same for both alternatives.

An assessment to evaluate the effects of project activities on the sensitive plants known or suspected to occur within the project was conducted. It was determined that there is some potential to impact one sensitive plant species (*Botrychium montanum)*, and that there may be impacts to undiscovered plants in areas identified as potential habitat for sensitive *Botrychium* and *Carex* species, *Phacelia minutissima and Trifolium douglasii*.

The wet meadow systems and boggy areas in and around the edges of unit's 63, 65 and 66 were identified as potential habitat for several sensitive plant species. Because these habitats may be impacted from harvest and skidding associated with the commercial (tractor) harvest, protective measures (refer to Plant PETS mitigation measures in Chapter 2) would exclude these areas providing adequate protection for the habitat and species. These units are also located within burn blocks 601 and 602, and may be impacted by prescribed fire and fuels reduction activities.

There are several vernally wet areas, which were identified as being potential habitat for the sensitive plant species *Phacelia minutissima*. Units 41, 42, 43, 43A, 87, 90 and 92 contain habitat for this species. These treatment units are located within burn blocks 606 and 602. In addition,

temporary road (T-18) which accesses units 41, 42, and 43 crosses through this habitat. Although no plants were found, design criteria which excludes these area from impacts from decking, skidding, piling or burning would be adequate to protect this habitat.

The boggy riparian areas associated with harvest units 1 and 2 (and possibly mechanical fuels treatment unit 505) may provide potential habitat for sensitive *Botrychium* or Carex species. These units are within burn block 603. These, as well as the ponds and other wetland features (i.e. meadows) would receive no activity buffers which are adequate to protect this habitat.

There is one *Botrychium montanum* site that could be impacted from harvest related activities under both action alternatives (Unit 62 and burn block 602), however; the area has been designated as an Area To Protect and design features incorporated into these units would protect the species and it's habitat.

## Cumulative Effects on Plant PETS

### *ALTERNATIVE 1 - No Action*

This alternative would not impact individuals or habitat and would not contribute to a trend towards federal listing, or cause a loss of viability to any plant species. Cumulative effects are the incremental impacts of the proposed action when added to other past, ongoing or reasonably foreseeable future action. Because no management would occur and there would be no contributing potential to cumulative effects there would be no cumulative impacts to any Region - 6 Sensitive plant species from this alternative.

### *ALTERNATIVES 2 and 3*

The potential impacts of activities proposed under Alternatives 2 and 3 in combination with those activities that occurred in the past and foreseeable future were based on the assumptions described in Table 26. The potential for damage to sensitive plant species and habitats utilizes a variety of factors. Variables include the amount of activity and damage, and the expected duration of effect. The determination of risk to the population should also consider the size, density, vigor and location of a plant population, its habitat requirements, and timing of the project in relation to life requirements of the species. Effects of the action alternatives may add to positive or negative impacts that have already occurred, when activities overlap. In general, it is expected that the possible effects related to plant PETS species are at a small scale and occur over a fairly localized area.

Past management activities within the Sugar analysis area include timber harvest, prescribed fire, livestock grazing, precommercial thinning, road maintenance, construction and reconstruction, aspen restoration, mining and other recreational uses and are described in Appendix D of the EA. It is likely that these actions have already led to a decrease in plant occurrences on the district. Since physical changes in habitat characteristics can last for decades, it is likely that some areas have not recovered, and that the residual effects of these past activities is a degradation in habitat and loss of occupied habitat.

Various recreational uses, including dispersed camping, firewood cutting, snowmobile routes and off-highway (OHV) vehicle use are also occurring. The cross country OHV use continues to increase, and non-motorized trails are currently used by the OHV's. Designated routes and elimination of cross country travel are potential outcomes of the Wallowa-Whitman Travel Management Plan EIS slated for completion in October 2010. Implementation of that project has the potential to decrease potential impacts to PETS plants species in addition to the protection measures applied in this project. Recovery of existing user constructed trails may increase potential habitat and reduce the potential for impacting knows populations within the area.

Past domestic grazing, timber harvesting and fire suppression have contributed to changes in

riparian habitats and the plant communities they support. Historically, past timber harvesting increased erosion and altered hydrologic relationships. Historic logging practices included skidding logs through riparian areas, which may have destroyed existing plants and led to alteration of habitat. Harvest treatments that significantly reduce overstory canopy or increase fuel loadings which lead to an increase in fire severity may have also reduced habitat over time. Harvest activities proposed in this project may have direct and indirect effects on PETS plants and their habitat; however, they are very moderate in nature and as such, are not anticipated to increase habitat loss in combination with past activities.

The effect of fire may be negligible for many plants; however, it can be compounded by drought, herbivory and other disturbance factors. The changes in botanical composition are related to the intensity and season of burning, and duration of the effects can also vary. Very hot burns, may have killed plants, or eliminated populations. Fire suppression may have caused a decline in populations through increased competition for soil moisture and nutrients by shade-tolerant plant species. Protective measures, prescription requirements, and the limited locations planned for prescribed fire use is not expected to increase negative impacts to plant PETS species or their habitat, it should, in conjunction with past activities continue to reduce fuel loadings allowing for smaller, less intense wildfires which would protect plant habitat over time.

Grazing can reduce competition from tall grasses and forbs in meadow habitat, but disturbances can still be detrimental. Grazing in combination with other activities is the biggest concern for most projects. Historic grazing levels may have resulted in loss of potential habitat for riparian species through stream down cutting and accelerated erosion processes that significantly alter local surface hydrology. It is likely that water developments, including cattle troughs have decreased wet meadow habitat. The potential for increased access for livestock (refer to Range Vegetation Effects Section) in this project area post-project may provide for additional impacts to plant PETS habitat and species.

Habitat conditions for riparian associated sensitive plants have changed over time. Altered conditions include insufficient moisture levels due to decreased shade or greater competition by other plant species due to increased light availability. Lower water tables, has reduced wetland habitat that may have supported riparian associated plant species. Wet sedge meadows may dry out enough to burn in summer. Although fire may have little effect on deep-rooted wetland species, prescribed burns have been known to damage populations which are already stressed by grazing. Overuse of wetlands, springs, and riparian areas by ungulates may have damaged habitat and impacted riparian associated plant species. However, livestock grazing has been regulated since1995 through PACFISH. Current management regimes are less impacting than historic activities.

The activities proposed under Alternatives 2 and 3 may affect individual plants and habitat for sensitive species; however, they will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species.

## Access and Travel Management

### Introduction

The following chart describes the outcome of the Access and Travel Management Plans developed for the action alternatives in comparison to the current condition (Alternative 1 – No Action). In general, the effects of this plan on other resources are discussed under each of the resource areas it may affect. Refer to those write-ups for a description of the effects of this plan on a particular resource. The direct and indirect effects analysis area for access and travel management is the same as the project area boundary as described in Chapter One of the EA.

## Effects Analysis

### No Direct, Indirect, or Cumulative Effects

The following activities associated with the Sugar project are of such limited and constrained nature that they would have no effect on Access and Travel Management within the project area.

- Aspen Restoration
- Precommercial thinning and Planting
- Large Wood Placement in 5 Points Creek
- Invasive Species Treatment
- Forage Enhancement
- Prescribed Burning

These activities and their effects will not be discussed further in the Access and Travel section.

### Direct, Indirect, and Cumulative Effects

***ALTERNATIVE 1 - No Action***

This alternative would retain the existing Access and Travel Management within the project area permitting access where possible to all roads, cross country OHV use, and OHV use on open and closed roads. The impacts are described in detail under specific resource areas in this Chapter. Refer to those analyses for resource-specifics effects.

This alternative would not meet National direction for roads analyses to determine the minimum system of roads needed for management of National Forest System lands and for public access in order to shift emphasis and funding to maintaining needed roads and ensuring successful closure or decommissioning of unneeded roads.

In the reasonably foreseeable future (2010) the Forest Management Plan should be implemented which should manage off road travel within this project area and emphasize which designated routes allow or do not allow motorized travel. With these restrictions in place, closure successes are expected to increased and enforced.

***ALTERNATIVES 2 and 3***

The road system in the Sugar analysis area is now serving three major users: recreational users, private land access, and resource management. The La Grande District has a District Access and Travel Management Plan (A&TM) which is a reflection of previous decisions focused on managing a road network appropriate for access and upkeep on the District and maintaining forest road densities to within Forest Plan guidelines. Access and travel management implementation has been on-going over the years within the Sugar project area; and as such, has been fully implemented; however, some of the closures have not been completely effective due the method of closure, topography and the location of the closure device, however, the overall plan for the area is appropriate. Alternatives 2 and 3 of the Sugar project would improve the current closure devices, method of closure, and closure locations for all of the closures within the project area. This, in combination with the Forest Travel Management Plan which should be completed and implementation beginning on the ground by 2010, would improve the success of these closures and protect natural resources, minimize big game harassment, and reduce sediment issues within the area.

The post sale road plan would reflect the current plan and upon completion would be within Forest Plan guidelines as show in the table below. Closures under Alternatives 2 and 3 would be important given the motorized recreation emphasis on the area which is expected within the purchase of the

Mt. Emily Recreation Area planned within the near future which is expected to increase the motorized pressure on adjacent Federal lands.

**Table 27 – Road Densities**

| SWS | Management Areas | Project Area (sq. mi) | Open Road Density (mi./sq. mi.) | Forest Plan Road Density Guideline |
|---|---|---|---|---|
| Lower 5 | 1 | 3.57 | 2.05 | 2.5 |
| Points | 1W | 1.63 | 1.6 | 1.5 |
| Creek | 3 | 12.7 | 0.89 | 1.5 |
| | 17 | 0.23 | 0.85 | N/A |

# Management Indicator Species - Terrestrial

## A. NORTHERN GOSHAWK

### Introduction

The northern goshawk is a management indicator species on the Wallowa- Whitman National Forest, and specific management standards for this species are included in the Regional Forester's Forest Plan Amendment #2. There is one known goshawk nest within the analysis area, in the vicinity of Sugarloaf Mountain and the volcanic neck (often referred to as the cinder cone). Active nests require a 30 acre nest area where no logging can occur, and a 400 acre post-fledgling area (PFA) where retention and development of late/old forest structure is emphasized. An active nest is defined as a nest that has been used by goshawks within the past five years. Two scales of analysis are appropriate for this species. The larger scale is the subwatersheds used in the HRV discussion for LOS habitat. The smaller scale is focused around known nest sites. Effects to goshawk habitat are also mentioned briefly in the old growth section of this effects analysis.

There is no logging proposed within the highest quality thirty acres of habitat around the known nest. There is also a MA 15 area associated with this nest. The MA 15 area will serve as the PFA for this nest area. If other nests are located during layout, operations or administration of this project, protective measures will be applied as outlined in the Forest Plan. Seasonal operating restrictions will be needed from March 15 through August 31 near goshawk nest sites during years when they are being used.

### Analysis Assumptions - Temporal Considerations

The duration of effects are discussed when relevant or practical to predict. The following timeframes will apply for the purpose of this analysis. These timeframes are appropriate given the scale of this analysis and the duration of effects expected from the prescribed treatments.

| | |
|---|---|
| Short term | 0 – 20 years |
| Mid term | 20 – 80 years |
| Long term | Greater than 80 years |

## Effects Analysis

### No Direct, Indirect, or Cumulative Effects

The following activities associated with the Sugar project are of such a limited and constrained nature that they would have no effect on Goshawks.

- Precommercial Thinning
- Planting
- Road Reconstruction
- Large Wood Placement in 5 Point Creek
- Invasive Species Treatments

These activities and their effects will not be discussed further in this section.

## Direct and Indirect Effects on Goshawks

***ALTERNATIVES ONE, TWO, and THREE***

The one known goshawk nest site would not be effected by any of the alternatives since it is not within an area proposed for logging and it is sufficiently far enough from other proposed activities as to not require a seasonal operating restriction. The nest area, surrounding MA 15 area, and habitat within the Little John Day Creek drainage will remain suitable and available for goshawks using the known territory under any of the alternatives.

## Cumulative Effects on Goshawks

***ALTERNATIVE ONE***

Alternative 1 foregoes opportunities to return dry ponderosa pine stands to an ecologically appropriate condition. As overstocked stands stagnate and fire susceptible, shade tolerant trees increase, the quality of foraging habitat for goshawks decreases. Perpetuating these overstocked conditions also predisposes these stands to more severe wildfire risks in the future, which could render thousands of acres unsuitable for goshawks. This combined with past regeneration logging and road building could reduce the capacity of the Sugar area to support goshawks at viable levels. This alternative is inconsistent with many of the potential strategies proposed by Wisdom et.al (2000) for reversing a negative trend for species in group 5 (includes summer habitat for northern goshawk).

***ALTERNATIVE 2***

Alternative 2 would reduce the quality of potential nesting and foraging habitat to a greater extent than Alternative 3 based on the fact that more habitat would be treated (reduced canopy closure and structural complexity). The duration of these effects would persist into the mid-term with intermediate treatments (HTH, HSV, HIM, HFU) and into the long-term with regeneration treatments (HSH). Overstory removal and shelterwood prescriptions (HOR and HSH, 133 acres) are not suitable goshawk habitat and would remain unsuitable following treatment. This alternative represents an incremental effect when considered with past regeneration harvest treatments that have not recovered to suitable goshawk habitat.

There are approximately 4,441 acres of source habitat for goshawks, and Alternative 2 would alter conditions on 919 of these acres. In the immediate short-term the 919 acres of commercial thinning in UR (biogroup G4) and MSLT (biogroups G5-G7) stands would reduce canopy closure and structural complexity of potential source habitat for goshawks. By opening up the understory in these stands, conditions may improve for goshawk foraging once canopy closure begins to recover from the thinning (DeStefano et al. 2006). Since these treatments retain the largest trees, abundant potential nesting trees will be retained. Prey abundance may be reduced in the short-term following treatment. Around 3,522 acres of potential source habitat would remain unchanged. Abundant potential source habitat also exists in the headwater drainages of Five Points Creek immediately to the east of the Sugar area. The scale, nature, and duration of these effects are not likely to have effects on the productivity of the goshawk population in this area.

Although some goshawk habitat will be reduced in quality, this alternative would not have cumulative effects to the known nest sites since no treatments are proposed near the nesting territory. Past intermediate and regeneration treatments combine with this alternative to create an interspersion of several structural stages that could enhance foraging habitat in the mid and long-term (Hargis et. al. 1994).

***ALTERNATIVE 3***

Alternative 3 retains more source habitat for goshawks by treating 287 fewer acres (of source habitat) than Alternative 2 and by retaining higher basal area on 318 acres of cover stands in big game winter range. Prescriptions that maintain connective corridors between LOS habitat patches would also continue to provide potential source habitat for goshawks. Prescribed fire may reduce habitat for some prey species by reducing structural complexity (snags and logs) in forest stands. These effects would persist through the short-term, and are not expected to reduce prey abundance enough to effect goshawk productivity. These effects are considered cumulatively with past regeneration harvest acres that have not recovered to suitable goshawk habitat. One known nest is protected the same in both action alternatives and will not experience cumulative effects from this project.

There are approximately 4,441 acres of source habitat for goshawks, and Alternative 3 would alter conditions on 1,371 of these acres. In the immediate short-term the commercial thinning in UR (biogroup G4) and MSLT (biogroups G5-G7) stands would reduce canopy closure and structural complexity of potential source habitat for goshawks. By opening up the understory in these stands, conditions may improve for goshawk foraging once canopy closure begins to recover from the thinning (DeStefano et al. 2006). Since these treatments retain the largest trees, abundant potential nesting trees will be retained. Prey abundance may be reduced in the short-term following treatment. Around 3,070 acres of potential source habitat would remain unchanged. Abundant potential source habitat also exists in the headwater drainages of Five Points Creek immediately to the east of the Sugar area. The scale, nature, and duration of these effects are not likely to have effects on the productivity of the goshawk population in this area.

**Summary Action Alternatives:** Some goshawk habitat will be incrementally reduced in quality by this project in addition to that which was historically treated and has not recovered to suitable habitat yet, but there would be no effect to known next sites from this project due to project design and deferred treatment areas around nest sites. Past intermediate and regeneration treatments in combination with the treatments in this project create an interspersion of structural states that could enhance foraging habitat.

Previous prescribed burns have improved foraging habitat and the burning proposed in this project will also contribute to foraging habitat, however, there will be short term (1-3 years) reductions until the grasses and shrubs resprout. Known nest sites are being protected in all phases of project design/implementation.

Unregulated OHV use in the past has lead to the creation of unapproved trails which contribute to the potential for nest site disturbance. The area closure in this area would reduce the potential for this disturbance. Known nest sites are being protected in project design and the area closure will add increased protection and minimize the potential for disturbance during the nesting period.

## B. PRIMARY CAVITY EXCAVATORS (SNAG AND LOG HABITAT)

### Introduction

Primary cavity excavators (woodpeckers, sapsuckers, flickers, nuthatches, and chickadees) are Management Indicator Species (MIS) on the Wallowa-Whitman NF. A common element in the habitat of these species is snags and down woody material. These MIS rely heavily upon decadent trees, snags, and down logs. Some cavity nesters (eg. northern flicker) do not require high canopy closure, and habitat for

these species is abundant and well distributed. Other cavity nesters show a preference for closed canopy settings. The analysis area for snag and log habitat is the subwatersheds that contain the project area.

Pileated woodpecker is a MIS addressed separately in the Forest Plan from the other primary cavity excavators. This species serves as a management indicator for old growth habitat, and could equally represent large snag and log habitat and is covered in detail in the LOS (old growth) section of this effects analysis.

**Snag Guidelines for Action Alternatives**

Current Forest direction says to "maintain snags and green tree replacement trees of ≥21" dbh (or whatever is the representative dbh of the overstory layer if it is less than 21 inches), at the 100% potential population levels of primary cavity excavators. This should be determined using the best available science …." (Regional Forester's Forest Plan Amendment #2, page 11).

The Wallowa-Whitman's LRMP used information from Thomas' 1979 Wildlife Habitats in Managed Forests to establish minimum snag guidelines. The model Thomas used to generate snag densities addressed snags for roosting and nesting, but did not consider snags for foraging, and was never scientifically validated. More recently several studies have shown that snag densities recommended in Thomas' book are too low to meet the needs of many primary and secondary cavity users.

The DecAID advisor and "Source Habitats for Terrestrial Vertebrates of Focus in the Interior Columbia Basin: Broad-Scale Trends and Management Implications" currently provide the most current, peer-reviewed science available for assessing snag habitat. Recent, local research has been done on Pileated Woodpecker (*Dryocopus pileatus*), Black-backed Woodpecker (*Picoides arcticus*), Williamson's Sapsucker (*Sphyrapicus thyroideus*), Pygmy Nuthatch (*Sitta pygmaea*) and White-breasted Nuthatch (*Sitta caroliensis*) by Nielsen-Pincus (2005) and pileated woodpecker by Bull and Nielsen-Pincus (2007) which has been incorporated into DecAID.

The habitat categories from DecAID that most closely reflect conditions in the Sugar area are the "Small/medium tree" structural conditions within the "Eastside Mixed Conifer Forests, East Cascades/Blue Mountains" and "Small/medium tree" structural conditions in "Ponderosa Pine/Douglas-fir Forest" wildlife habitat descriptions. Effects are discussed in terms of snag densities with and without the proposed treatments, and how those densities relate to tolerance levels for wildlife species that utilize snags.

Direction from the Regional Forester's Forest Plan Amendment No. 1 requires that pre-activity levels of logs be left unless those levels exceed those shown in the table under section D (1) Down Woody Material (for wildlife and soils) in the Management Requirements, Constraints, and Mitigation Measures in Chapter II of this EA.

**Green Tree Replacements (GTRs)**
Guidelines for logs and snags also require that green trees of adequate size be retained in harvest units to provide replacements for snags and logs through time. Generally GTRs need to be retained at a rate of 25-45 trees per acre, depending on biophysical group. All harvest prescriptions in the Sugar project will retain GTRs within or above this range. Effects to GTRs will not differ between alternatives.

## Effects Analysis

### No Direct, Indirect, or Cumulative Effects

The following project activities associated with the Sugar project are of such limited and constrained nature that they would not disturb any of snag and log habitat and would therefore have no effect on Snag and Log resources or activities.

- Precommercial Thinning
- Planting
- Road Reconstruction
- Forage Enhancement
- Large Wood Placement in 5 Point Creek
- Invasive Species Treatment

These activities and their effects will not be discussed further in this section.

## Direct and Indirect Effects on Snag and Log Habitat

Since snags are lost in harvest units it stands to reason that an increase in acres harvested or burned will result in a greater reduction in snags and logs. The indicator used to compare effects between alternatives is total acres treated by mechanical harvest and prescribed burning. Both action alternatives will retain all existing snags greater than 12" d.b.h. and logs will be retained at least to the minimums stated in the table under section D (1) Down Woody Material (for wildlife and soils) in the Management Requirements, Constraints, and Mitigation Measures in Chapter II of this EA. The only snags that would be cut in either action alternative would be due to operational needs such as landing or skid trail placement and safety concerns, including danger trees along log haul routes. Retention of existing snags retains current snag habitat to the greatest level possible.

Although snag densities within harvest units would not differ between action alternatives, the effectiveness of snag habitat is reduced when their context is converted from a closed canopy setting to an open setting. A few species (flicker, bluebirds, sapsuckers) seem to do well in either setting, but others (pileated woodpeckers, nuthatches, black-backed woodpeckers) generally avoid nesting in open settings.

The use of fire to prepare sites for planting after harvest or to reduce fuel loading will consume some snags and logs. Also, snags within sight distance of open roads are often lost to firewood cutting. These effects are not quantifiable due to the many variables involved. The highest quality vulnerable snags near open roads will likely be lost. Prescribed burning will be done under conditions that minimize the risk of losing larger diameter logs and snags.

Table 28 compares projected snag densities that would exist forty years from present for two broad habitat categories. Snag levels are estimated for a no treatment and a treatment scenario. These estimates were generated for representative stands using a Forest Vegetation Simulator.

Although the most important snags for most wildlife species are those greater than 12" d.b.h, there are also some important functions of smaller snags. Snag density estimates in table 7 recognize the small diameter (< 12" d.b.h.) material that can be important as foraging substrate for many woodpecker species. The estimates in table 28 recognize that silvicultural treatments that reduce tree stocking thereby increasing distance between leave trees may reduce natural snag recruitment rates. As stocking levels are reduced, so is the density related mortality factors that typically lead to snag recruitment. Likewise, by spacing trees further apart there is less chance of trees and large limbs falling and creating wounds on neighboring trees. These wounds are entry points for heartrot fungal spores, which over time creates hollow trees and soft heartwood necessary for many woodpeckers to excavate cavities. Heartrot fungus also predisposes trees to other insects and pathogens that can kill the host tree, thereby creating snags.

**Table 28 - Snag densities at 40 years in the future.**

| Forest Type | Snags/Ac > 12" d.b.h. | Snags/Ac < 12" d.b.h | Tolerance levels for Wildlife* |
|---|---|---|---|
| **Dry Ponderosa Pine** | | | |
| No treatment | 23 | 81 | 80% |
| Commercial thin | 11 | 5 | 80% |
| **Mixed Conifer** | | | |
| No treatment | 16 | 168 | >50% |
| Commercial thin | 9 | 3 | >30% |

*These tolerance levels represent snag densities for "where the objective is to manage for natural conditions of snag habitat" and come from "unharvested inventory plots with measurable snags" under the "Snag density and dbh" subheading (DecAID version 2.0). A greater than (>) or less than (<) sign indicates where snag densities are slightly greater or less than those documented for a particular tolerance level in DecAID.

***ALTERNATIVE 1***

This alternative retains the most snag habitat in the short-term and mid-term to the degree that snags will not be reduced for operational reasons, danger trees, or consumed during prescribed burning as in the action alternatives.

No new roads would be constructed with this alternative to facilitate further reductions of snags and logs. Existing roads would continue to facilitate reductions in snags and logs from firewood cutting and danger tree removal. The effects of continued snag and log removal through firewood cutting can result in reduced habitat for cavity nesters, followed by reduced populations of dependent species (primary and secondary cavity users).

***ALTERNATIVE 2***

Alternative 2 would have the greatest negative effect to wildlife species associated with higher canopy cover, snags, and down logs, but would be consistent with LRMP standards and guidelines. All snags $\geq$ 12" d.b.h. would be retained on 1,715 acres of timber harvest, except for incidental losses due to operational needs (safety, landing and skid trail placement). Some snags are also likely to be consumed on approximately 4,200 acres (within the 10,621 acres of burn blocks) during prescribed burning in this alternative.

Natural snag recruitment rates will be reduced on treated acres (1,715 acres) which would lead to lower snag numbers than if these acres were left to progress without treatment. See table 28 for indications of the difference in snag levels forty years from present in the different forest types involved.

***ALTERNATIVE 3***

Alternative 3 would treat 1,422 acres through timber harvest and 4,200 acres (within 10,621 acres of burn blocks) by prescribed burning, resulting in a smaller reduction in snag and log habitat than Alternative 2. All snags $\geq$ 12" d.b.h. will be retained in timber harvest units, except for those removed for operational needs (safety, skid trail and landing placement). Additionally, several units have modified prescriptions that will retain higher canopy closure for connective corridors and cover stands within big game winter range. These acres will maintain more snags in a closed canopy context than provided under Alternative 2.

## Cumulative Effects on Snag and Log Habitat

The cumulative effects of eleven (or parts thereof) past timber sales and the Sugar project will result in some level of logging on approximately 6,230 acres within this analysis area since the late 1970's. The past intermediate treatments have left stands in well stocked, insect resistant conditions, while some have simplified structure to conditions avoided by most wildlife except the more common generalist species.

Efforts to reduce density related mortality factors combined with a history of firewood gathering have led to a deficiency in large diameter snags and logs over much of the analysis area, however total snag numbers greater than 12" dbh exist to support snag dependent wildlife species between the 30% and 50% tolerance levels. The snag component is very unevenly distributed with riparian areas, MA 15 areas, and LOS stands containing higher snag densities capable of providing habitat near the 80% tolerance level and past logging units containing few snags are at the 30% or lower tolerance level. The past timber harvest activities are pertinent to a cumulative effects discussion since the effects of reduced snag numbers overlaps the effects of Sugar in time and space. The silvicultural treatments in Sugar will indirectly perpetuate this snag deficiency by spacing trees so that natural snag recruitment, through density related mortality factors, will be reduced (see table 28). A positive effect of these treatments is that larger trees will develop, so that larger trees will be recruited as snags in the long-term.

***ALTERNATIVE 1***

Alternative 1 would not contribute to cumulative effects of other management activities in the analysis area. Snag habitat in past treatment units will slowly develop as these stands grow and snags are naturally recruited in the long-term. Snags would likely reflect densities from unharvested plots across the analysis area within 100 years in the absence of large scale disturbances. In the event of a stand replacing wildfire, snags would be abundant for 0-30 years, followed by a century or more of low snag densities until burned areas regenerate.

***ALTERNATIVES 2 and 3***

Alternative 2 would contribute to a slightly greater loss of snags and reduction of snags in a closed canopy context than Alternative 3. Both action alternatives would maintain all snags $\geq$ 12" d.b.h, except those lost for operational reasons. This would result in a minor incremental effect when considered with past, present and foreseeable future actions since the existing snag component will change very little except for the changes in context (closed canopy setting vs. open canopy setting) and the snags lost for operational reasons and to prescribed burning (assumed to be very few). Effects from prescribed burning are the same for both action alternatives. Snags and logs are sure to be consumed during burning, but it is not possible to predict how many and where. New snags and logs created from the burning will partially mitigate the loss of snags and logs that are consumed. The primary difference is that sound live trees that are killed by fire do not contain rot and defect that exists in snags and logs that die more slowly from other causes. Rot and defect provide more usable snags and logs for a greater number of species than do sound trees recently converted to snags by fire. Snag losses to prescribed fire are assumed to be very low since burning prescriptions are aimed at retention of larger diameter woody materials.

# NEOTROPICAL MIGRATORY BIRDS

**Introduction**

Neotropical migratory birds are those that breed in the United States and winter primarily south of the United States-Mexico border. They include a large group of species, including many hawks, shorebirds, warblers, and other song birds, with diverse habitat needs spanning nearly all successional stages of most plant community types. Of the 225 migratory birds that are known to occur in the western hemisphere, about 102 are known to breed in Oregon. Nationwide declines in population trends for neotropical migrants have developed into an international concern. Habitat loss is considered the primary factor in the decline of some of these species. Since there are so many different species in this group, it is difficult to assign an

appropriate analysis area scale. Generally the subwatersheds that contain the project area would be an appropriate scale for the species in this group for the period of the year that they utilize the area.

In 2000, the Oregon-Washington Chapter of Partners in Flight published its Landbird Conservation Plan (PIF,2000). The Plan uses a "Priority Habitats and Species" approach. By managing for a group of species representative of important habitat components, many other species and elements of biodiversity will be conserved. The Sugar project area contains primarily mesic mixed conifer (structurally diverse) habitat in the central and north, and dry forest (ponderosa pine and ponderosa pine/Douglas-fir/grand fir) in the south. Eight focal species (table 29) were selected based in part on their conservation need and degree of association with important habitat attributes in coniferous forests in the Blue Mountains. For further discussion of this resource refer to the Wildlife Reports in the Sugar Analysis File.

**Table 29 - Forest conditions and associated habitat attributes and focal species for landbird conservation in the Sugar project area.**

| Forest condition | Habitat Attribute | Focal Species |
|---|---|---|
| Dry Forest | Large trees and snags | White-headed woodpecker |
| Dry Forest | Old forest with openings | Flammulated owl |
| Dry Forest | Open understory with pine regen | Chipping sparrow |
| Mesic Mixed Conifer | Large snags | Vaux's swift |
| Mesic Mixed Conifer | Overstory canopy closure | Townsend's warbler** |
| Mesic Mixed Conifer | Structurally diverse | Varied thrush |
| Mesic Mixed Conifer | Dense shrub layer | MacGillivray's warbler |
| Mesic Mixed Conifer | Edge and openings | Olive-sided flycatcher* |

*significantly declining population trends in the Central Rocky Mountain BBS physiographic region.

** significantly increasing population trends in the Central Rocky Mountain BBS physiographic region

## Effects Analysis

### No Direct, Indirect, or Cumulative Effects

The following restoration activities associated with the Sugar project are of such limited and constrained nature that they are not near any of these habitats and would therefore have no effect on NTMBS.

- Planting
- Road Reconstruction
- Road Obliterations
- Precommercial thinning
- Forage Enhancement

These activities and their effects will not be discussed further in this section.

### Direct and Indirect Effects on NTMBS

Prescribed burning in the spring through early summer could directly affect nesting neotropical migratory bird species (NTMBS) through direct mortality of eggs and nestlings. Logging also poses risks of direct mortality or displacement during the spring and early summer. These changes can lead to some competitive bird species forcing NTMBS to nest elsewhere. Anytime habitat is changed through logging or burning, some species will benefit while others are negatively affected.

Effects of fire vary depending on its intensity and extent. It is generally accepted that the effects of prescribed fire are less severe than for wildfire. The differences are that prescribed burning is done under specific prescriptive parameters that are more likely to result in a favorable outcome, whereas wildfires (and associated suppression activities) occur when fuels are dry, temperatures are high, and relative humidity is low. These conditions often lead to greater reductions in forest structure, changes in all vegetation layers, and sometimes detrimental effects to soils. Although a few species of birds benefit from high intensity wildfires, a greater number of NTMBS experience detrimental effects from these events.

For most upper forest canopy birds, large stand replacement fires will have long-term negative effects. Wildfire results in loss of habitat for many species requiring young, mature and old growth forest stand conditions. Small and of low intensity fires tend to have a positive effect on the majority of NTMBS by creating heterogeneity in forested habitat. Shrub levels will increase for several years following burning which would also favor NTMBS (olive-sided flycatcher) that prefer early-seral forest conditions.

***ALTERNATIVE ONE***

In the absence of large scale disturbances, Alternative 1 will provide long-term habitat for migratory birds at the same level that exists today. Habitat for old growth associated bird species is deficient in the Sugar area due to past timber harvest activities. Overstocking in UR stands would lead to increased susceptibility to insect and disease outbreaks and stand replacement fires, which would be detrimental to the majority of NTMBS that use this area.

Although forest fuel levels are not severely high at this time, they would continue to accumulate as prescribed burning is deferred. Missed fire returns have contributed to uncharacteristically deep duff layers. So when fires occur the shallow roots of large overstory trees are at risk of being damaged, resulting in the mortality of some trees that are generally considered fire resistant. Alternative 1 would perpetuate and contribute further to increased fuel accumulations, increasing the risks to overstory trees when wildfires occur. NTMBS would experience indirect negative effects from this alternative if fire effects in the future are more severe than under the action alternative scenarios.

***ALTERNATIVES 2 and 3***

Intermediate silvicultural treatments and prescribed burning would increase the amount of habitat available for species that prefer more open forest conditions. Reductions in snag habitat will be minor (only those cut down for safety and operational needs) and will not result in measurable effects to habitat for NTMBS. In the long term, effects of reduced snag recruitment via natural mechanisms could result in reduced perch sites and nesting substrate for some NTMBS. This effect is expected to be offset at the landscape scale since a variety of snag densities and diameters will exist in riparian areas, allocated old growth areas, and various managed forest conditions. Alternative 2, which treats more acres (prescribed burning and logging) would create the greatest direct benefit to those NTMBS that prefer more open stand conditions such as the chipping sparrow and flammulated owl, but would negatively effect species that prefer more closed canopies such as the varied thrush. The combination of various logging and burning treatments and untreated areas in Alternatives 2 and 3 would assure that habitat is provided for a variety of NTMBS species.

Logging between April and July could have direct effects on nesting NTMBS. All existing snags greater than retention levels are assumed to be adequate to meet the needs of cavity excavators, but reductions in overall snag numbers reduces options available to cavity nesting birds (flamulated owl, white-headed woodpecker, Vaux's swift).

NTMBS associated with riparian areas are not expected to be affected by this project due to the no-treatment buffers. Prescribed burning would be allowed to back into the riparian areas; however this is not expected to affect habitat for NTMBS. This is based on the limited area of reduced grasses and shrubs within riparian habitat conservation areas (RHCA) and the relatively short recovery period for these vegetative components (1 to 5 years). The few modified stream buffers along select intermittent streams would be negligible to NTMBS.

### Cumulative Effects on NTMBS

***ALTERNATIVE ONE***

Alternative 1 will not contribute to the cumulative effects of past and present activities except for perpetuating missed fire returns. Past timber sales, roads, and prescribed burning have modified and converted habitat for NTMBS across this analysis area. The effects of roads are long lasting in that roads replace habitat with non-habitat and influence adjacent habitat by changing the microenvironment and by introducing disturbances through use of roads by people.

***ALTERNATIVES 2 and 3***

Alternatives 2 and 3 will have similar cumulative effects by reducing snag recruitment rates in the long-term, creating more open stand structure, and setting back shrubs for one to three years. When considered with past timber sales, roads, and prescribed burning, these alternatives will further change the arrangement and patch sizes that determine habitat selection by NTMBS. Given the large size of this analysis area, and the relatively small difference between alternatives, there is not an appreciable difference between the action alternatives in terms of effects to NTMBS. A mosaic of forest and rangeland conditions will exist under either of the action alternatives capable of supporting nesting populations of NTMBS. There is no indication that habitat changes from either of these alternatives would result in reduced populations of NTMBS that would be meaningful at the local population scale or larger.

Continued maintenance of the aspen clone near Hugh Spring, noxious weed treatments, and large wood placement in Five Points Creek will have minor positive effects on NTMBS by restoring native plant communities and improving structural complexity in Five Points Creek riparian zone.

# UNIQUE & SENSITIVE HABITATS

**Introduction**

This analysis area contains numerous unique and sensitive habitats in the form of rock features, ponds, springs, seeps, and shrub patches. All action alternatives will protect these features in the same manner. No harvest buffers or retention of higher basal area will be used to maintain the context of these features. The project area is the analysis area for unique and sensitive wildlife habitats. For further discussion of this resource refer to the Wildlife Reports in the Sugar Analysis File.

## Effects Analysis

### No Direct, Indirect, or Cumulative Effects

The following restoration activities associated with the Sugar project are of such limited and constrained nature that they are not near any of these habitats and would therefore have no effect on Unique and Sensitive Habitats.

- Precommercial Thinning
- Planting
- Road Reconstruction
- Road Obliterations
- Temporary Road Construction
- Invasive Species Treatments
- Forage Enhancement

These activities and their effects will not be discussed further in this section.

## Direct and Indirect Effects for Unique Habitats

***ALTERNATIVE ONE***

Alternative one would retain unique and sensitive habitats in their current condition and context, having the least effect to wildlife in the short-term. An indirect effect of alternative 1 would be continued departure from HRV and buildup of forest fuels. In the event of wildfires or insect epidemics unique and sensitive habitat would be at increased risk of being damaged or compromised.

***ALTERNATIVES 2 and 3***

Effects to the way wildlife uses these features will be similar on a site specific scale, but the alternative that treats more acres would potentially have greater negative effects at larger scales. These effects include severing or reducing the connective value of forested stands between unique and sensitive habitats. For example, the habitat value of larger rock features can be reduced when logging or road building fragments or reduces vegetative cover along travel routes between these features. Wide ranging species like bobcat, bear, wolf, and cougar would be negatively affected by these landscape scale changes. Other species that are associated with rock features and could be affected by this project include: bushy-tailed woodrat (*Neotoma cinerea*), several bat species, yellow-bellied marmot (*Marmota flaviventris*), weasels (*Mustela erminea & frenata*), raven (*Corvus corax*), turkey vulture (*Cathartes aura*), band-tailed pigeon (*Columba fasciata*) and prairie falcons (*Falco mexicanus*).

Aspen is one of the uncommon tree species that receives a disproportionately high amount of wildlife use. An aspen clone near Hugh Spring (NW side of Sugarloaf Mountain) has received restoration work and will continue to be maintained through fencing and removal of encroaching conifers. These restoration efforts will likely ensure that aspen persists on this site for at least another generation of aspen (80-120 years). There is no difference in effects between action alternatives in regard to aspen.

Ponds, springs, seeps, and possibly wallows exist in the area, providing essential water for amphibians and upland wildlife species. Limited or deferred harvest buffers prescribed to protect fisheries and water quality usually maintain the context of these special habitats within logging areas. There will be no difference in effects to these water features between the alternatives.

## Cumulative Effects for Unique Habitats

***ALTERNATIVE ONE***

There are no measurable cumulative effects on sensitive and unique habitats from the no action alternative.

***ALTERNATIVES 2 and 3***

Past road construction, regeneration logging, firewood gathering, unauthorized motorized trials, and unregulated off highway vehicles use have isolated and had detrimental effects to some of the unique and sensitive habitats in this area. Disturbance from motorized access and associated human activities also has a negative effect on how some species utilize these special habitats, and can lead to habitat avoidance, disruption of denning behavior, and poor distribution of animals across available habitat. The action alternatives would represent a minor incremental negative effect to these past and ongoing activities in the short-term, but would result in positive effects in the mid and

long-term as vegetation recovers toward HRV. The forest is currently undergoing travel management planning which would regulate motorized vehicle use. This project is scheduled to be implemented within the reasonably foreseeable future (2010) and has the potential to ameliorate some of the issues that unauthorized motorized uses within the area have created over time. It should reduce the potential of isolation, eliminate further impacts on vegetation in the area, and reduce the disturbance of species using these habitats.

All alternatives would address the small scale, or immediate context of these features in the same way, but the larger landscape scale effects would vary slightly by alternative. More acres treated (Alternative 2) would increase the potential for severing connectivity between major rock features and other unique habitat features. Alternative 3 would have slightly less of a cumulative effect to unique and sensitive habitats in the short-term.

Re-opening closed roads also has the short term potential to create a minor incremental negative effect contributing to the isolation between major rock features and other unique habitat features. These roads will all be closed following the completion of harvest activities and the area closure would reduce the potential for this isolation and the disturbance of species using these habitats.

# Rangeland Resources

**Introduction**

The following is an analysis of the effects on rangeland resources and noxious weed for the Sugar Vegetation Management project area (herein referred to as Sugar). The Sugar analysis area is primarily located within the Lower Five Points Creek subwatershed (170601040403) within the Grande Ronde River-Five Points Creek Watershed (1706010404) and serves as the scale of analysis for rangeland resources. A small portion of the project is located in the East Meacham Creek subwatershed (170701030202) within the Meacham Creek Watershed (1707010302). The East Meacham Creek subwatershed has very few project acres (less than five percent of the project acres) will therefore not be analyzed further in the document. The Lower Five Points Creek subwatershed is included in the Grande Ronde River-Five Points Creek Watershed Assessment initiated in 2006.

The description of rangeland resources and noxious weeds, along with the analysis of the expected and potential effects for each alternative were assessed using field surveys, noxious weed databases, and professional judgment.

Management directives from the Wallowa-Whitman Land and Resource Management Plan (LRMP) 1990, apply to this project. The effects outlined below are based on all rangeland resources protection and mitigation measures being implemented in full.

For the complete analysis of these resources refer to the Rangeland documents in the Sugar Vegetation Analysis File.

## EFFECTS ANALYSIS

### No Direct, Indirect, or Cumulative Effects

The following restoration activities associated with the Sugar project are of such limited and constrained nature that they would have no effect on rangeland resources or range management activities.

- Large Wood Placement
- Temporary Road Construction and reconstruction
- Roadside Danger Tree Removal

These activities and their effects will not be discussed further in this section.

## Direct Effects on Rangeland Resources/Range Management

***ALTERNATIVE 1 - NO ACTION***

There are no known direct effects on range resources as a result of the No Action Alternative. Effects related to this alternative on range resources are primarily indirect in nature.

***ALTERNATIVES 2 and 3***

Vegetation Management

*Fuels Reduction*—Direct effects from the implementation of any action alternative described with this project include an immediate reduction in available forage where burning occurs. This would be short term (1 year) until the following growing season. If prescribed fire is implemented during the normal grazing season some displacement of livestock is expected.

Control lines for prescribed fire treatment may permit access by livestock into areas previously not accessible. Livestock will use control lines as defacto cattle trails.

*Timber Harvest*— Direct effects due to timber harvest (commercial and non-commercial) include disturbance to livestock during harvest activities, hazards created by livestock on roads during log haul and other related activities. Disturbance to rangeland plants and soils may occur if landings are placed in sensitive areas such as scabs or moist meadows. There would be more disturbance under Alternative 2 than 3 due to the increase in acres treated under Alternative 2.

*RHCA Treatment*—Direct effects due to timber harvest within RHCA are similar to those imparted by other forms of timber harvest. Disturbance to herbaceous forage by equipment used within RHCAs may result in reduced available forage for livestock and wildlife during the year of harvest. Increased access to the RHCA for livestock may occur in unit 65 and 66 under both action alternatives.

*Invasive Species Treatments*—There would be no direct effects to rangeland resources by implementing the proposed invasive species treatments.

*Forage Enhancement*—Direct effects to rangeland resources by the proposed forage enhancement project would include soil displacement if a rangeland drill is utilized for seed sowing.

Transportation

*Road Opening*—Livestock distribution may be directly affected by the temporary road construction and use during and following timber harvest for a short period by blocked trails and equipment use in the pastures where cattle are stocked.

*Road Closures*—Livestock distribution may be directly affected by removing access to areas where previously open or passable roads have been used by livestock to travel within the project area

## Indirect Effects on Rangeland Resources/Range Management

***ALTERNATIVE 1 - NO ACTION***

Vegetation Management

*Fuels Reduction*-- Indirect effects relate to the potential lack of improvement to forage conditions from not implementing the prescribed burning. Livestock distribution would remain unchanged

*Timber Harvest*— Indirect effects relate to lack of potential transitory range creation through timber harvest activities. Livestock distribution would remain unchanged.

*RHCA Treatment*—There are no known indirect effects by not implementing timber treatment within RHCAs.

*Invasive Species Treatments*—There would be no indirect effects to rangeland resources by not implementing the proposed action. Invasive species treatments would continue within the project area in the absence of the project.

*Forage Enhancement*—Indirect effects to rangeland resources by not implementing the proposed forage enhancement project would include continued poor vegetative condition on the areas where the forage enhancement was proposed for implementation. Expected improvements in forage condition would not occur.

Transportation

*Road Closure/Decommissioning*—Roads and trails that have been historically used for livestock movement would remain open and or unchanged.

***ALTERNATIVES 2 and 3***

Vegetation Management

*Fuels Reduction*-- Indirect effects from the implementation of any action alternative described with this project include a potential short term (3-5 years) increase in available forage due to crown release in some species and a potential decrease in others. Forb, shrub and understory grass and grass-like forage will likely see a long term (5-15 years) increase in density and production following harvest and prescribed burning. This would decrease after this point due to canopy closure by tree re-initiation. This increase is due to created openings by timber harvest and prescribed burning. Livestock distribution may change due to the creation of transitory range and the increased production in forage following burning.

Control lines created for prescribed fire treatments may indirectly increase livestock presence within riparian areas if these lines cross riparian areas. Increased access may contribute to management difficulties if livestock congregate within the RHCA's.

RHCA fuels reduction treatments may indirectly effect livestock distribution within these areas through the removal of material that currently prohibits or limits access to these areas.

*Timber Harvest*— Indirect effects due to timber harvest (commercial and non-commercial) include a long term increase in transitory range (5-25 years, based on treatments in other areas of the Ranger District) unless tree regeneration reduces access and reduces forage production. This reduction could occur mainly in areas with lodgepole pine regeneration where canopy closure occurs soon after stand initiation. If landings are placed in sensitive areas such as scabs and meadows,

displacement of native vegetation will occur and create the potential for the introduction of invasive species.

*RHCA Treatment*—Indirect effects due to timber harvest within RHCA are similar to those imparted by other forms of timber harvest. RHCA timber harvest may indirectly effect livestock distribution within these areas through the removal of material that currently prohibits or limits access to these areas.

*Invasive Species Treatments*—Indirect effects to rangeland resources by implementing the proposed invasive species treatments would include a reduced potential for spread of invasive species by wildlife and livestock. Reducing the spread of invasive species will allow native grasses and forbs to persist without competition by invasive species.

*Forage Enhancement*—Indirect effects to rangeland resources by the proposed forage enhancement project would include an increase in native grasses and forbs and eventually increased forage availability for wildlife and livestock.

Transportation

*Road Opening*—Indirect effects to rangeland resources through improvement access through new and temporary road construction may allow livestock to enter areas previously avoided due to difficult terrain or dense timber. This may result in lower levels of forage utilization in some areas and higher utilization in areas that were previously less accessible.

*Road Closures*—Livestock distribution may be indirectly affected for a short period (1-2 years) by removing access to areas where previously open or passable roads have been used by livestock to travel within the project area. Livestock will recreate trails to access preferred areas within several seasons or choose new routes.

## Cumulative Effects Rangeland Resources/Range Management

Potential cumulative effects are analyzed by considering the proposed activities in the context of past, present and reasonably foreseeable actions within the project area. In addition, some activities have an influence that may extend downstream in the subwatershed within the project area boundary. This broad area is referred to as the “cumulative effects analysis area”. A summary table of the past management activities that have occurred in the cumulative effects analysis area is located in Appendix D of the EA and has been used to assess the cumulative effects of implementing this project on Rangeland Resources.

***ALTERNATIVE ONE***

Livestock distribution and forage available for utilization will remain consistent with existing management. Changes in distribution possible through enhancement of transitory range will not occur.

Areas where burning would have occurred in the action alternatives will remain untreated for the foreseeable future. The potential for uncontrolled wildfire may increase in the absence of controlled burning. This could lead to reductions in livestock grazing if destructive wildfire occurred on a large scale.

***ALTERNATIVES 2 and 3***

Forage quality and quantity would be increased short and long term by opening stands and through prescribed burning. Opening areas not previously accessible to livestock would also provide opportunities for livestock to access previously treated stands and better utilize forage throughout the

allotment. Enhanced livestock distribution will enable more even utilization of forage and potentially reduce impacts to areas of higher use that would continue to occur without treatment.

Improved management (primarily fencing and grazing strategies) on domestic livestock grazing have reduced impacts to riparian areas and stream channels due to the implementation of INFISH standards and guidelines.

Potential conflicts between grazing/allotment management and OHV use in terms of safety and harassment of livestock exist with the present OHV access plan, however, within the reasonably foreseeable future planning for the Forest Travel Management Plan will be completed which has the potential to resolve many of the conflicts with grazing

## Noxious Weeds

**Introduction**

The Sugar Vegetation Management project area is located almost entirely within the Lower Five Points Creek Subwatershed (170601040403) of the Grande Ronde – Five Points Creek Watershed (1706010404). A very small portion of the project is located in the East Meacham Creek Subwatershed (170701030202) with in the Meacham Creek Watershed (1707010302).

There are approximately 19 documented locations for six noxious weed species on National Forest System lands within the project area. Additional sites may occur outside the project area boundary, but within the analysis area used for cumulative effects.

The majority of the individual weed infestations are relatively small, less than an acre. However, one of the diffuse knapweed sites is documented at just over 19 acres, and there is a five acre Hounds tongue infestation. Once introduced, the potential for these numerous weed species to become established is a concern, and varies based on an array of factors. Soil movement and disturbance associated with proposed activities pose a likelihood of noxious weed invasion and further spread in these areas of disturbance.

Noxious weed is a legal term, used by state and federal agencies to denote plants that pose serious threats to agriculture and wildlife. Under the Pacific Northwest Region, October 2005 Record of Decision, for preventing and managing invasive plants, the program has been expanded to include non-native invasive plants, not just “noxious weeds.” It also includes all planning efforts, not just ground-disturbing actions. In this document, the terms will be used interchangeably to represent non-invasive, plant species of concern.

Activities considered within this analysis include commercial timber harvest (using skyline, tractor, forwarder and helicopter) fuels reduction (including prescribed burn and harvest forwarder), temporary road construction and reconstruction; opening closed roads to be used during harvest, followed by re-closure (and associated equipment); and pre-commercial thinning treatments. Additional activities include safety and restoration projects.

The potential risk of noxious weed spread and establishment is dependant on the associated ground disturbance and is further affected by the following factors:

- Type of activity (intensity).
- Proximity to a propagule/seed source and vectors for dispersal (risk).
- Size of area affected (magnitude).
- Reclamation time, from disturbance to vegetation recovery (duration).

The type of project activity affects the intensity of the associated disturbance and the probability or risk of noxious weed propagule introduction. Comparing the level and potential for disturbance is combined with the risk of noxious weed introduction and potential for establishment to predict the effects from activities on noxious weeds.

The risk of noxious weed introduction and establishment associated with a particular activity is a little more difficult to generalize, and can vary widely depending on location of activity to known weed sites. This will be further determined on a site specific basis, but is ranked in simplified terms, as follows:

**Risk:**

**Low:** Planting, cleaning, area/road closures (via gates and barricades), pre-commercial thinning, prescribed under burning, and harvest removal via skyline and helicopter systems.

**Moderate:** Timber harvest (via tractor, slash buster harvest forwarder), road reconstruction, decommissioning, and road closure activities (utilizing equipment)pose a risk of introduction and spread of invasive plants and may have a measurable effect.

**High:** Tractor and helicopter landings, pile burning, skid trails, new road construction, and use of heavy equipment are likely to have the highest associated risk for noxious weed introduction and establishment, and result in a measurable effect.

In predicting the consequences of the above activities, each can be further complicated by the extent of the activity (i.e. acres), location (proximity to weed site or source) and the timing and duration of the activities, as previously mentioned. All these factors are utilized to determine the consequences associated with the project activities, and are used in estimating qualitative rankings

In this discussion regarding invasive plant species short-lived effects are considered to last from one to two (growing) seasons. Intermediate effects are those which last for three to five years, and long-term effects will last for more than five years. The current existing condition will be used as the reference baseline for the comparison of alternatives. Three alternatives are being analyzed for this project.

For the complete analysis of these resources refer to the Noxious Weed documents in the Sugar Analysis File.

## EFFECTS ANALYSIS

### No Direct, Indirect, or Cumulative Effects

The following restoration activities associated with the Sugar project are of such limited and constrained nature that they would not create introduction sites and would therefore have no effect on noxious weed prevention resources or activities.

- Precommercial Thinning/Cleaning
- Planting
- Prescription Modifications

These activities and their effects will not be discussed further in this section.

### Direct and Indirect Effects Noxious Weeds

Effects to vegetation and habitat can be temporary or permanent. They can be described by the direction the resource is moved, and measured by how long the effects are expected to last, and the magnitude. Direct effects are assumed to be associated with physical impacts directly to the plant(s) or habitat from the actions of machinery, animals, or humans, and thermal impacts from fire.

The general direct and indirect effects of project activities on vegetation are described in detail in the Botanical effects document. The mechanisms of the actions are the same for invasive species, although the results/consequences may be different.

Indirect effects are most often associated with changes in habitat and stand characteristics or conditions, and the resulting changes in community interactions.

In general, invasive plant species are quick to colonize disturbed areas, and are fire tolerant / resistant. Introduction of noxious weeds results in an increased competition with native vegetation, plant species of concern and other desirable species.

***ALTERNATIVE 1 - NO ACTION***

There are no new direct or indirect effects to established noxious weed infestations, under Alternative 1, the No Action Alternative. There are no vegetation management activities proposed.

However, any existing impacts from other sources and projects will continue. Potential effects on noxious weed populations under the no action alternative would include use of the area by ATV's and full size vehicles, which increases the potential for spread of noxious weeds along roads and trails. Unregulated off road vehicle use has one of the highest potential direct effects on noxious weed spread via contaminated vehicles, and affects the general landscape. Motorized use is currently being analyzed at the forest level under a separate project, due to be implemented in 2010.

Direct effects associated with weed spread via motorized equipment are reduced with cleaning/washing, however there are no requirements for these activities for recreational motor vehicles, therefore, the continued infestation/spread of these species can continue.

***ALTERNATIVES 2 and 3***

Alternative 2 will commercially treat 293 more acres than Alternative 3. Yarding systems differ slightly, with more acres treated in each category, under Alternative 2. Modified RHCA treatments will take place on approximately 30 more acres (94 acres) under Alternative 2, than Alternative 3. Fuel reduction activities which do not include commercial harvest will occur on fewer acres under Alternative 2 (at 317, rather than 338 acres).

Created openings from harvest activities can lead to a shift in plant composition and soil disturbances can increase the likelihood of invasive plant introduction. Impacts from tractor activities are expected to be greater than those from skyline operations. Equipment used in conjunction with fuel reduction, harvest and road activities can spread invasive plant species and lead to introduction to new areas.

Both action Alternatives 2 and 3 will open closed roads, and involve reconstruction and temporary road construction activities, directly affecting the potential for spread of noxious weeds. The project proposes to open just over 10 miles of (gated or barricaded) closed road, for project use, then re-close to original condition. Alternative 2 proposes 9.5 miles, and 9.26 miles are proposed under Alternative 3. Opening previously closed roads for transportation use has potential for spreading noxious weeds. Reduced use by motorized vehicles can decrease the opportunity for spread by these vectors.

There is no new, specified road construction, although the project calls for 0.2 mile of reconstruction, and four to five miles of temporary road construction. Alternative 2 proposes 5.42 miles and 4.13 miles are proposed under Alternative 3. The disturbance from road construction activities will increase the potential for introduction and establishment of invasive plants. The risk is reduced with shorter constructed segments, and if the site becomes reoccupied by native vegetation.

Direct effects also include spread of propagules from existing infestations through road activities. Temporary roads T-4, T-5, T-20 and T-21 access units in the vicinity of established diffuse knapweed infestations. There is risk of spreading existing infestations. Temporary roads will be decommissioned, after use. There is potential for the transportation and spread of active noxious weed populations along existing roads. This will occur with or without project activities, however due

to the close proximity of weed infestations to the road systems there is some concern with haul routes identified for project use. There are four invasive plant species (diffuse knapweed, spotted knapweed, Canada thistle and hound's tongue) occupying 14 infestations on approximately 28 acres.

The following road systems and spur roads have been identified for use, and support known weed infestations: 31, 3107 and 3112; and 3100-079, 3100-130, 3100-131, 3100-137, 3100-138 and 3100-139; 3106-100 and 3108-175.

Alternative 3 includes 338 acres of fuel reduction activities, which do not include commercial harvest (FFU). This is slightly more than the 317 proposed under Alternative 2. There are three knapweed infestations associated with the FFU treatments in FFU # 503 and # 505. The potential for spread within these non-harvest units is highest where (mechanical) slashbusters are used. Disturbance caused by hand and grapple piling of thinning slash, followed by burning also poses a risk of spreading or introducing weeds. The difference in disturbance intensity and risk between the two alternatives is expected to be negligible.

There is no difference in treatment acres or areas for pre-commercial treatments or prescribed burning under Alternatives 2 and 3. The impacts to noxious weed sites from these activities will be the same under both action alternatives. There are seven proposed treatment units (# 52, 53, 58, 59, 62, 66 and 69), totaling 201 acres, which may impact four established infestations (~ 20 acres) of diffuse knapweed. This is the same for both action alternatives.

Created openings from harvest activities and prescribed burning can lead to a shift in plant composition and soil disturbances which can increase the likelihood of invasive plant introduction. Direct effects of burning may include exposed patches of mineral soil where downed logs and duff is consumed. These result in the introduction of invasive plan species via a variety of vectors. A reduction in the desirable native vegetation over one to two years can reduce competition for non-native invasive species, resulting in potential establishment of noxious weeds. Burning in areas where there are active noxious weed infestations has the potential to prepare seedbeds for spread of the existing populations. All 19 infestations occur within five of the designated prescribed burn blocks: 601, 602, 603, 604 and 607, under both action alternatives, for a total just over 28 acres.

The following proposed activities are not expected to have any negative effects to the invasive plant species under discussion, because ground disturbing activities are considered to be low (to none) and / or the actions will not take place at any of the established infestations. These include pre-commercial thinning, safety and enhancement work.

Enhancement projects will be implemented under both action alternatives. These include large wood placement in Five Points Creek, forage enhancement, invasive species treatments, and danger tree removal. Any impacts to noxious weeds are expected to be positive, and involve invasive species treatments and forage enhancement work, such as native grass seeding.

## Cumulative Effects Noxious Weeds

Past activities including logging, grazing, prescribed fire and road construction activities, as well as wildlife, fisheries and watershed restoration projects, and miscellaneous recreation uses. Past, ongoing and future activities are considered in the cumulative effects analysis. Activities proposed under the project may have impacts and will add to negative impacts that have already taken place, but are at a small scale and occur over a fairly localized area. The expected duration of the effects is variable based on site and alternative, and impacts. These projects categories are described in more detail in Appendix D of the EA.

There are invasive plant species documented on within the project area. Treatments, both manual and chemical, have been ongoing for several noxious weed species.

***ALTERNATIVE ONE***

Because no management would occur under the no action alternative, there will be no cumulative impacts.

***ALTERNATIVES 2 and 3***

Most of the impacts that occur to plants on National Forest System lands are associated with mining, timber harvest, road building and grazing (both domestic and big game). Activities that remove vegetation and displace soils are expected to have more severe impacts with respect to invasive plants. Activities with less impact and of short duration (i.e. low intensity fire, light grazing and/or utilization and recreational hunting) result in a reduced potential for introduction, spread and establishment of invasive plant species. However, with repeated disturbance, the potential increases.

All of these activities are considered as source vectors for noxious weed dispersal. The occurrence of many of these activities, (especially grazing, prescribed fires and wildfires, and flood events) has the potential to affect time needed to reach recovery of vegetation. Grazing and prescribed fire are activities that may be administered and managed through their own associated plans, such as burn plans or annual operating plans.

Effects of the action alternatives, with respect to vegetation would add to negative impacts that have already occurred, when project activities overlap areas of previous activity. Although these effects can occur over a broad area, they are likely to occur at a localized level for this project. Previous grazing, historic mining, and logging may have lead to a degradation of habitat conditions, allowing for the introduction and establishment of invasive plants. Grazing rates out as having a low to moderate potential for habitat disturbance and the potential for spread and introduction of invasive plants. Equipment used in conducting road work and harvest activities can spread invasive plant species and lead to introduction into new areas.

Camping, off-road vehicle use and other recreational activities can contribute to the spread of weeds. Developed campsites are known to be areas of high concern. However, there are limited campsites within the project area, most of which support dispersed use only. Project activities create more openings and disturbed soil which could create seedbeds for the noxious weed propagules which are carried in by livestock, until ground cover and undergrowth comes back.

The effects of fire may be negligible for many plants, and varies, depending on the intensity and season of burning. Other impacts, including compaction of soils, rutting, and displacement of vegetation tend to be of longer term.

These types of impacts are cumulative in nature if the habitat has not fully recovered when new activity occurs at the same locations. When adequate seed and root stock remain on site, native or desirable plants should remain dominant, decreasing the risk of occupation by invasive plants. Under the action alternatives, there are instances where multiple actions proposed under the project, are congruent with established weed infestations. When impacts occur on the same piece of ground as the fire, harvest and road activities, there are likely to be cumulative effects and impacts from invasive plant species. These are the items of highest concern.

Burning in areas of active noxious weeds can act to prepare seedbeds for spread of the existing populations. If fire intensity or harvest activities expose excessive bare mineral soil in large areas, the opportunity for a long term shift to introduced undesirable plants and noxious weeds increases.

**Summary:** Weed infestations within the cumulative effects analysis area for the Sugar Vegetation Management Project total just over 28 acres. There are documented weed sites for Canada thistle, diffuse and spotted knapweed, hound's tongue, St. John's wort and sulphur cinquefoil, associated with project

activities.

There is little difference between the two action alternatives for the Sugar project, with respect to the disturbance intensity, or risk of introduction, establishment or spread of invasive plant species. The primary difference is the amount of temporary road construction and opening of closed roads, which varies by approximately one and one-quarter mile (between the alternatives) for each activity.

## Recreation/Visuals

### Introduction

The 10,621 acre Sugar analysis area lays within the Lower Five Points Creek watershed (170601040403) and a minor portion within the East Meacham Creek watershed (170701030202). The area is bordered by Drumhill Ridge (northeast), Walker Ridge (southwest) and across Five Points Creek and Three Cabin Ridge (east and south). The analysis area borders the Umatilla National Forest to the north.

Recreation, cultural and viewing resources are of local significance within the Sugar analysis area. Although there are no developed campgrounds numerous dispersed sites exist within the Sugar analysis area. Other recreation activities are focused on day use activities such as firewood gathering, hunting and mushroom picking. The high use in this area occurs during the big game hunting seasons when hunters occupy many of the dispersed campsites within the area.

Five Points Creek is identified in The Wild and Scenic River Study Report and Draft Legislative Environmental Impact Statement (1995) as being suitable for inclusion into the National Wild and Scenic Rivers System. The preferred alternative recommended designation of Five Points Creek (12 miles) as "Scenic". Five Points Creek flows through a 500-800 foot deep canyon that cuts through the broad, open, ridges of the surrounding plateau. The steep canyon walls of the mainstem and tributaries, occasional rock outcrops, variety of plant communities, and the free-flowing river are all of scenic interest

This scenic designation on Five Points Creek would provide river protection while allowing a range of natural resource management. The National Wild and Scenic Rivers Act was passed in 1968 to balance river development with river protection. Rivers are designated as Wild and Scenic Rivers to keep selected rivers, or river segments in a free flowing condition and to fulfill vital national conservation purposes. The corridor has a VQO mostly Middleground and Foreground, Class 2A, Partial Retention.

The objective of the Sugar project is to improve timber stand conditions through thinning and intermediate silvicultural treatments, and re-introduce fire into areas that have missed one or more fire return intervals. Stands exhibiting over-stocking, poor crowns, high mortality, or insect and disease at higher than endemic levels would be treated to improve stand conditions, improve stand resilience, and move the area toward the historical range of variability for stand structure. Prescribed fire would be used to maintain or reduce the moderate to low fuel levels that currently exist. Non-commercial thinning would be used to promote tree growth and reduce competition between remaining trees. Additional release thinning and cleaning is proposed in commercial harvest units to improve growing conditions for the regeneration that has established in these stands. Tree planting would occur in shelterwood stands where species composition will be changed, and in treatment units that retain too few seed source overstory trees.

Fire suppression and overstocked stands are two effects on the desired landscape character that are considered in this analysis in terms of the ecological and scenic integrity. Poor stand health and overstocked stands have resulted in moderate integrity. Visual Quality Objectives in most areas are generally partial retention.

The analysis area for the Recreation assessment will be the project area as described in Chapter One and on the maps in the Appendices and will be the visual areas for the 3100 road related to the partial retention objectives for direct, indirect, and cumulative effects.

**Trends, or Conditions that Pose Risk to Positive attributes.**

The trends or conditions that pose a risk to landscape character attributes include those that contribute to large, severe intensity, stand replacement fires and insect and disease epidemics. Conditions such as these reduce the sustainability of the scenic resources.

The Scenery Key indicators are as follows:

- Unnatural Appearing Impacts
  Disturbance <10% of the viewshed (Retention Foreground)
  Disturbance <14% of the viewshed (Partial Retention and Retention Middleground)

The following effects analysis is based on field surveys, data review and professional judgment.

## Effects Analysis

The following restoration activities associated with the Sugar project are of such limited and constrained nature that they would not be easily seen upon implementation and therefore have no effect on Recreation and Visual resources or activities.

- Precommercial Thinning/Cleaning
- Planting
- Large Wood Placement in 5 Points Creek
- Forage Enhancement
- Invasive Species

These activities and their effects will not be discussed further in this section.

### A. RECREATION EFFECTS

#### *ALTERNATIVE 1*

Two non-motorized trail systems are located within the analysis area; (1) Trail Number 1843 (1.93 miles) follows Five Points Creek until it meets Little John Day Creek and (2) Trail Number 1856 (1.32 miles) connects Camp One to road 31130. These trails are designed and managed for non-motorized use; however, OHV use is prevalent on these systems and has increased over the past 10-15 years. Resource damage continues due to motorized use especially in the Camp One area.

Road related recreation and off-road travel will continue to increase in an unmanaged and unrestricted manner. New off-road tracks would continue to increase and create resource impacts and affect the non-motorized recreation experience. The motorized and non-motorized user conflicts include hunting, sightseeing, hiking and horseback users. The lack of enforceable motorized management is leaving very little of the area available to non-motorized activities. Currently the analysis area is in a Roaded Natural recreation opportunity spectrum.

A snowmobile route lies along road 3100; 6.1 miles lies along the northern perimeter of the Sugar analysis area. A snow park area is located 2 miles from the Interstate 84 along the 3100 road.

#### *ALTERNATIVES 2 and 3*

Alternative 2 involves 5.42 miles of temporary road and 4.13 miles in Alternative 3. In addition 9.5 miles closed roads will be temporarily opened in Alternative 2 and 8.26 miles in Alternative 3. New roads, even temporary roads can lead to easier access into forested stands for the removal of

firewood and recreational off highway vehicle riding. Unless these temporary roads are made impassable following logging, the potential of for motorized access and increased disturbance is expected. Alternatives would not change the ROS- Roaded Natural recreation opportunity spectrum.

There is a minor potential to impact hunting opportunities during fall burning but these potential impacts would be very short (<1week) during which activities would occur within an area. Burning would improve long term available forage, huckleberries, and mushroom gathering.

OHV use trends have been rising significantly over the last 10 to 15 years. The effects from increased motorized access should decrease following implementation in 2010 of the Forest Travel Management Plan that has the potential to restrict cross country motorized travel and restrict motorized travel to designated routes and areas only. While this would restrict current motorized recreation activities within the area, however, it would allow for more back country non-motorized hunting opportunities.

## B. SCENERY

### Direct and Indirect Effects on Scenery

#### *ALTERNATIVE 1*

Alternative 1 would not change existing conditions, nor would it alter the existing trends or conditions that may pose risk to the positive attributes of the landscape character.

No action will allow the existing condition to continue, and the trend of increasingly declining forest stands. No visual impacts will occur, however the conditions will continue to diminish the sustainability of the long term scenery resources.

Five Points Creek was logged extensively in the 1920 and 1930s from a railroad that ran 2/3 of the length of the study corridor. No timber harvest has occurred within the corridor in the past 40 years.

#### *ALTERNATIVES 2 and 3*

The actions proposed in alternative 2 and 3 are designed to reduce fuel loadings and tree stocking. The actions proposed are designed in a manner that will not create unnatural or uncharacteristic impacts from a middleground or background view. The impacts visible from a foreground view would include the following, stumps less than 6 in. height, some areas of soil disturbance and evidence of tree removal. The impacts to foreground views will not be concentrated enough to degrade scenic resources. In some areas the slash removal and prescribed burning will decrease the amount of unnatural appearing effects.

No treatments are proposed, under either alternative, within 0.25 miles of Five Points Creek; therefore, the scenic qualities would continue to be met (The Wild and Scenic River Study Report and Draft Legislative Environmental Impact Statement; 1995). Due to the steep canyon walls of Five Points Creek and the distance from management activities scenic qualities would not be altered.

Treatments that reduce the potential of a stand replacing fire improve the potential for maintaining scenic sustainability by artificial means. Therefore, the scenic sustainability rating would not improve, but remain as moderate as it is currently rated.

**Commercial and Release (Precommercial) Thinning**

These treatments will reduce tree densities, open the canopy and let in more light to the forest floor. Treatments to remove dead standing and down trees will enhance the landscape character through increasing the scenery attributes such as large trees and decreasing the dense thickets of

suppressed trees and dead wood. The understory views will be improved and have a more healthy appearance.

Thinning to reduce tree densities and crown fuels will not be visibly apparent from a middleground or background distance. Close scrutiny of the stands from this distance will discern a less dense but evenly textured canopy. In areas where there are currently clusters of dead standing timber, there may be created openings after removal. These openings will be small (less than ½ acre) and have a natural appearance that will not detract from the existing scene. These treatments will improve the ability to sustain the existing landscape character attributes in the long term.

Adjacent to FS Rd 3100, units 5, 52, 60, 67, 68, 65, 66, 69, 71 are being treated with a commercial thinning harvest. The views from this road will be "cleaned up" and the appearance of the understory would be more open. Flush cut stumps in the immediate foreground (approximately 300 feet from FS Rd 3100) will be needed to maintain the scenic quality. Stand treatment effects would not be apparent from a middleground or background view. These units will be well within the standards set by the Forest Plan for percent of any viewshed disturbed at any one time for the project area for retention and partial retention foreground.

In addition, Trail 1858 travels through unit 58 (Alternative 2 and 3) and stumps within 300 feet of the trail will require flush cut to maintain the scenic quality.

Pile burning and underburning will create scorched and blackened underbrush, saplings, bark, grasses and forbs. These effects will continue for 1 to 5 years. There is a possibility of the prescribed fire getting into the crowns of trees. This could cause a cluster of dead scorched trees. After the following growing season, the majority of the effects would no longer be visible as new growth of forbs and shrubs would quickly sprout.

**Prescribed Burning**

The proposed prescribed burning will create blackened soils and grasses, burned understory brush and saplings. Scorching larger tree trunks and lower needles will occur. The effects will be primarily short term (1-20 years). Much of the blackened understory and grasslands will not be evident after a few growing seasons and the area begins to revegetate. There may be some minimal long term effects such as small patches of overstory mortality; however, the patches are not expected to detract from the valued landscape character.

The prescribed fire will improve conditions for fire resistant species, which will indirectly improve landscape character attributes of large tree character and open stands that can withstand low intensity fires. This treatment will improve visuals into the forest understory from foreground views.

**In summary**, the scenic integrity will remain high. The ecological integrity will not improve; however, in the long-term sustainability of the scenery resources will be improved. The visual quality objectives will be met by the action alternatives.

## Cumulative Effects on Scenery

There are visible effects caused by previous timber sales (as described in Appendix D of the EA) along FS Rd 3100 and some of the minor travel routes. Past timber projects have created unnatural appearing stands that detract from the scenery on the ridges in this area. In areas where minimal management has occurred, much of the stands are overstocked with dead and down material. Overall, action alternatives would improve the latter condition, but have no negative cumulative effects to scenery resources.

***ALTERNATIVE 1***

The no action alternative would allow the conditions and trends that currently exist to continue to pose a risk of losing positive attributes of the landscape character, but would not cause cumulative

effects to the scenery resource.

***ALTERNATIVES 2 and 3***

Although many elements of the ecosystem affect the aesthetic experience, within the Sugar area the condition of vegetation and the condition of the recreational settings affect the landscape character most directly. Unhealthy, overstocked stands and impacts to the recreation setting are two major impacts that detract from the desired landscape character. Implementation of the actions in Alternatives 2 and 3 would improve these conditions and improve the ecological and scenic integrity in the project area. Minor short term impacts in terms of fresh stumps would be expected; however, these would be short term in nature and not provide measurable cumulative effects.

While a mosaic of stand conditions exists it is not within the historical range of variability. Fire suppression has led to a proliferation of shade tolerant tree species (grand fir, alpine fir, and Douglas-fir) primarily in the seedling to pole size classes. Western larch is a disturbance dependant tree species. Larch is disappearing in many stands as it becomes crowded by true firs. The proliferation of shade tolerant species has increased the risk of stand replacement fire. These trees provide ladder fuels and close crown contact with seral overstory trees, seriously putting these large trees at risk.

Fire suppression and some other management practices have changed tree species composition and stand structure, making the landscape less resilient to natural disturbances. Off-road use of vehicles and unclassified roads will continue to cause adverse impacts until implementation of the travel and access management plan that will restrict cross country motorized travel.

This project would accelerate the development of vegetation species composition and structure into the mean historical range of variability. Thinning overstocked stands in a manner that would create a spatial and structural mosaic that supports fire resistant species would move toward the desired character for vegetation and the ecological integrity in both action alternatives.

Short-term (<1 year) visual impacts before spring green-up the following year are common with the use of prescribed fire, however, nearly all visual impacts from past burning activities within the project area are gone within 3 years. There would also be short-term (1 week) one time impacts from smoke in the area to camps and cabins. The length of potential impacts from smoke intrusion could be extended depending on the occurrence of wildfires within the project area or that might affect the project area. However, this is not a frequent occurrence due to topography and prevalent wind/weather flows.

## Issue: Forest Plan Amendment for the Treatment in Old Growth Below HRV and Treatment in Winter Range (MA3)

**Introduction**

The purpose of this project is to provide for long-term forest health to improve wildlife habitat, reduce the likelihood and severity of future insect infestations, reduce potential damage from wildfires by reducing tree densities, developing forest structure toward historic ranges by restoring healthy stands toward LOS and conversion of some of the stands from MSLT to SSLT to reflect what these sites would historically have represented on the landscape, improving cover stand health, restoring healthy riparian conditions, and reintroduction of fire as a disturbance factor.

The Wallowa-Whitman National Forest Plan was signed in 1990. Over the ensuing years, new information has come out of a variety of sources such as the Interior Columbia Basin Ecosystem Management Assessment, National Fire Plan, 10-year Comprehensive Strategy, and the Endangered Species Act, which have not been studied and integrated with the resource protection and objectives of the 18 year-old Forest

plan. In order to integrate these other resource needs, a non-significant forest plan amendment has been incorporated as part of this project to address vegetation treatment needs in the project area.

Forest Plan direction relative to treatment within cover stands in big game winter range does not reflect the stand conditions within the project area not the capability of those biophysical environments to achieve those cover levels. Many of the stands proposed for treatment are minimally meeting the definition of marginal thermal cover. Left untreated, these stands would decrease in cover quality as the live crown ratio of overstory trees declines. A portion of the project area is management area 3 (MA 3), big game winter range. The Forest Plan contains direction (page 4-61) for MA 3 that requires at least 80% of the acres converted from a thermal cover condition to a forage condition to be within 600' of a satisfactory thermal cover patch of at least 40 acres in size. This standard was meaningful when the Forest Plan was finalized in 1990. During that period regeneration harvests were common, and risked depleting cover over large areas of winter range. The intermediate treatments used today retain varying levels of foraging areas and cover patches intermixed within a stand. Additionally, the naturally fragmented land types and dry biophysical environments in much of the project area are incapable of providing satisfactory thermal cover in patches of 40 acres or more. Therefore, in order to protect and enhance cover within the area, this project would adopt the modified cover guideline as described under Alternative 2 in Chapter Two of this EA.

The Screens direction was signed in 1994, as interim direction amending Eastside Forest Plans until the Interior Columbia Basin Ecosystem Management Project (ICBEMP) was completed which was to amend Forest Plans to reflect new scientific information related to fish habitat, wildlife habitat in terms of snags and old growth. The planning for ICBEMP was controversial and after many years the Chief made the decision to issue a proposed Decision in December 2000, which would describe the science findings and management recommendations. This did not amend the Forest Plans; therefore the Screens direction of 1994 is still in place. Over time the intent of the Screens direction has been questioned and analyzed and inconsistencies discovered. The intent of the LOS direction in the Screens is to maintain and enhance available LOS. However, as currently written the Screens direction does not allow the use of timber harvest to move stands which were historically SSLT and have over time become MSLT to back to the stand structure they would have historically been if fire had not been removed as a disturbance regime. Therefore, in order to accomplish that goal and meet the intent of the Screens direction, this project would adopt the modified LOS guideline as described under the Common Elements section in Chapter Two of this EA.

The effects of this Forest Plan amendment have the potential to affect other resources and species associated with the Sugar project area. The Silviculture and Wildlife Effects described earlier in this chapter discuss the effects of treating in LOS stands on old growth and old growth dependant species and the treatment of cover stands in big game winter range have been covered.

The following effects analysis is for the other resources and uses within the project area and is based on data review and professional judgment.

## Effects Analysis

### No Direct, Indirect, or Cumulative Effects

The adoption of the two sections of the Forest Plan amendment (LOS and MA 3 cover guidelines modifications) for the small number of acres within the project area that are affected by these modifications (approximately 780 acres) is of such a limited nature or are not physically located within a designated or allocated area that it would not have any effect on the following resources or uses:

- Inventoried Roadless Areas
- Uninventoried Roadless Areas
- Allocated Old Growth – MA15
- Proposed, Endangered, Threatened, and Sensitive Fish and Plant Species

These activities and their effects will not be discussed further in this effects analysis.

## Direct, Indirect and Cumulative Effects

### *ALTERNATIVE 1 – NO ACTION*

Because Alternative 1 is the no action alternative and no activities would occur in LOS stand structures or in big game winter range, the Forest Plan Amendment for treatment in LOS stands below HRV and treatment in MA3 cover stands would not be necessary and therefore there would be no change to old growth or cover as it currently exists in the area and the existing LOS and cover would continue to not appear or function as they would have historically with regular fire return intervals. The effects of this alternative are described under the Alternative 1 discussions in the Wildlife and Silviculture sections of this chapter.

### *ALTERNATIVE 2*

Alternative 2 would mechanically treat 1,715 acres with commercial thinning and fuels reduction prescriptions. Prescribed burning and some planting would occur on these treated acres. The effects of implementing the modified guidelines in the action alternative on these acres would have no additional effects beyond those described under their specific resource areas within Chapter 3 for Alternative 2, and see the effects for Alternative 1 for the acres not treated under the action alternative:

- Soil Quality and Productivity
- Management Indicator Species
- Neotropical Migratory Birds
- Noxious Weeds
- Old Growth – LOS
- Recreation
- Fisheries and Water Quality
- Vegetation Management and Forest Health

Actual on the ground implementation of the 2 sections of the amendment would begin in late 2010 which is 20 years after the signing of the ROD for the Forest Plan (April 1990). In general, the Forest Plans should be updated every 10-15 years. The Wallowa-Whitman Forest Plan began its revision cycle in year 14 of the original Forest Plan and has been on-going with completion still 2-3 years away.

Adoption of the guidelines for the acres treated in the project area does not alter the goods and services projected by Forest Plan as amended by Screens. In general, due to the small nature of the materials being removed (in the LOS stands and marginal cover stands), the small number of acres being treated (approx 780 acres), the type of intermediate prescriptions being used, and the small nature of the materials being removed to restore structure within the LOS stands a miniscule increase in outputs over the totals projected by the Forest Plan as amended by Screens in this entry is anticipated. In comparison to the total, the increase is imperceptible at the Forest Level.

The amendment does not change the allocation of any of the lands within the Sugar project area; it merely allows:

- Treatment within (511 acres) LOS structure with no net loss in LOS to meet the HRV's for this area;
- and the treatment of 266 acres of cover stands within MA3 to improve the health and sustainability of cover within the project area over time.

The scale of the change of management on these acres is imperceptible when compared to the total goods and services estimated for the Forest Plan.

***ALTERNATIVE 3***

This alternative would have the same effects as those described above for Alternative 2, however, treatment within the 266 acres of cover stands within MA3 would not reduce cover to forage or was deferred from treatment consideration in this alternative and would therefore affect even fewer total acres than described under Alternative 2 above.

## D. Required and Additional Disclosures

This section discloses the effects of the alternatives on the human environment as specified by law, regulation, policy, or Executive Order.

**Cultural Resources**

No impacts to any known cultural resource site would result from implementation of any of the action alternatives. Appropriate protection and avoidance measures have been designed and applied to the known sites existing within the project area in conjunction with the project Archaeologist.

**Tribal Treaty Rights**

Treaties provide that Native Americans will continue to have the right to erect suitable buildings for fish curing, privileges of hunting, gathering roots and berries, and pasturing stock on unclaimed lands. Indian treaty rights and privileges were considered throughout this analysis and maintained through appropriate design and layout features, especially related to resources such as fish, wildlife, and riparian areas. All alternatives are relatively equal in their treatment of treaty rights and are expected to maintain treaty rights and opportunities into the future. This responds to the non-key issue of Indian treaty rights and trust responsibilities.

**Biological Diversity**

All existing native and desirable introduced species and communities are maintained with all alternatives. Aspen restoration efforts would increase diversity. Erosion control measures (seeding) would use native species when possible (EA, Chapter Two). Biological diversity is not expected to be affected.

**Public Safety**

No long-term public safety problems are anticipated with any of the alternatives. Short-term safety hazards such as log truck traffic and falling trees near roads would be mitigated through contract safety provisions and are not anticipated to impact public safety.

There is no expectation that there would be a change in public health and safety. Mitigation and precautions apply to the action alternative. Should a wildfire occur under any alternative, there could be an adverse impact to public health in terms of a change in the water quality. However, under Alternatives 2 or 3, safe firefighter ingress and egress would be improved and strategic areas from which to attack fires from would be improve firefighter safety for direct attack suppression methods. No such improvement would occur under Alternative 1. Other safety measures are discussed in or are a standard part of sale contracts.

Standing trees that lean over or near roadways and present a hazard to public safety due to conditions such as deterioration or physical damage to roots, trunks, stems, or limbs would be removed from the project area.

**Research Natural Areas, Experimental Forests, and Wilderness**

There are no research natural areas, experimental forests, or wilderness areas associated with the Sugar project area. There are no known significant cumulative effects from the project and other projects implemented or planned on areas separated from the affected area of the project beyond those evaluated in Chapter IV of the FEIS of the Forest Plan. The physical and biological effects are limited to this analysis area. No actions are proposed which are considered precedent setting.

There are no known effects on the human environment that are highly uncertain or involve unique or unknown risks. None of the actions threaten a violation of Federal, State, or local law. Action alternatives would comply with air and water quality regulations (laws). Although the effects on the quality of the human environment are not likely to be highly controversial, based on public participation, the project proposals themselves are highly controversial.

There is no expectation that there would be a change to public health and safety. Mitigation and precautions apply to all the action alternatives. Should there be a wildfire under any alternative, there could be an adverse impact to public health in terms of a change in the water quality. Other safety measures are discussed or are a standard part of sale contracts.

There are no known plant communities containing yew species within the analysis area.

**Probable Adverse Environmental Effects that Cannot Be Avoided**

Some impacts caused by implementation of management activities proposed in this analysis that cannot be avoided may be considered adverse according to individual interpretations. Stumps and disturbed areas are not a pleasing sight to some people, visually or environmentally. Truck traffic would compete with public traffic on roads used in common. Traffic and removal activities would also create dust and noise. Smoke from prescribed burning, fuels reduction, and slash disposal is an irritant and an unpleasant sight to some people. Recreation users may find changes to the areas they have visited in the past, either through reduced or increased access, changed landscape, or changes in vegetation.

**Irreversible and Irretrievable Commitment of Resources**

Irreversible resource commitments are actions that either deplete a non-renewable resource or disturb another resource to the point that it cannot be renewed within 100 years. There are no known significant irreversible resource commitments or irretrievable loss of timber production, wildlife habitats, soil production, or water quality from actions initiated under any of the alternatives. No heritage sites are known to be affected.

Impacts to soil and water are controlled by management practices and mitigation measures and would not represent an irreversible resource commitment, except for the minor acreage involved in log landing sites used for decking logs and in road construction. For all practical purposes, rock is a non-renewable resource. Use of rock as surfacing represents an irretrievable commitment of a resource, although due to quantities of supply, it is not a significant commitment. Existing roads and newly constructed roads constitute a more-or-less permanent commitment of a portion of land to a purpose other than timber production.

Some non-designated old growth may be affected under the action alternatives, however, the affect is generally considered a positive one and there will be no net loss of old growth. In addition, some loss of snag habitat would occur under all action alternatives. It is not known whether this is an irretrievable or irreversible action at this time. It is also not know what impact this type of change may have on unidentified nest sites of management indicator species.

**Energy Requirements of Alternatives**

Management alternatives that require less energy efficient methods such as helicopter logging are less energy-efficient. The need for less energy-efficient and more expensive techniques, such as helicopter logging is often due to the need to mitigate soil damage or adverse effects on watershed and other resources that would occur if more energy-efficient means, such as tractor yarding systems were employed. In this analysis, a combination of yarding systems and road development scenarios were developed in order to evaluate the tradeoffs of implementing various options.

**Prime Farmlands, Range Land, Forest Land**

Actions taken under any of the alternatives would have no impact on farmland, rangeland, or forestland inside of outside the National Forest. There are no prime farmlands affected by the proposal. Wetlands and floodplains associated with streams and springs would be protected using mitigation guidelines previously identified. No designated Wild and Scenic rivers would be affected by this project proposal.

**Civil Rights, Women, Minorities, Environmental Justice**

There are no known direct or adverse effects on women, minority groups, or civil rights of individuals or groups. Action alternatives are governed by sale or service contracts, which contain nondiscrimination requirements to prevent adverse impacts to these groups. The no action alternative may have some short-term adverse impacts on the local community by not providing timber sale receipts. To the greatest extent possible all populations have been provided the opportunity to comment before decisions are rendered on proposals and activities affecting human health or the environment. The proposals within this EA would not have a direct or indirect negative effect on minority or low-income populations (Presidential Exec. Order No. 12898 on Environmental Justice).

**Wetlands and Floodplains**

Executive Order 11190 requires the Forest Service to “avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands”. The Sugar Project is consistent with this EO because it does not propose to destroy or modify any wetlands. Executive Order (EO) 11988 requires the Forest Service to “avoid to the extent possible the long and short term adverse impacts associated with the occupation or modification of floodplains. The Sugar Project is consistent with this EO because it does not propose to occupy or modify any floodplain.

## E. CONSULTATION WITH OTHERS

The Sugar Vegetation Management project was published in the Wallowa-Whitman Schedule of Proposed Actions (SOPA), a quarterly publication, in April 2008 and has appeared in each quarterly SOPA since then. The SOPA is available on the forest website at www.fs.fed.us/r6/w-w/projects/. It is also mailed to approximately 100 government offices, elected officials, and individuals.

A detailed description of the proposed action was mailed on February 8, 2008 to approximately 100 forest users and concerned publics soliciting comments and concerns related to this project. Three letters of response were received from interested parties and one phone call, which are part of the Issues identified in this Chapter and are located within the Public Comments section of the EA. In addition to the direct mailing of the Proposed Action, a news release was published in the Observer newspaper soliciting comments on the Proposed Action.

An informational meeting was held on February 27, 2008 with Hells Canyon Preservation Council to discuss the Proposed Action, answer questions, and listen to their concerns/issues with the project.

A brief overview of the project and regular project updates have been presented to the Union County Community Forest Restoration Board as a part of District program of work for 2007-2010. Members also received a copy of the Proposed Action.

Scoping and consultation for the project was initiated and is on-going with the Confederated Tribes of the Umatilla Indian Reservation.

The Oregon Department of Fish and Wildlife (ODF&W) office was contacted as part of the Proposed Action scoping process.

Permittees who graze cattle within the Sugar analysis area were notified of project planning activities.

An analysis file for this project is available for public review at the La Grande Ranger District. The analysis file includes specialist's reports, data specific to the project, public notifications and their responses, meeting notes, and miscellaneous documentation.

Resource specialists from the Wallowa-Whitman Forest Headquarters reviewed the project at several checkpoints along the way to provide feedback on the project design, analysis, and documentation.

Consultation with National Marine Fisheries Service and US Fish and Wildlife Service for threatened and endangered species has been initiated and will be completed prior to signature of the decision document for this project.

A 30-day Comment Period for this Environmental Assessment was published in The Observer and Baker City Herald newspapers. Comment letters received and responses are located in the appendix for this EA.

## F **INTERDISCIPLINARY PARTICIPATION**

We have participated in this analysis and believe the significant issues have been identified and addressed:

| Name | Date | Title |
|---|---|---|
| Bob Clements | 7/29/08 | Silviculturist |
| Rand Hagen | 7/29/08 | Logging Systems |
| Mike Johnson | 7/29/08 | Fire/Fuels Specialist |
| Brad Lovatt | 7/29/08 | Fisheries Biologist |
| Jennifer Yancey | 7/29/08 | Hydrologist |
| Mark Penninger | 7/29/08 | Wildlife Biologist |
| Cindy Whitlock | 7/29/08 | Team Leader |
| Ginger White | 7/29/08 | Writer/Editor |
| Aric Johnson | 7/29/08 | Range Conservationist |
| Penny D. Hall | 7/29/08 | Botanist |
| Erik Harvey | 7/29/08 | Archaeologist |
| Joe Neer | 7/29/08 | Engineer – Trans Planner |

Recommended:

_____ _____ District Ranger – LGRD

DR Signature Date

I believe this assessment meets the requirements of the National Environmental Policy Act of 1969.

_____ _____ Env. Coordinator

EC Signature Date

# Sugar Vegetation Management Appendix D
# Cumulative Effects Analysis
# Process and Project Area Activities

The following process and assumptions were used by the Sugar Vegetation Management ID Team in their analysis of the effects of actions proposed in this document on their resources.

**A. Analysis Area** - In general, the analysis area will be the project area. If the resource being analyzed necessitates extending the analysis area outside the project area for an appropriate analysis then the extent of the analysis area is documented under each resource area.

**B. Effects -** The specific effects of each action alternative on the environment, including the No Action alternative are to be analyzed by each resource area.

***Actions to be analyzed by ALL resources are:***

1. Timber Treatment Prescriptions
2. Prescription Modifications for Corridors (HSA, HTH, HSH, HIM, HOR, SPC)
3. RHCA Treatments
4. Fuels Reduction
5. Prescribed Burning
6. Treatment of LOS below HRV
7. Precommercial thinning
8. Snag removal <12in
9. LOS treatment for LOS < HRV
10. Rehabilitation (large wood placement, invasive species, forage)
11. Temporary Road Construction
12. Road Obliterations
13. Mitigation Measures

***Show the cause and effect for Direct, Indirect, and Cumulative effects, defined as follows:***

**Direct Effects:** Explain the direct effects the implementation of the alternatives would have on the environment. These include effects which are caused by the action and occur at the same time and place as the action.

**Indirect Effects:** Describe indirect effects of alternatives on the environment. Indirect effects include those which are caused by the action but are later in time or farther removed in distance what are still reasonable foreseeable.

**Cumulative Effects:** The cumulative effects analysis will include:

Past Actions + Present Actions + Proposed Actions + Reasonably Foreseeable

Present actions will incorporate all know activities. Reasonably foreseeable future is approximately 5 years within which we are reasonably certain our proposed actions would occur.

**Note:** should you change any of these parameters, the change is documented in the effects writeup for that resource.

**C. Analyze the effects** in terms of:

1. **Differences from the present condition**: How do each of the alternatives (include all actions under each) change the environment based on what is there now? What are the specific differences between alternatives? What is the direction of the effect (increase or decrease)?

2. **Duration:** How long will the impacts last?

3. **Significance**: Analyze in terms of context and intensity.

    - **Context**: Analyze whether effects are local, regional, national, or affect society as a whole.
    - **Intensity**: Analyze in terms of severity of impacts.

Effects write ups need to disclose what these actions WILL DO to the environment.

Avoid relative measurements such as "minimal, substantial, etc". Talk about the specific differences between alternatives in units of measure that are relevant, quantifiable, and descriptive. Use the Key Indicators to describe the effects on the key issues.

Use tables graphs, drawings, etc. when appropriate and available.

Use references to relevant scientific studies to back up statements when appropriate and available. In addition, identify where there are information gaps, incomplete or unavailable information.

**D. Past Present and Reasonably Foreseeable Future Actions**

The following is a list of the past, present and reasonably foreseeable future activities within the project area, and on immediately adjacent public and private lands. This list will serve as a guide for resource specialists as they define their Analysis areas for their resource and identify the direct, indirect, and cumulative effects of implementing the Bald Angel alternatives. Reasonably foreseeable future is defined as within the next 5 years for this exercise.

Regen = clearcut, seedtree, shelterwood
Intermediate = commercial thinning, partial removals, prep cuts, salvage, selection
Other = final removals, overstory removals

| Timber | | | |
|---|---|---|---|
| **Project Name** | **SWS** | **Year** | **Activity** |
| Brown Sugar Jr. | Lower Five Points Creek (170601040403) | 1976 | 173 Ac – Intermediate |
| Little John | Lower Five Points Creek (170601040403) | 1982 | 713 ac - Regen |
| Little John | Lower Five Points Creek (170601040403) | 1982 | 911 ac - Intermediate |
| Pelican Smith R. | Lower Five Points Creek (170601040403) | 1984 | 57 ac - Regen |
| Pelican Smith R. | Lower Five Points Creek (170601040403) | 1984 | 32 ac - Intermediate |
| Little John II | Lower Five Points Creek (170601040403) | 1986 | 636 ac – Other |
| Little John II | Lower Five Points Creek (170601040403) | 1986 | 160 ac - Intermediate |
| Little John II | Lower Five Points Creek (170601040403) | 1986 | 66 ac - Regen |
| Big John Salvage | Lower Five Points Creek (170601040403) | 1988 | 81 ac - Intermediate |

| Timber | | | |
|---|---|---|---|
| **Project Name** | **SWS** | **Year** | **Activity** |
| Big John Salvage | Lower Five Points Creek (170601040403) | 1988 | 283 ac - Regen |
| Pelican Smith Ridge. | Lower Five Points Creek (170601040403) | 1989 | 455 ac - Regen |
| Pelican Smith Ridge. | Lower Five Points Creek (170601040403) | 1989 | 39 ac - Intermediate |
| Thirty One Salvage | Lower Five Points Creek (170601040403) | 1990 | 18 ac - Intermediate |
| 3-Cabin Trespass | Lower Five Points Creek (170601040403) | 1991 | 1 ac - Regen |
| Fish Cheeks | Lower Five Points Creek (170601040403) | 1992 | 128 ac – Other |
| Moon Salvage | Lower Five Points Creek (170601040403) | 1993 | 30 ac – Intermediate |
| 3-Cabin | Lower Five Points Creek (170601040403) | 2003 | 29 ac - Regen |
| 3-Cabin | Lower Five Points Creek (170601040403) | 2003 | 703 ac - Intermediate |

| Pre-Commercial Thinning | | | |
|---|---|---|---|
| **Project Name** | **SWS** | **Year** | **Activity** |
| Fish Cheeks | Lower Five Points Creek (170601040403) | 1998 | 62 ac – SPC |
| 3-Cabin | Lower Five Points Creek (170601040403) | 1999 | 71 ac - SPC |
| Little John | Lower Five Points Creek (170601040403) | 2008 | 468 ac - SPC |
| Pelican Smith Ridge | Lower Five Points Creek (170601040403) | 2007 | 143 ac - SPC |

| Overview of Timber Harvest: | | | |
|---|---|---|---|
| | **Time Period** | **Project Name** | **Description and Extent of Activity** |
| **Timber Harvest** | 1976 – 1987 > 20yrs Old | Brown Sugar Jr., Little John, Little John II, Pelican Smith Ridge. | These timber harvests projects are greater than 20 years old, treated 2,748 acres with a combination of prescriptions (see above). These acres should be fully hydrologically and vegetatively recovered. Associated activities were road building and increased access as a result of these harvests. |

| | | | |
|---|---|---|---|
| | 1987 – 1995 Pre PACFISH & < 20yrs Old | 3-Cabin Trespass, Big John Salvage, Fish Cheeks, Moon Salvage, Pelican Smith Ridge., Thirty One Salvage | These timber harvests projects are less than 20 years old, but were implemented prior to PACFISH standards for RHCA buffers. They treated 1,035 acres with a combination of thinning, final removal, and regeneration prescriptions. These acres were all treated greater that 10 years ago and would be partially hydrologically and vegetatively recovered. Associated activities were road building and increased access as a result of these harvests. |
| | 1996 – 2007 Post PACFISH | 3_Cabin | These timber harvest projects were conducted based on all PACFISH fisheries and watershed protection and mitigation measures being implemented in full reducing the effects and speeding up the recovery rate. They treated 1,021 acres with a combination of thinnings (992 acres) and shelterwood harvest prescriptions. No new permanent road construction was a part of these projects. A very small amount of temperorary road was used, but was immediately obliterated at the conclusion of the project. |

| **Past RX Burns** | | | |
|---|---|---|---|
| **Project Name** | **SWS** | **Year** | **Activity (RX-Burn)** |
| 3 Cabin/Green Pelican | Lower Five Points Creek | 2002-2006 | 477 |
| | | | |
| | | **TOTAL** | **477** |
| **RX Burns in the Foreseeable Future** | | | |
| **Project Name** | **SWS** | **Year** | **Activity (RX-Burn)** |
| 3 Cabin/Green Pelican | | | 600ac |
| | | | |
| | | **TOTAL** | **600ac** |

| **Past Land Owner Activities** | | | | |
|---|---|---|---|---|
| **Land owner** | **SWS** | **Year(s)** | **Activity** | **~Acres** |
| J. Smejkal | Lower Five Points Creek | 2000-2008 | Thinning/Piling | 300 |
| C. Silbernagel | Lower Five Points Creek | 2000-2008 | Thinning/Piling | 190 |
| H. Cantrell | Lower Five Points Creek | 2000-2008 | Thinning/Piling | 190 |
| | | | **TOTAL** | **680** |

| **Recreation** | | | |
|---|---|---|---|
| **Project Name** | **SWS** | **Year** | **Activity** |
| Dispersed Camping | | On-going | |
| Firewood Cutting | | On-going | District-wide personal use firewood |
| Snowmobiles Rtes | | On-going | Approx. 6.1 miles of groomed route on Road 3100 within the analysis area. |
| OHV Use – Current | | On-going | Cross-country OHV use continues to increase – non-motorized trails currently used by OHVs. Recreation use is moderate with primary use during hunting seasons. |
| Designated OHV Trails (Future) | | 2008 | Routes may be considered within the area under the W-W Travel Management Plan EIS (Oct 2008) |

| Roads | | | |
|---|---|---|---|
| **Project Name** | **SWS** | **Year** | **Activity** |
| Timber Harvest Projects | All SWS | 1978-Present | The roads miles and densities, increases and decreases are directly correlated to the timber harvest activities. Associated activities and structures include decommissioning (earthen berms, obliteration, recontouring), maintenance and culvert replacements and drainage improvement. |
| 3100 Road | | 2007 | Road Maintenance – blading, ditch and culvert cleaning, etc |
| 3120 Road | | 2007 | Road Maintenance – blading, ditch, and culvert cleaning, ect. Reconstruction – drainage structures, template and surfacing. |
| 8405 Road | | 2000 | Road Maintenance – blading, ditch, and culvert cleaning, ect. |

| Range Allotments | | | |
|---|---|---|---|
| **Project Name** | **SWS** | **Year** | **Activity** |
| Five Points C&H | All | Active | Forage Production- Livestock Grazing |
| Spring Mountain S&G | | Active | Forage Production- Livestock Grazing |

## Water Quality, Fisheries Habitat, and Populations

| Activity | Time Period | Project Name | Description and Extent of Activity |
|---|---|---|---|
| **Mining** | 1988 | Rob's Hill Mine | Mining activity occurred in the Five Points Creek drainage in 1988 along an unnamed tributary that enters Five Points Creek at Camp One. This placer mine involved the removal of surface materials over an area of 50 feet by 200 feet in order to explore for metals in the underlying materials. Settling ponds and a channel were constructed within 300 feet of the unnamed tributray for the purpose of washing gravels. The area was restored in 1990 by an effort to level and seed the area in grasses. In 1996, a second enhancement project reconstructed portions of the stream channel and stream banks and revegetated the area with native shrubs and grasses. Restoration of the area was successful and no evidence of the mines existence is visible and no longer impacting the stream. |
| **Irrigation Ditches** | 1800s – Present | None | There are no irrigation ditches or diversions in the Lower Five Points Creek subwatershed. However, an old cement diversion structure that is no longer used is located on Private Land. |
| **Restoration (Fisheries and Watershed)** | 1996 | Unnamed Tributary Streambank Restoration Project | The Streambank Restoration Project in 1996 used coconut fiber mats and logs to treat bank erosion and channel form problems along reaches of an unnamed tributary to Five Points Creek that enters at Camp One. This project was used to aggressively treat short sections of impacted streams in order to improve their function, form, and stability. |
| **Restoration (Fisheries and Watershed)** | 1993 | Nunamker Creek | Watershed rehabilitation work was conducted within the Five Points Allotment in 1993. This rehabilitation included large woody debris additions surrounding Nunamaker Creek to restrict cattle access. |
| **Restoration (Fisheries and Watershed)** | 1998 | Five Points Whole Tree Addition Project | The Five Points Whole Tree Addition Project added 30 large trees with root wads attached to Five Points Creek from Camp One upstream. |
| **Restoration (Fisheries and Watershed)** | 1997 | Camp One Restoration project | The Camp One Restoration project was implemented in 1997. This project took place in the Lower Five Points Creek subwatershed where recreational pressure from off-road enthusiasts is very high. Several spur roads were scarified and re-contoured. In addition, boulders and logs were used to block access on these roads. A culvert was removed and the site restored. A portion of the 8405-130 road was completely obliterated where it captured the flow from an unnamed tributary to No Name Creek (enters Five Points Creek at Camp One). The damaged tributary was reconfigured to follow its former channel. |

## Overview of Range Allotments within project area:

| Activity | Time Period | Project Name and Location (5th Field HUC) | Description and Extent of Activity |
|---|---|---|---|
| **Livestock Grazing** | 1880s - Present | Five Points Allotment (Lower Five Points 170601040403), (Pelican Creek, 170601040402), (East Meecham Creek, 170701030202)<br>Spring Mountain Allotment (Lower Five Points 170601040403), (East Meecham Creek, 170701030202) | Unregulated grazing occurred prior to the early 1900s. Much of the project area was in ownership of the Mt Emily Timber Company which encouraged abusive grazing practices to reduce percieved fire hazards. Following the aquisition of the land within the project area by the USFS, focused resource based management commenced first with sheep grazing and then a conversion to cattle grazing. After 1995, the listed allotments began regulating the grazing within the analysis area through PACFISH Standards and Guides. Associated activities and structures include fencing (boundary and riparian), cattle guards, water systems, drift fences, corrals, loading chutes and designated stock driveways. |

| Wildlife | | | |
|---|---|---|---|
| **Project Name** | **SWS** | **Year** | **Activity** |
| Aspen Restoration | 89L | 2003 | Removed most conifers, burned slash piles, fenced area |

| Mining | | | |
|---|---|---|---|
| **Project Name** | **SWS** | **Year** | **Activity** |
| No Name Creek Restoration | | | |
| Camp One Restoration | | | |
| | | | |

| Private Land Activities | | | |
|---|---|---|---|
| **Project Name** | **SWS** | **Year** | **Activity** |
| Logging | 29F,29H, 13C,D,E | 2000 - 2008 | In general, the private lands adjacent to the National forest consist of forest and grasslands that are used for private residences and forest management. Forest management has generally been a mixture of even/uneven-aged management providing a variety of seral structures and stages. It is anticipated that these management procedures would continue into the foreseeable future. Additionally it is anticipated that hazardous fuels reduction work will be occurring in the WUI area surrounding Hilgard. |
| Grazing | None | None | None |
| Roads | | | No known new road construction planned. |
| Recreation / Mt Emily | 29D | | Potential for recreation use to increase dependent on private land purchase (Mt Emily/ Owsley Canyon) for OHV and non-motorized opportunities. As private land use increases, demands for extensive OHV trail systems on National Forest land will increase. |

# Cumulative Effects Determination Tables

## Silviculture/Vegetation Management

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| Past Harvest | Continued stand succession and movement toward HRV | Yes | Yes | Yes | Forested stands will continue through successional stage development. Previous harvest reduced the amount of LOS within the area. Proposed treatments will accelerate stands toward LOS and convert warm/dry MSLT stands to SSLT which will move the area toward HRV across the landscape reflecting past and present management activities. |
| Rx Burn | Stand health, moving toward HRV, and reduction of fir encroachment | Yes | Yes | Yes | Previous prescribed fire treatments began the reintroduction of fire into areas outside historic fire return intervals, but, were primarily focused in grassy timbered stringers. Prescribed fire in this project will continue the treatments started in earlier burns, reduce fuel loadings, improve forage, and reduce encroachment into meadows and reduce the amount of grand fir in timbered stands which would have historically been Douglas-fir and, ponderosa pine. This, in combination with previous burns, would accelerate movement towards desired stand conditions to create healthier stands more resilient to effects from wildfire. |
| Irrigation Ditches | None | No | No | No | |
| Camping/Cabins | None | No | No | No | |
| OHVs | None | No | No | No | |
| Existing Roads | None | Yes | Yes | No | |
| Closed Roads | None | Yes | Yes | No | |
| Grazing | Effect the amount and quality of available forage. | Yes | Yes | No | Grazing forage should be enhanced over the long term from prescribed burning and stand treatments (opening of crown densities). |
| Wildlife Enhancement | Enhancement of Aspen stand | Yes | Yes | Yes | Project will ensure that aspen persists at the Sugarloaf site. Fencing protects aspen suckers from browsing and cutting conifers reduces conifer tree encroachment. Enhancement and protection of this aspen clone increases the vegetative diversity of the area. |

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| Mining | None | Yes | Yes | No | |

## Old Growth

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| Past Harvest | Reduce canopy closure and structural complexity. | Yes | Yes | Yes | Previous harvest reduced the amount of old growth within the area. Past harvest has positive and negative effects on species into the foreseeable future. Acres of MSLT converted to SSLT reduces structural complexity, but provides for a structure that is significantly underrepresented. |
| Rx Burn | Reduce canopy closure and structural complexity. | Yes | Yes | Yes | Previous prescribed fire treatments began the reintroduction of fire into areas outside historic fire return intervals, but, were primarily focused in grassy timbered stringers. Prescribed fire in this project will continue the treatments started in earlier burns, reduce fuel loadings, improve forage, and reduce fir encroachment into meadows and timbered stands which would have historically been Douglas-fir, ponderosa pine, larch. Prescribed fire will reduce the amount of overstocked understory creating an ecosystem more resilient during attacks from insects and disease. |
| Camping/Cabins | None | No | No | No | |
| OHVs | Disturbance of old growth related species | No | No | No | Regulated closure (Dry Beaver-Ladd Canyon) reduces the potential for disturbance of species associated with old growth. |
| Existing Roads | Firewood cutting and species disturbance | Yes | Yes | No | Motorized access will not change under this project. Firewood cutting will continue at the same rate. |
| Closed Roads | Disturbance of old growth related species. | Yes | Yes | No | Regulated closure (Dry Beaver-Ladd Canyon) reduces the unauthorized use of closed roads and potential harassment of old growth associated species. |
| Grazing | Grazing in old growth stands | Yes | Yes | No | There is potential for stands converted to SSLT, or old growth stands that have been burned to increase livestock grazing due to increased forage. |
| Wildlife Enhancement | None | Yes | Yes | No | The previously accomplished wildlife enhancement work benefits old growth associated species by implementing year round access |

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| | | | | | management. |
| Mining | None | Yes | Yes | No | No effect to mines from this project. |

## Big Game

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| Past Harvest | Reduction of Cover | Yes | Yes | Yes | In those areas where past harvest activities have reduced satisfactory cover to marginal cover or forage and not yet returned to cover, the HorseFly project will add incrementally to these reduced cover acres within the area – reducing security habitat, however, the existing area closure offsets this effect by securing blocks of habitat with limited or no motorized access. |
| Rx Burn | Reduction of cover and forage enhancement | Yes | Yes | Yes | Past, planned, and future prescribed burning reduces some habitat over the short term but in many areas will enhance long term habitat and forage as grasses, shrubs, etc regenerate/sprout. There is a potential to affect hiding cover and some overstory cover while burning as well, however, this affect will be minor over all and will leave cover patches as burning occurs in a mosaic which closer represents historical conditions. Prescribed fire is scheduled over many years to avoid over-depleting forage within the area and to rejuvenate grassy areas when they begin to get overgrown and unpalatable. |
| Camping/ Cabins | More security habitat | No | No | Yes | The existing area closure associated with this project will reduce the number of dispersed recreation sites available for use and concentrate camping in other areas, decreasing the potential for animal disturbance throughout the entire area by providing for security areas. |
| OHVs | More security habitat | No | No | Yes | Unregulated OHV use in the past has lead to the creation of unathorized trails which contribute to the isolation and interruption of connectivity between habitat |

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| | | | | | features in the project area. The existing area closure reduces the potential for this isolation, impacts on vegetation, and the disturbance to species using these habitat features. |
| Past Harvest | Reduction of Cover | Yes | Yes | Yes | In those areas where past harvest activities have reduced satisfactory cover to marginal cover or forage and not yet returned to cover, the HorseFly project will add incrementally to these reduced cover acres within the area – reducing security habitat, however, the existing area closure offsets this effect by securing blocks of habitat with limited or no motorized access. |
| Existing Roads | Improved big game habitat, increased security habitat | No | No | Yes | |
| Closed Roads | Improved big game habitat, increased security habitat | No | No | Yes | Closed roads are proposed to be reopen for timber harvest and closed upon completion. The existing area closure improves big game security habitat. |
| Grazing | Forage competition | Yes | Yes | No | Grazing by cattle and sheep will continue within the allotments that occur at least partially in this analysis area. Grazing by cattle throughout August, September, and part of October reduces available forage for elk and deer prior to going into the rut. This can lead to elk and deer going into breeding and winter seasons with less body fat than necessary to survive or successfully reproduce. These effects will persist and will not change as a result of any of the action alternatives. |
| Wildlife Enhancement | Minor forage source | Yes | Yes | No | The amount of forage provided by aspen is negligible at the analysis area scale. |
| Mining | None | Yes | Yes | No | |

## Fire and Fuels Management

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| Past Harvest | Return to historic fire intervals; Decrease in fire risk | Yes | Yes | Yes | The effects of the Sugar action alternatives contribute to the trend toward a decrease in fire risk begun by previous treatments in the area.<br><br>The other past/present projects within |
| Rx Burn | Return to historic fire intervals; | Yes | Yes | Yes | |

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| | Decrease in fire risk, air quality from smoke | | | | the project area have very similar treatments to those proposed for Sugar (commercial and non-commercial thinning, improvement cuts, and fuels reduction). Prescribe fire would be used to reduce surface fuel loading following mechanical treatment. The cumulative effects of past projects, combined with the proposed activities, move several thousand of fire adapted plant communities (fire regimes 1 and 3) closer to historic conditions.<br><br>Prescribed burning would produce smoke that may impact nearby sensitive areas. However, smoke emissions could be managed to meet the Clean Air Act. |
| Irrigation Ditches | None | Yes | Yes | No | |
| Camping/ Cabins | Increased human cause fire risk | Yes | Yes | Yes | Good access for people, OHVs and vehicles in northern portion of project area. There are many dispersed camp sites, thus increasing the potential for fire starts from vehicles, campfires, and smoking. There are limited access options for fire suppression activities within Five Point drainage. |
| OHVs | Increased human cause fire risk | Yes | Yes | Yes | Treatments would increase fire-fighter and public safety by reducing potential for high intensity fires. Good access options for fire suppression activities.<br><br>In the Union County CWPP, Perry/ Hilgard WUI is identified as a high hazard priority area. The CWPP was developed collaboratively with numerous State, Local, and Federal Government entities and the local public. The Perry/Hilgard WUI includes values at risk such as a major interstate (I-84), a state highway (244), Hilgard State Park, Union Pacific Railroad, the communities of Perry and Hilgard, and private forestland ownership. Fuels treatments on private land have been successful. Three major landowners have thinned, logged, or removed brush on 680 acres thus far. |
| Existing Roads | Increased human cause fire risk; initial attack access | Yes | Yes | Yes | |
| Closed Roads | Increased human cause fire risk; initial attack access | Yes | Yes | Yes | |
| Grazing | Reduce fine fuels | Yes | Yes | Yes | Grazing livestock from the Five Points and Spring Mountain allotments would reduce the grass component in predominantly natural openings. Overstocked forested areas are generally not heavily grazed by |

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| | | | | | livestock. Livestock grazing is expected to slightly reduce fire behavior. As a result, livestock grazing is not expected to impede progression toward historic fire return intervals. |
| Wildlife Enhancement | None | Yes | Yes | No | |
| Mining | None | No | No | No | |

## Socio-Economics

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| Past Harvest | Payments to County; Jobs generated and/or supported | Yes | Yes | Yes | Socio-economic effects were analyzed in terms of payments to counties and jobs and income. Payments are 25 percent of the stumpage paid to the U.S. Treasury. Employment and income generated as a result of timber harvest is based upon the amount of timber harvested by product, either saw timber or non-saw timber.<br><br>The cumulative effects of this project are very similar between alternatives, they all will provide the county with receipts which otherwise would be dollars out of the taxpayers pocket. They all will provide a similar number of jobs related to harvesting, transporting, processing, marketing and distributing a valuable product. The income generated by this project contributes to family wage earners and local industries which in turn support other local businesses, hospitals, and services contributing to the overall economic vitality of the County. The products produced from this project would not support the local mills alone, however, when added to the wood products being removed from other private and corporate lands, it contributes to the overall viability and sustainability of local mills and businesses. |
| Rx Burn | Contracts - Jobs generated and/or supported | Yes | Yes | Yes | |
| Camping/Cabins | Jobs generated and/or supported | Yes | Yes | Yes | |
| OHVs | Jobs generated and/or supported | Yes | Yes | Yes | |
| Existing Roads | Payments to County; Jobs generated and/or supported | Yes | Yes | Yes | |
| Closed Roads | Payments to County; Jobs generated and/or supported | Yes | Yes | Yes | |
| Grazing | Jobs generated and/or supported | Yes | Yes | Yes | |
| Wildlife Enhancement | Jobs generated and/or supported | Yes | Yes | Yes | |
| Mining | None | Yes | Yes | No | |

## *Water Quality, Fisheries Habitat, and Populations*

| Activity | Time Period | Project Name | Description and Extent of Activity |
|---|---|---|---|
| **Timber Harvest** | 1976 – 1987 > 20yrs Old | Brown Sugar Jr., Little John, Little John II, Pelican Smith Ridge. | These timber harvests projects are greater than 20 years old and treated 2,748 acres with a combination of prescriptions. These acres should be fully hydrologically and vegetatively recovered. Associated activities were road building and increased access as a result of these harvests. |
| | 1987 – 1995 Pre PACFISH & < 20yrs Old | 3-Cabin Trespass, Big John Salvage, Fish Cheeks, Moon Salvage, Pelican Smith Ridge., Thirty One Salvage | These timber harvests projects are less than 20 years old, but were implemented prior to PACFISH standards for RHCA buffers. They treated 1,035 acres with a combination of thinning, final removal, and regeneration prescriptions. These acres were all treated greater than 10 years ago and would be partially hydrologically and vegetatively recovered. Associated activities were road building and increased access as a result of these harvests. |
| | 1996 – 2007 Post PACFISH | 3-Cabin | This timber harvest project were conducted based on all PACFISH fisheries and watershed protection and mitigation measures being implemented in full reducing the effects and speeding up the recovery rate. They treated 1,021 acres with a combination of thinning (992 acres) and shelterwood harvest prescriptions. No new permanent road construction was a part of these projects. A very small amount of temporary road was used, but was immediately obliterated at the conclusion of the project. |
| **Pre-Commercial Thinning** | 1998-2007 | Fish Cheeks, 3-Cabin, Little John, Pelican Smith Ridge | Timber stand improvement. Thinned 744 acres of overstocked stands to reduce competition, increase tree growth and vigor, and remove undesirable species resulting in healthy fully stocked stands. |
| **Prescribed Fire** | 2002-2006 | 3 Cabin/Green Pelican | Combined projects treated 477 acres. Prescribed fire became regulated after 1995 through PACFISH. Associated activities included restricting direct ignition and fire lines in RHCAs and controlling fire severity and intensity. Prescribed burn areas are typically revegetated and recovered within one year. |
| **Livestock Grazing** | 1880s - Present | Five Points and Spring Mountain Allotments | Unregulated grazing occurred prior to the early 1900s. Much of the project area was in ownership of the Mt Emily Timber Company which encouraged abusive grazing practices to reduce perceived fire hazards. Following the acquisition of the land within the project area by the USFS, focused resource based management commenced first with sheep grazing and then a conversion to cattle grazing. After 1995, the listed allotments began regulating grazing within the analysis area through PACFISH Standards and Guidelines. Associated activities and structures include fencing (boundary and riparian), cattle guards, water systems, drift fences, corrals, loading chutes and designated stock driveways. |
| **Mining** | 1988 | Rob's Hill Mine | Mining activity occurred in the Five Points Creek drainage in 1988 along an unnamed tributary that enters Five Points Creek at Camp One. This placer mine involved the removal of surface materials over an area of 50 feet by 200 feet in order to explore for metals in the underlying materials. Settling ponds and a channel were |

| Activity | Time Period | Project Name | Description and Extent of Activity |
|---|---|---|---|
| | | | constructed within 300 feet of the unnamed tributary for the purpose of washing gravels. The area was restored in 1990 by an effort to level and seed the area in grasses. In 1996, a second enhancement project reconstructed portions of the stream channel and streambanks and revegetated the area with native shrubs and grasses. Restoration of the area was successful and no evidence of the mines existence is visible and is no longer impacting the stream. |
| **Irrigation Ditches** | 1800s – Present | None | There are no irrigation ditches or diversions in the Lower Five Points Creek subwatershed. However, an old cement diversion structure that is no longer used is located on Private Land. |
| **Recreation** | On-going | Dispersed Camping | Camping in non-designated campgrounds |
| | On-going | Firewood Cutting | District-wide personal use firewood |
| | On-going | Snowmobiles Routes | Approx. 6.1 miles of groomed route on Road 3100 within the analysis area. |
| | On-going | OHV Use - Current | Cross-country OHV use continues to increase – non-motorized trails currently used by OHVs. Recreation use is moderate with primary use during hunting seasons. |
| | 2008 | Designated OHV Trails (Future) | Routes may be considered within the area under the W-W Travel Management Plan EIS (Oct 2008) |
| **Roads** | 1978 – Present | Timber Harvest Projects | The roads are established in this area. Any increases or decreases in miles and density are directly correlated to timber harvest activities. Associated activities and structures include decommissioning (earthen berms, obliteration, recontouring), maintenance, culvert replacements and drainage improvement. |
| | 2007 | 3100 Road | Road Maintenance – blading, ditch and culvert cleaning, etc |
| | 2007 | 3120 Road | Road Maintenance – blading, ditch, and culvert cleaning, etc. Reconstruction – drainage structures, template and surfacing. |
| | 2000 | 8405 Road | Road Maintenance – blading, ditch, and culvert cleaning, etc. |
| **Wildlife Enhancement** | 2003 | Aspen Restoration-East Meacham subwatershed | Removed most conifers, burned slash piles, fenced area |
| **Restoration (Fisheries and Watershed)** | 1993 | Nunamker Creek | Watershed rehabilitation work was conducted within the Five Points Allotment in 1993. This rehabilitation included large woody debris additions surrounding Nunamaker Creek to restrict cattle access. |
| | 1996 | Unnamed Tributary Streambank Restoration Project | The Streambank Restoration Project in 1996 used coconut fiber mats and logs to treat bank erosion and channel form problems along reaches of an unnamed tributary to Five Points Creek that enters at Camp One. This project was used to aggressively treat short sections of impacted streams in order to improve their function, form, and stability. |
| | 1997 | Camp One Restoration project | The Camp One Restoration project was implemented in 1997. This project took place in the Lower Five Points Creek subwatershed where |

| Activity | Time Period | Project Name | Description and Extent of Activity |
|---|---|---|---|
| | | | recreational pressure from off-road enthusiasts is very high. Several spur roads were scarified and re-contoured. In addition, boulders and logs were used to block access on these roads. A culvert was removed and the site restored. A portion of the 8405-130 road was completely obliterated where it captured the flow from an unnamed tributary to No Name Creek (enters Five Points Creek at Camp One). The damaged tributary was reconfigured to follow its former channel. |
| | 1998 | Five Points Whole Tree Addition Project | The Five Points Whole Tree Addition Project added 30 large trees with root wads attached to Five Points Creek from Camp One upstream. |
| **Private Land Activities** | 2000-2008 | Forest Management | Thinning/Piling – 680 acres |
| | To present | Grazing | In general, the private lands adjacent to the National Forest consist of forest and grasslands that are used for ranching and forest management with an associated road network. It is anticipated that these activities would continue into the foreseeable future. Specific management plans for grazing, and maps or records of the road network on private land were not readily available. |
| | To present | Roads | |

## Soils

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| Past Harvest | Increase detrimental soil conditions (DSC), reduce organic material | Yes | Yes | Yes | Analysis of the cumulative effects of detrimental soil conditions indicates that soil quality is being maintained on about 98% of the project area, in comparison to the Forest Plan guideline of maintaining at least a minimum of 80% of the project area in a non-detrimental soil condition.<br><br>On that 2% of the project area considered in a detrimental condition ground cover, fine organic matter, and coarse woody material is below potential. The remaining 98% has adequate levels and since the project area has been protected from wildfire and rangelands appear to be properly grazed, there are satisfactory accumulations of ground cover, fine organic matter, |
| Rx Burn | Increase detrimental soil conditions (DSC), reduce organic material | Yes | Yes | Yes | |
| Irrigation Ditches | None | Yes | Yes | No | |
| Camping/Cabins | Increase detrimental soil conditions (DSC) | Yes | Yes | Yes | |
| OHVs | Increase detrimental soil conditions (DSC) | Yes | Yes | Yes | |
| Existing Roads | Increase detrimental soil conditions (DSC) | Yes | Yes | Yes | |

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| Closed Roads | Increase detrimental soil conditions (DSC) | Yes | Yes | Yes | and coarse woody materials on forestland and rangelands.<br><br>Implementation of Alternative 2 and 3 would increase DSCs in the project area about 3.0% and 2.7% respectively. These alternatives would not include any actions that would decrease existing DSCs.<br><br>The effect of harvest combined with past and foreseeable future activities and the currently proposed prescribed fire treatments and new and temporary roads would result in a maximum increase in DSCs of approximately 3% for a total of 5%, which is well below the Forest Plan guidelines of 20%. There is less than one mile (1.8 acres) of road proposed for reconstruction for all alternatives, which would not result in a measurable decrease in DSCs. |
| Grazing | Increase detrimental soil conditions (DSC) | Yes | Yes | No | |
| Wildlife Enhancement | None | Yes | Yes | No | |
| Mining | Increase detrimental soil conditions (DSC) | Yes | Yes | Yes | |

## PETS – Wildlife

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| Past Harvest | None | Lynx - No<br>Sens Sp - Yes | Lynx – No<br>Sens Sp - Yes | No<br>No | This project is not within a lynx analysis unit and will therefore have no effect on lynx or lynx habitat. Impacts to sensitive species will be non-existent or minor in scale and duration, and will not lead to federal listing of these species. |
| Rx Burn | None | Lynx - No<br>Sens Sp - Yes | Lynx – No<br>Sens Sp - Yes | No<br>No | |
| Irrigation Ditches | None | Lynx - No<br>Sens Sp - Yes | Lynx – No<br>Sens Sp - Yes | No<br>No | |
| Camping/Cabins | None | Lynx - No<br>Sens Sp - Yes | Lynx – No<br>Sens Sp - Yes | No<br>No | |
| OHVs | None | Lynx - No<br>Sens Sp - Yes | Lynx – No<br>Sens Sp - Yes | No<br>No | |
| Existing Roads | None | Lynx - No<br>Sens Sp - Yes | Lynx – No<br>Sens Sp - Yes | No<br>No | |
| Closed Roads | None | Lynx - No<br>Sens Sp - Yes | Lynx – No<br>Sens Sp - Yes | No<br>No | |
| Grazing | None | Lynx - No | Lynx – No | No | |

| | | | | | |
|---|---|---|---|---|---|
| | | Sens Sp - Yes | Sens Sp - Yes | No | |
| Wildlife Enhancement | None | Sens Sp - Yes | Sens Sp - Yes | No | |
| Mining | None | Lynx - No<br>Sens Sp - Yes | Lynx – No<br>Sens Sp - Yes | No<br>No | |

## PETS – Plants

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| Past Harvest | Reduction in habitat and plant occurrence | Yes | Yes | Yes | Past management activities such as harvest, burning, road construction, mining and other recreation uses have led to a decrease in plant occurrence and created physical changes in plant characteristics that persist for decades. In areas which have not recovered the residual effect is degradation in habitat and loss of occupied habitat. These activities in combination with the actions proposed in the Sugar Vegetation Management project would increase the potential for this loss of habitat and impacts to individual plants. The degree of the impacts due to project modifications will be minimal in most cases and will not likely contribute to a trend toward federal listing or cause a loss of viability to the populations or species.<br>These activities also contribute to the potential introduction and spread of noxious weeds. Current populations are possibly affecting sensitive plant sites and also lead to degradation of potentially suitable habitat. This condition is likely to occur with or without implementation of the Sugar Vegetation Management project. |
| Rx Burn | Reduction in habitat and plant occurrence | Yes | Yes | Yes | |
| Recreation; Dispersed camping Firewood and snowmobiling | Spread of Noxious weeds | Yes | Yes | Yes | |
| OHVs | Spread of Noxious weeds | Yes | Yes | Yes | |
| Existing Roads: 31 Road, FS road 3120 and 8405. | Reduction in habitat and plant occurrence, Spread of Noxious weeds | Yes | Yes | Yes | |
| Closed Roads | Reduction in habitat and plant occurrence | Yes | Yes | Yes | |
| Grazing | Reduction in habitat and plant occurrence | Yes | Yes | Yes | While current grazing management regimes are less impacting than historic actions, disturbance to habitat and impacts to sensitive plants ranges from low to high. When impacts occur at the same |

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| | | | | | location as fire and harvest activities, individual plants and their habitat are affected. |
| Wildlife Enhancement | Ensure that aspen persists at Sugarloaf site into the future. | Yes | Yes | No | Minor short term immeasurable impacts to habitat from wildlife enhancement work – will not cumulatively add to measurable impacts. |
| Mining: Rob's Hill Mine | Reduction in habitat and plant occurrence | Yes | Yes | Yes | See past harvest above. |
| Wildlife ; Aspen enhancement | Ensure that aspen persists at the Sugar-loaf site in the East Meacham Subwatershed. | Yes | Yes | No | Minor short term immeasurable impacts to habitat from wildlife enhancement work – will not cumulatively add to measurable impacts. |
| Restoration: Fisheries and Watershed | Streambank and watershed restoration projects conducted during the mid- to late 90's; 1993, 1996, 1997, and 1998. | Yes | Yes | No | Minor short term immeasurable impacts to potential habitat from restoration projects work – will not cumulatively add to measurable impacts. |

## Access and Travel Management

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| Past Harvest | None | Yes | Yes | No | |
| Rx Burn | None | Yes | Yes | No | |
| Irrigation Ditches | None | No | No | No | |
| Camping/Cabins | | No | No | No | |
| OHVs | Closure violations; enforcement issues | Yes | Yes | Yes | The road re-closures associated with this project increase the potential for being breached where closures were previously successful to explore less traveled areas, game retrieval, and will contribute to enforcement difficulties. |
| Existing Roads | Road Maintenance Improvement | Yes | Yes | Yes | Realignment of road 5110060 will be a more resource sensitive location, reduce stream crossings, improve the quality of the road, reduce |

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| | | | | | road/stream interactions, and reduce potential maintenance needs and costs. |
| Closed Roads | Closure violations; enforcement issues | Yes | Yes | Yes | The road re-closures associated with this project increase the potential for being breached where closures were previously successful to explore less traveled areas, game retrieval, and will contribute to enforcement difficulties. |
| Grazing | None | Yes | Yes | No | |
| Wildlife Enhancement | Road Closure Violations and Forage Enhancement | Yes | Yes | No | Blue Mtn Elk Initiative – This closure area is year round and has travel only on designated routes – therefore, any road re-closures will not change the use in this area. However, outside of the BMEI the road re-closures associated with this project increase the potential for being breached where closures were previously successful. |
| Mining | None | Yes | Yes | No | Current access is adequate for mining. |

## Management Indicator Species – Terrestrial

### Goshawk (see also LOS)

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| Past Harvest | Reduce quality of nest habitat; Disturb known nest sites; increase foraging habitat. | Yes | Yes | No | Some goshawk habitat will be incrementally reduced in quality by this project in addition to that which was historically treated and has not recovered to suitable habitat yet. Past intermediate and regeneration treatments in combination with the treatments in this project create an interspersion of structural states that could enhance foraging habitat. |
| Rx Burn | Foraging habitat enhancement | Yes | Yes | No | Previous prescribed burns have improved foraging habitat and the burning proposed in this project will also contribute to foraging habitat, however, there will be |

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| | | | | | short term (1-3 years) reductions until the grasses and shrubs respond. |
| Camping/Cabins | None | No | No | No | |
| OHVs | Potential for nest site disturbance | Yes | Yes | Yes | Unregulated OHV use in the past has lead to the creation of unapproved trails which contribute to the potential for nest site disturbance. The area closure (Dry Beaver-Ladd Canyon) reduces the potential for this disturbance |
| Existing Roads | Disturb nest sites | Yes | Yes | No | |
| Closed Roads | Disturb nest sites | Yes | Yes | No | |
| Grazing | None | Yes | Yes | No | |
| Wildlife Enhancement | None | Yes | Yes | No | |
| Mining | None | No | No | No | |

## Management Indicator Species – Terrestrial
## Primary Cavity Excavators

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| Past Harvest | Reduction of snag habitat | Yes | Yes | Yes | Past harvest activities have led to a deficiency in large diameter snags and logs over much of the analysis area, however, total snag numbers $\geq$12" dbh (which will be retained in this project) appear to exist at adequate levels to support snag dependant species between the 30-50% tolerance levels, with higher levels in MA15, riparian areas, and LOS stands. Harvest treatments in this project will indirectly perpetuate this condition by spacing tress so that natural snag recruitment through density related mortality factors will be reduced. However, larger trees will develop so that the trees recruited for snags over the long term will be larger. |
| Rx Burn | Snags | Yes | Yes | Yes | Some snags and logs are |

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| | consumed by fire | | | | expected to be consumed during burning but it is not possible to predict how many or where. New snags and logs created during burn operations will partially offset those consumed by fire. Snag losses by fire are assumed to be low since burning prescriptions are aimed at retention of large diameter woody materials. |
| Irrigation Ditches | None | No | No | No | |
| Camping/Cabins | None | No | No | No | |
| OHVs | None | No | No | No | |
| Existing Roads | Loss of snags to firewood cutting | Yes | Yes | Yes | Open roads provide access to firewood cutters into the areas. Loss of snags to firewood gatherers would contribute in localized areas of snag loss in combination with the loss from harvest operations. This effect is substantial in much of the project area. Snags ≥12" are being retained in all treatment areas.. |
| Closed Roads | Loss of snags to firewood cutting | Yes | Yes | Yes | Successful road closures provide some measure of protection from firewood cutting. Roads being re-opened for use in this project will again provide access to firewood cutters into areas which were previously inaccessible. Loss of snags to firewood gatherers would contribute in localized areas to the cumulative loss of snags from harvest operations. |
| Grazing | None | Yes | Yes | No | |
| Wildlife Enhancement | None | Yes | Yes | No | |
| Mining | None | No | No | No | |

## Neotropical Migratory Birds (NTMB)

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| Past Harvest | Habitat conversion or | Yes | Yes | Yes | This project in combination with the past harvest |

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| | modification:<br>• Open stands<br>• Setback of shrubs | | | | activities will further change the arrangement and patch sizes that determine habitat selection by NTMB. However, a mosaic of forest and rangeland conditions will exist after this project that will support nesting populations of NTMB and will not result in habitat changes that would be meaningful at local and regional population scales. |
| Rx Burn | Habitat conversion or modification:<br>• Loss of snags<br>• Open stands<br>• Setback of shrubs | Yes | Yes | Yes | Past, planned, and future prescribed burning reduces habitat over the short term for NTMB that nest on or near the ground, or depend on ground vegetation for cover or foraging. Habitat will be enhanced in the long-term as shrubs are regenerated and forest conditions are made more resilient and resistant to disturbances. |
| Irrigation Ditches | | No | No | No | There are none in this area. |
| Camping/Cabins | | No | No | No | |
| OHVs | | No | No | No | |
| Existing Roads | Habitat conversion or modification | Yes | Yes | Yes | Existing roads have replaced habitat with non-habitat and influence adjacent habitat by changing the microenvironment and by introducing disturbances from people. This project in combination with existing roads will further change the patch size and arrangement that determine habitat selection by NTMB. A mosaic of forest and rangeland conditions will exist after this project that will support nesting populations of NTMB and will not result in habitat changes that would be meaningful at local and regional population scales. |
| Closed Roads | Habitat conversion or | Yes | Yes | Yes | Closed roads have modified habitat for NTMB but, in |

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| | modification | | | | many cases successful road closures are allowing roadbeds to return to resource/habitat production. Roads being re-opened for use in this project will contribute cumulatively in a minor way to a reduction in habitat for NTMBs . |
| Grazing | None | Yes | Yes | No | |
| Wildlife Enhancement | Increased vegetative diversity | | | | The enhancement work planned for in this project, in combination with the aspen work done in the past will add to the habitat protected from browse and enhance the development of aspen and shrub species. |
| Mining | None | No | No | No | |

## Unique and Sensitive Habitats

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| Past Harvest | Isolate and interrupt connectivity | Yes | Yes | Yes | Past harvest and firewood cutting has isolated some unique features and contributed to the severing of connectivity between major rock features and other unique habitat features. Harvest in this project would protect the immediate context of these features; however, the harvest in the Sugar project would create a minor incremental negative effect contributing to the further isolation of these areas at the landscape scale. |
| Rx Burn | None | Yes | Yes | No | |
| Irrigation Ditches | None | No | No | No | |
| Camping/Cabins | None | No | No | No | |
| OHVs | Interrupt connectivity, vegetation impacts, and disturbance | Yes | Yes | Yes | Unregulated OHV use in the past has lead to the creation of unapproved trails which contribute to the isolation and interruption of |

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| | | | | | connectivity between unique habitat features in the project area. . |
| Existing Roads | Isolate and interrupt connectivity, and disturbance | Yes | Yes | Yes | Past road building to facilitate timber harvest, recreation and administrative access has isolated some unique features and contributed to the severing of connectivity between major rock features and other unique habitat features. |
| Closed Roads | Isolate and interrupt connectivity, and disturbance | Yes | Yes | Yes | Re-opening closed roads has the short term potential to create a minor incremental negative effect contributing to the isolation between major rock features and other unique habitat features. |
| Grazing | None | No | No | No | |
| Wildlife Enhancement | None | No | No | No | |
| Mining | None | No | No | No | |

## Rangeland Resources/Grazing

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| Past Harvest | Increase in forage quality/quantity, increased livestock access/trespass | Yes | Yes | No | Forage quality and quantity are expected to be increased in the short and long term by opening stands through timber harvest and through prescribed burning. Opening areas not previously accessible to livestock may provide opportunities for livestock to access previously treated stands and trespass into restricted/recreation areas. However, it would be immediately mitigated by permittee. |
| Rx Burn | Increase in forage quality/quantity, increased livestock access | Yes | Yes | No | Forage quality and quantity are expected to be increased in the short and long term by opening stands through timber harvest and through prescribed burning. Increased access may contribute to changes in |

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| | | | | | livestock distribution that allow increased use of riparian areas previously not accessible. |
| Irrigation Ditches | None | No | No | No | |
| Camping/Cabins | None | No | No | No | |
| OHVs | Livestock Harassment | Yes | yes | Yes | Potential conflicts between grazing/allotment management and OHV use in terms of safety and harassment of livestock exist with the present OHV access plan |
| Existing Roads | Increased livestock access | Yes | Yes | No | There will be no expected change in livestock use of existing use but increased traffic may result in cattle choosing areas with less activity |
| Closed Roads | Increased livestock access | Yes | Yes | No | There will be no expected change in livestock use of existing use but increased traffic may result in cattle choosing areas with less activity |
| Grazing | Increase in forage availablity | Yes | Yes | Yes | Forage quality and quantity are expected to be increased in the short and long term by opening stands through timber harvest and through prescribed burning. Opening areas not previously accessible to livestock may provide opportunities for livestock to access previously treated stands and better utilize forage throughout the allotment. |
| Wildlife Enhancement | None | Yes | Yes | No | Wildlife enhancement areas are fenced to restrict access. Activities proposed in this project in combination with the wildlife enhancement areas will have no measurable effect on Rangeland resources and grazing other than to remove small areas from the grazing land base. |
| Mining | None | No | No | No | This project will not affect |

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| | | | | | the mines or mining activities within the area and will have no effect on Range. |

## Noxious Weeds

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| Past Harvest | Noxious Weed Introduction/ existing populations | Yes | Yes | No | There is a potential for the transportation and spread of active noxious weed populations, however, implementation of the action alternatives is not expected to contribute to weed spread over and beyond what would be expected with typical traffic because weed control efforts are on-going, effects are limited to the treatment sites, and management requirements for prevention would be incorporated in project design. |
| Rx Burn | Seed bed preparation | Yes | Yes | No | Burning in areas where there are active noxious weed populations has the potential to prepare seedbeds for spread of the existing populations. Treatment of the existing populations should keep this to a minimum and avoid known sites. |
| Recreation; Dispersed camping Firewood and snowmobiling | Noxious Weed Introduction/ existing population spread | Yes | Only dispersed camping | No | |
| OHVs | Noxious Weed Introduction/ existing populations | Yes | Yes | Yes | Implementation of the Travel Management Plan will reduce the potential for spread of noxious weeds by unregulated OHV use. |
| Existing Roads | Vector for spread of existing | Yes | Yes | Yes | There is a potential for the transportation and spread of active noxious |

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| | populations | | | | weed populations, however, implementation of the action alternatives is not expected to contribute to weed spread over and beyond what would be expected with typical traffic because weed control efforts are on-going, effects are limited to the treatment sites, and management requirements for prevention would be incorporated in project design. |
| Closed Roads | None | Yes | Yes | No | Opening previously closed roads for use as temporary roads has the potential for the transportation and spread of noxious weeds, however, implementation of the action alternatives is not expected to contribute to weed spread over and beyond what would be expected with typical traffic because weed control efforts are on-going, effects are limited to the treatment sites, and management requirements for prevention would be incorporated in project design. |
| Grazing | Vector for spread of existing populations | Yes | Yes | No | Project will create more openings and disturbed soil which could create seedbeds for the remote possibility that noxious weeds could be carried into these areas by livestock and germinate until ground cover and undergrowth comes back. |
| Mining: Rob's Hill Mine | Noxious Weed Introduction/ existing populations | No | No | No | This project will not affect the mines or mining activities within the area. |
| Wildlife Enhancement | Noxious Weed Introduction | Yes | Yes | No | Minimal ground disturbance, no |

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| | | | | | cumulative impacts expected. |
| Restoration: Fisheries and Watershed | Streambank and watershed restoration projects conducted during the mid- to late 90's; 1993, 1996, 1997, and 1998. | Yes | Yes | No | Minor short term immeasurable impacts to potential habitat from restoration projects work – will not cumulatively add to measurable impacts. |

## Recreation

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| Past Harvest | None | Yes | Yes | No | |
| Rx Burn | Impact to availability of some areas for hunting during burning operations. Increased available forage. | Yes | Yes | No | Minor potential to impact hunting opportunities during fall burning but would be very short (<1week) during which activities would occur within an area. Would improve long term available forage, huckleberries, and mushroom gathering. |
| Camping/Cabins | Smoke | Yes | Yes | Yes | Short term minor potential to affect recreational users using the area to camp. Could be very short (<1week) period of time when smoke is present in the area from prescribed burning. |
| OHVs | Available Access/Use Change | Yes | Yes | Yes | OHV use trends have been rising significantly over the last 10-15 years. Non-motorized trails are currently used by OHVs. When harvest/burn areas are adjacent to permitted use routes there will be more opportunities to violate the closure order and create enforcement issues. |
| Existing Roads | Access to Dispersed Rec sites, Safety | Yes | Yes | Yes | Roads, remaining open would meet safety standards. |
| Closed Roads | Access to Dispersed Rec sites, Non-motorized | Yes | Yes | Yes | The access to dispersed sites will remain unchanged. |

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| | recreation | | | | |
| Grazing | Cow pies in campgrounds | Yes | Yes | No | Some people do not appreciate cattle and cow pies in dispersed campsites or on National Forest System lands. This project will have little to no effect on the cattle use of the area |
| Wildlife Enhancement | None | No | No | No | |
| Mining | None | Yes | Yes | No | This project will not affect the mines or mining activities within the area. |

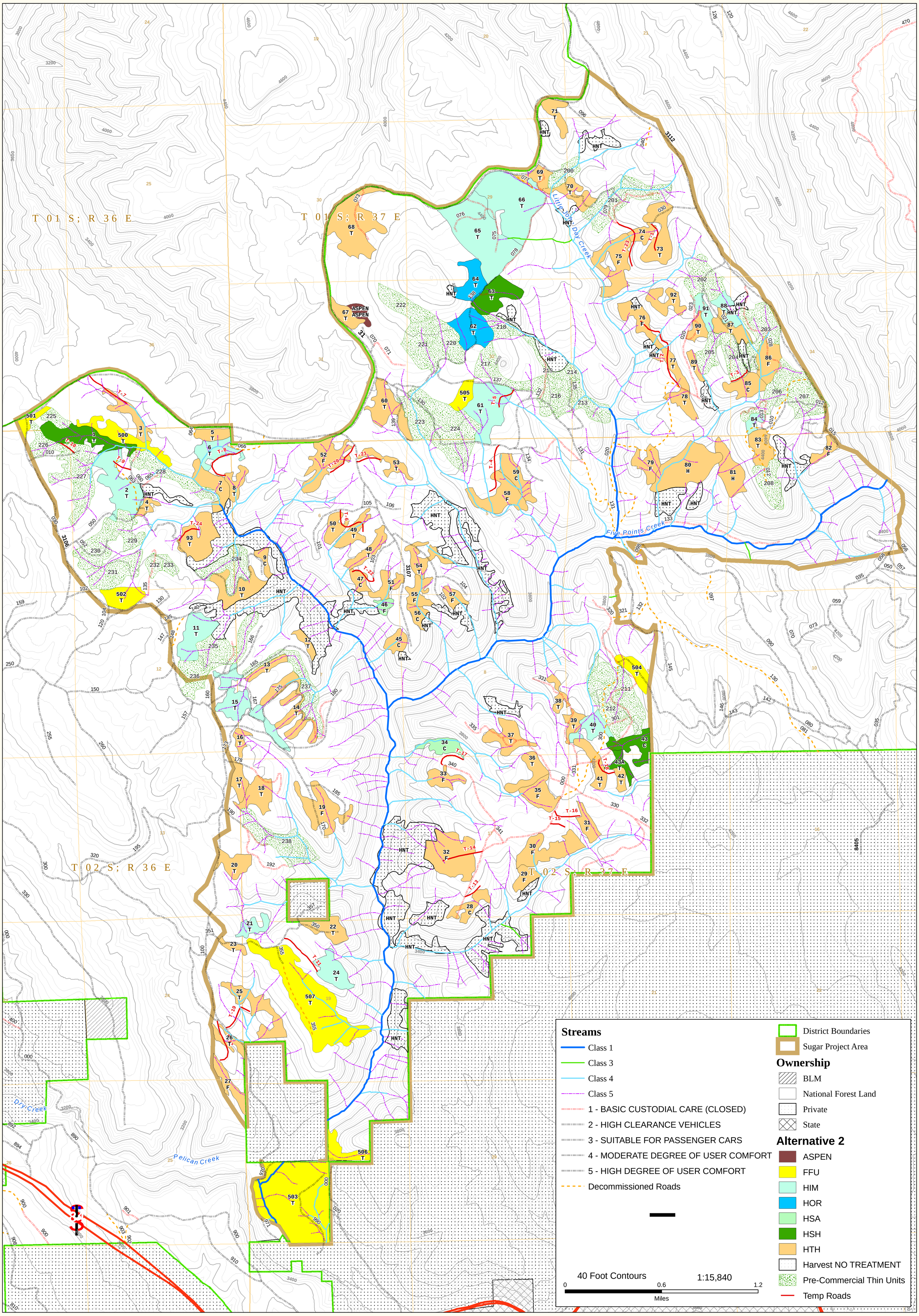
## Visuals

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| Past Harvest | R and PR Foreground disturbances | Yes | Yes | No | Minor short term impacts in terms of stumps, but treatments are intermediate harvest and will not create openings. Five Points Creek would continue to meet suitability for inclusion into the National Wild and Scenic Rivers System. |
| Rx Burn | Burned ground and trees | Yes | Yes | Yes | Short-term (<1 year) visual impacts before spring greenup the following year. Nearly all visual impacts gone within 3 years. |
| Camping/Cabins | Smoke | Yes | Yes | No | Short-term (1 week) one time impact from smoke in area. |
| OHVs | Burned ground and trees | Yes | Yes | No | Short-term (<1 year) visual impacts before spring greenup the following year. Nearly all visual impacts gone within 3 years. |
| Existing Roads | None | No | No | No | |
| Closed Roads | None | No | No | No | |
| Grazing | Cow pies in campgrounds and cows | Yes | Yes | No | Some people do not appreciate cattle and cow pies in campgrounds or on National Forest System lands. This project will have little to no effect on the cattle use of the area |
| Wildlife Enhancement | See more wildlife, aspen contributes to | Yes | Yes | No | Ensuring that aspen persists could increase wildlife viewing opportunities, and |

| Project | Potential Effects | Overlap in: | | Measurable Cumulative Effect? | Extent Detectable? |
|---|---|---|---|---|---|
| | | Time | Space | | |
| | scenic landscapes | | | | scenic landscapes for viewing and photographing. |
| Mining | None | No | No | No | No change with this project |

# SUGAR VEGETATION MANAGEMENT PROJECT

## Alternative 2



# SUGAR VEGETATION MANAGEMENT PROJECT

## Alternative 3