

Appendix C

Silvicultural Treatments

Introduction

What is a silvicultural system?

A silvicultural system is a planned program of vegetation manipulation treatments during the whole life of a stand to meet specific management direction within the biological and ecological context of the land and landscape.

Included in this appendix are brief descriptions and illustrations of the silvicultural treatments proposed for implementation in the proposed alternatives. Complete documentation of the vegetation analysis and the Silvicultural Diagnosis and prescription process is included in the project file.

Timber harvest proposed includes a blend of traditional silvicultural treatments. These techniques incorporate even-aged stand management treatments that are characterized by stands comprised of trees that are approximately the same age. Both regeneration harvest and intermediate harvest treatments are identified.

Regeneration treatments designed for implementation in the project would retain all of the overstory ponderosa pine and western larch (which varies by stand depending on the existing numbers of these overstory trees). Prescribed treatments would retain all of the older and larger western larch and ponderosa pine, as well as all existing snags and coarse woody material.

All of the proposed treatments emphasize retaining important stand components of leave trees, standing and down large logs, and hardwood trees; all of which help meet the present and future function and process of forest systems.

The timber harvest and fuels treatments proposed in the action alternatives are designed to meet one or more of the following objectives for vegetation management. All harvest is on lands identified as suitable for timber production in the Forest Plan.

- Reduce high tree densities and risk of crown fire;
- Promote and maintain fire-adapted vegetation;
- Enhance the potential of some stands to develop as old forest habitat;
- Reduce susceptibility of forest conditions to bark beetles and root rot;
- Replace stands with levels of insect or disease-caused conditions with particular emphasis on restoration of western larch and ponderosa pine;
- Reduce fuels in the urban interface;
- Contribute timber products to the economy.

Various harvest methods are prescribed depending on individual stand conditions.

SILVICULTURAL TREATMENT DESCRIPTIONS AND ILLUSTRATIONS

A. Regeneration Harvest – Clearcut with Reserve Trees and Seed Tree

These regeneration harvest treatments leave selected trees standing in a harvest area, either individually or in small groups.

Regeneration harvest would take place in stands that currently are not meeting target stand objectives. Examples of these types of stands are:

- Those with low stocking caused by insect or disease mortality;
- Stands with elevated levels of root disease where intermediate harvest is not appropriate; and
- Stands of primarily lodgepole that are at high risk of mountain pine beetle attack due to their age and density.

Clearcut with Reserve Trees: The majority of trees would be removed in this treatment, retaining any western larch or ponderosa pine that is present. These stands are primarily lodgepole pine and Douglas-fir, with little species or structural diversity. This treatment is similar to a stand replacement fire regime. Mechanical treatments and prescribed fire would be used to reduce fuels, recycle nutrients, and restore fire as an ecological process. Treatments are proposed on **323 acres** in Alternative B and **277 acres** in Alternative C.

Seed Tree Harvest: The existing western larch and ponderosa pine would be retained to provide for seed sources and long term structure. Approximately 5 to 15 large reserve trees favoring western larch would be designated to remain on site through this rotation. The majority of the Douglas-fir, and all of the lodgepole, would be removed to facilitate regeneration of western larch and ponderosa pine. The majority of trees to be removed are in the co-dominant or intermediate canopy. This treatment is similar to a stand replacement fire regime. Mechanical treatments and prescribed fire would be used to reduce fuels, recycle nutrients, and restore fire as an ecological process. This treatment ranges from **410 acres** in Alternative B to **349 acres** in Alternative C.

Coarse woody debris as specified in the project Design Criteria would be left on site in all regeneration harvest units. The Sale Administrator would work with the logger to minimize disturbance to large woody material through skid trail design and encourage avoidance when possible.

Existing snags and large down woody material would be left on-site. Underburning in some units would occur to prepare the site for regeneration of new seedlings and invigorate grasses, forbs, and shrubs.

Benefits of regeneration harvest would include establishing tree species that are less susceptible to fire, insects, and disease, providing for species that require open stands (both flora and fauna), and increasing early successional species diversity and diversity of forest structure over the landscape. Regeneration would enhance the restoration of western larch and ponderosa pine.

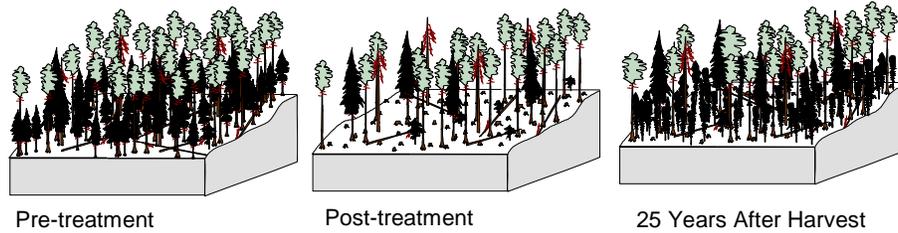


Figure B-1 - Regeneration Harvest

Regeneration harvest greater than 40 acres would occur in stands with concerns regarding insect and disease and fuel loads related to past mountain pine beetle mortality or in-growth of Douglas-fir regeneration. These regeneration harvest openings are necessary to meet project goals and objectives. The larger-than-40-acre harvest openings would emulate natural processes associated with a mixed severity/stand-replacement fire occurrence and be closer to desired conditions in size and effects. Shade-intolerant species, primarily western larch, would have sufficient light and other resources to grow vigorously. This would lead to more resilient forest stands with a trend toward maintaining forest health. Within the larger landscape, larger openings are common in the adjacent ownerships. All of the regeneration openings on NFS lands have successfully regenerated, and many are no longer considered openings.



Figure B-2 - Regeneration Harvest

Hand Planting of trees for species diversity would occur in Clearcut with Reserve Tree and Seed Tree harvest units to promote desirable species, including ponderosa pine and western larch. This treatment would occur after site preparation treatments.

B. Intermediate Harvest – Commercial Thin, Salvage, Thin from Below – Non-Commercial, Sanitation, and Sanitation with Pre-Commercial Thinning

Intermediate harvest is proposed in stands where forest density and structure is interfering with growth in desired species and crown classes (See Figure B-2). The purpose is to release trees that will improve the composition, form, or growth of the residual stand, by removing trees that are susceptible to insect or disease, are growing poorly, or are contributing to fuels conditions that make the stands susceptible to ground to crown fire (ladder fuels). This treatment would develop a more open forest structure with a greater proportion of large fire-adapted species.

The following descriptions are examples of intermediate treatments proposed with this project. These treatments are designed to leave a stand that is sufficiently stocked to follow a normal development pattern until other treatments are considered appropriate. Thin From Below – Non-Commercial Treatments in addition to salvage harvest are also included in this category and are described below:

Commercial Thin: The existing mature tree canopy closure in the project area ranges from 0 to 100 percent with an average closure of 70 to 90+ percent. Within areas to be commercially thinned, the resulting stands would have 40 to 60 percent canopy closure (average 50 percent)

within the ground-based and cable units. The target leave basal area would range between 70 to 100 square feet per acre, depending on the species and site. Generally, all dominant and most co-dominant crown classes would be retained, while some co-dominant and generally all intermediate and suppressed crown classes would be removed. The purpose of this treatment is to enlarge the growing space condition of desirable trees, by reducing excessive tree competition for limited site resources, thereby modifying site conditions for improved tree crown and cone development, sustained vigor and growth, and overall forest health. This treatment simulates a low to moderate-severity, mixed-lethal burn. The vast majority of these stands are unmanaged. Some have had past treatment entries. Understory or jackpot burning would be implemented as a secondary fuels treatment to cycle nutrients and restore fire as an ecological process. This treatment is proposed for **546 acres** in Alternative B and **561 acres** in Alternative C.

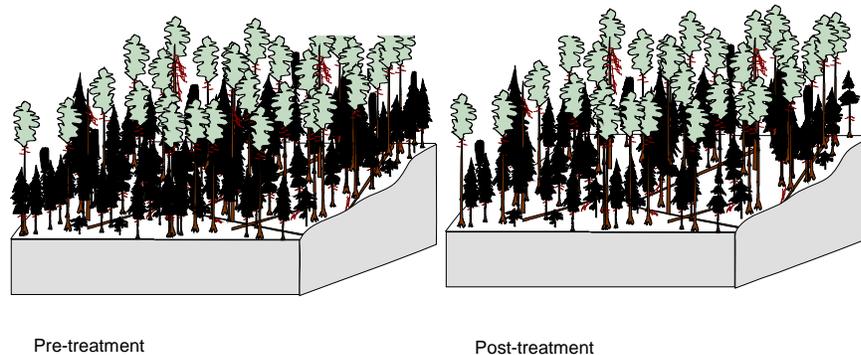


Figure B-3 - Commercial Thin

Salvage Harvest: The existing mature tree canopy would be reduced from the existing average of 70 to 80 percent canopy closure to approximately 50 to 60 percent canopy closure, removing trees primarily in the intermediate and co-dominant canopy. Lodgepole pine and some Douglas-fir would be removed to reduce stand density and fuel loadings. Mechanical treatments to reduce fuels would be implemented on **66 acres** in all action alternatives.

Sanitation: The existing overstory of Douglas-fir in some stands is heavily infested with mistletoe. Infested and high risk trees would be removed and overall stand density would be reduced. Residual species composition would favor non-susceptible trees and canopy closure following treatment would average 50 percent across the stand as a whole. Treatments are proposed on **63 acres** in all action alternatives.

Sanitation with Pre-Commercial Thinning: The existing scattered overstory of Douglas-fir is heavily infested with mistletoe and would be removed. The remaining stand is comprised of a mixture of western larch, Douglas-fir, and lodgepole pine, primarily sapling and pole-sized trees. Understory trees would be pre-commercially thinned to reduce densities, remove mistletoe infested trees, and reduce fuels. Treatments are proposed on **13 acres** in all action alternatives.

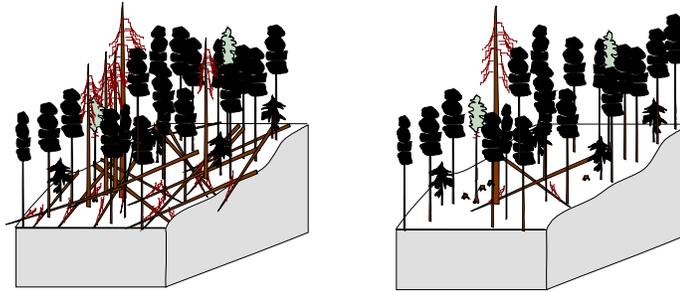


Figure B-4 - Sanitation, Sanitation with Pre-Commercial Thinning, and Salvage Harvest

Thin from Below – Non-Commercial:

Trees to be removed would be lodgepole pine, between 2 to 6 inches in diameter. Removal would be primarily by hand cutting with chainsaws, and hand removal. No commercial treatments are feasible. These stands are very densely stocked and suppressed, and would not respond to pre-commercial thinning. Treatments are proposed on **13 acres** in Alternative B and **8 acres** in Alternative C.



Figure B-5. Thin From Below – Non-Commercial Harvest

Ecosystem Burns

Ecosystem burns are proposed in stands composed of Douglas-fir, larch, ponderosa pine, and lodgepole pine with mid-elevation shrub and grass fields. Using prescribe fire in these areas will help reduce natural fuel buildups, reduce wildfire suppression costs, and maintain a healthy, vigorous ecosystem. These burns are designed to replicate the natural role of fire (moderately frequent/low intensity fires) in a controlled manner by:

- Slowing the spread of invasive species into these stands and increasing vigor of resulting stands;
- Removing above ground stems of decadent shrubs and stimulating the root crowns to produce new, vigorous growth
- Reducing understory stocking of conifer seedlings and saplings;
- Promoting the growth of native grasses and forbs;
- Increasing snag availability for birds and small animals;
- Reducing natural fuel buildup;
- Reducing ladder fuels to reduce crown fire potential; and
- Perpetuating larger diameter ponderosa pine, Douglas-fir and larch.

Within areas where there are high concentrations of smaller trees and brush, chainsaw slashing of a portion of this material would be conducted before burning. This hand slashing would reduce ladder

fuels and minimize the potential of excessive overstory tree mortality. Fuel breaks, consisting of a 20 foot space cleared of brush and dead fuels, may be constructed by hand around the perimeter of the burns. Both hand and aerial methods would be used for fire ignition.

Prescribed burning would be conducted in the spring or fall, when surrounding fuel conditions are moist (e.g. low fire danger). All non-consumed material would remain on site. No product removal would occur in the prescribed burn areas.

Illustrations included in this appendix are rough approximations of existing, desired, and future conditions. Graphics are not to scale and may not be exactly representative of actual conditions.