
**EDDY GULCH LATE-SUCCESSIONAL RESERVE
FUELS / HABITAT PROTECTION PROJECT**

SILVICULTURE REPORT

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Silviculture Report

1.1 Introduction

This report describes forest vegetation (conifer and hardwood) in the Assessment Area for the Eddy Gulch Late-Successional Reserve (LSR) Fuels / Habitat Protection Project (Eddy Gulch LSR Project). This report describes the natural and human factors that have contributed to current conditions of vegetation, composition, and structure of the forest. This section also describes the effects from taking no action (Alternative A) and effects that would result from implementing the Eddy Gulch LSR Project under the Proposed Action (Alternative B) or under Alternative C (No New Temporary Roads Constructed).

1.1.1 Project Location

The Eddy Gulch LSR Project Assessment Area is located on the Salmon River and Scott River Ranger Districts, Klamath National Forest, in southwestern Siskiyou County. The LSR is located mostly west of Etna Summit, south of North Russian Creek and the town of Sawyers Bar, east of Forks of Salmon, and north of Cecilville. The LSR is about 61,900 acres in size, making it one of the largest LSRs on the Klamath National Forest. The LSR encompasses much of the area between the North and South Forks of the Salmon River, as well as headwaters of Etna Creek. Elevations range from 1,100 feet to about 8,000 feet. The terrain is generally steep and dissected by sharp ridges and streams. There are a few private inholdings in the LSR and along the main Salmon River and other stream corridors adjacent to the LSR.

The legal description for the Eddy Gulch LSR includes the following (all Mount Diablo Meridian):

T38N, R11W, Sections 2–5, 8–10, and 17–19
T38N, R12W, Sections 1–3, 9–16, and 22–24
T39N, R10W, Sections 2–10, 15–21, and 29–31
T39N, R11W, Sections 1–18, 20–29, and 32–36
T39N, R12W, Sections 11–14, 23–25, and 36
T40N, R10W, Sections 3–5, 8–11, and 13–35
T40N, R11W, Sections 24–27 and 34–36
T41N, R10W, Sections 2–5, 8–17, 20–24, 26–29, and 31–34
T42N, R10W, Sections 28–29 and 32–35

1.1.2 Terms

Eddy Gulch LSR — the entire 61,900-acre LSR.

Assessment Area — the 37,239-acre portion of the Eddy Gulch LSR west of Etna Summit where various treatments are proposed. All released roadless areas that occur in the LSR were excluded from planning efforts and are therefore not part of the Assessment Area.

Treatment Unit — the acres proposed for some type of on-the-ground treatment under a particular alternative.

Analysis Area — the area around treatment units considered in the effects analysis (the analysis area may be larger than the LSR Assessment Area). The analysis area varies by resource.

1.2 Summary of the Alternatives

Chapter 2 in the environmental impact statement (EIS) for the Eddy Gulch LSR Project presents more information about the three alternatives, and Appendix A in the EIS contains project maps.

1.2.1 Alternative A: No Action

The no-action alternative is described as continuation of the current level of management and public use—this includes road maintenance, dispersed recreation (hunting, fishing, camping, and hiking), mining, watershed restoration projects, and the modeled wildfire. The time frame for analysis is considered to be 20 years. Given the fuel hazard in the Eddy Gulch LSR and current predictions of climate change, it is assumed at least one wildfire will escape initial attack during the 20-year period and burn under 90th percentile weather conditions (defined as 10 percent of the days in the historical weather database that had lower fuel moisture and higher wind speeds compared to the rest of the days). An analysis of a wildfire for three days that escaped initial attack in the Eddy Gulch LSR Project Assessment Area indicates that fire would burn 7,200 acres. Of those 7,200 acres, 1,355 acres (19 percent) would be surface fire; 5,065 acres (70 percent) would be a passive crown fire; and 780 acres (11 percent) would be an active crown fire.

1.2.2 Alternative B: Proposed Action

The Klamath National Forest proposes 25,969 acres of treatments to protect late-successional habitat and communities. Three primary treatment types were identified in the Assessment Area: Fuel Reduction Zones (FRZs), Prescribed Burn Units (Rx Units), and Roadside (RS) treatments along emergency access routes, which are described below.

- **FRZs**—strategically located on ridgetops to increase resistance to the spread of wildfires. The FRZs would be wide enough to capture most short-range spot fires, and ground, ladder, and crown fuels would be reduced so as to change crown fires to surface fires within the treated areas. The FRZs would provide safe locations for fire-suppression personnel to take fire-suppression actions during 90th percentile weather conditions, and they serve as anchor points for additional landscape-level fuel treatments, such as underburning.
 - **Proposed Action.** Construct 16 FRZs totaling 8,291 acres to increase resistance to wildfires. The 8,291 acres includes 931 acres in 42 M Units (thinning units) and 7,383 acres in fuel reduction areas (outside the M Units) to reduce ground and ladder fuels.
- **Rx Units**—a series of landscape-level treatments (ranging from 250 to 4,300 acres in size) designed to increase resilience to wildfires by reducing ground and ladder fuels. Most of these treatments would occur on south-facing aspects where fuels dry faster, and treatments would support the role of the FRZs.

- **Proposed Action. Implement** 17,524 acres of Rx Units to increase resiliency to wildfires.
- **RS treatments**—along 60 miles of emergency access routes identified in the Salmon River Community Wildfire Protection Plan (CWPP) (SRFSC 2007) and designed to facilitate emergency access for residents to evacuate and for suppression forces to safely enter the LSR in the event of a wildfire.
 - **Proposed Action.** Treat 44 miles of emergency access routes in FRZs and Rx Units (treatments would be similar to the FRZ or Rx Unit the route passes through) and 16 miles (with 154 acres of treatments) of RS treatments outside of FRZs and Rx Units—a total of 60 miles of RS treatments along emergency access routes.

Proposed Temporary Roads and Landings

The construction of new temporary roads and the use of former logging access routes are proposed to access treatment units.

- Approximately 1.03 miles (5,433 feet) of new temporary roads would be used to access all or portions of seven M Units. All of these temporary roads would be closed (ripped and mulched, as needed) following thinning.
- Approximately 0.98 mile (5,177 feet) of former logging access routes would be re-opened (vegetation removed and bladed) to access all or portions of five M Units. These routes would be water-barred and closed immediately after thinning is completed.
- Five short spurs, each less than 100 feet long, would be bladed for tractor or cable yarding operations in two units.
- Existing landings would be used to the extent possible.

1.2.3 Alternative C: No New Temporary Roads Constructed

Alternative C responds to public concerns regarding the environmental and economic effects of constructing new temporary roads. Alternative C is similar to the Proposed Action but approximately 1.03 miles (5,443 feet) of new temporary roads identified in the Proposed Action would not be constructed. As a result, no fuels treatments would occur in portions of seven M Units. This reduces the total acres of treatments in M Units from 931 acres under Alternative B to 832 acres in Alternative C. Fuels treatments could not be carried out in those M Units because of excessive treatment costs, high existing dead crown fuel loadings, and potential heat damage to the overstory if these untreated units were prescribed burned.

Under Alternative C, the FRZs would continue to total 8,291 acres; however, 99 acres in M Units would remain untreated. The total number of acres treated by tractor yarding would remain at 361 acres; however, the acres of cable yarding would be reduced from 570 acres under Alternative B to 471 acres under Alternative C. Reducing acres of M Units treated would also reduce the number of acres treated in Rx Units 5 and 6 because excessive fuels remaining in M Units would preclude safely burning portions of those Rx Units. Rx Unit 5 would be reduced by 26 percent (418 acres) because no

treatment would occur in a portion of M Unit 17, and Rx Unit 6 would be reduced by 28 percent (404 acres) because no treatment would occur in a portion of M Unit 24. Six-foot-wide control lines would be constructed around the perimeter of those untreated areas to keep prescribed burns out of those portions of Rx Units 5 and 6. There would be no changes in the miles of emergency access routes treated, transportation plan, or resource protection measures.

1.3 Significant Issue

Public and agency comments received during collaboration and scoping efforts did not identify any significant issues related to forest vegetation. The only significant issue was in regard to construction of new temporary roads to access some of the treatment units. Alternative C was developed in response to public concerns regarding the environmental and economic impacts of constructing new temporary roads.

1.4 Regulatory Framework

1.4.1 Klamath National Forest Land and Resource Management Plan

The Klamath National Forest Land and Resource Management Plan (Klamath LRMP) (USFS 1995) Standards and Guidelines for fuels and vegetation management activities in LSRs were incorporated from Attachment A to the *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (USDA, USDI 1994).

The direction in the Klamath LRMP states: “Silvicultural systems proposed for Late-Successional Reserves have two principal objectives: (1) development of old-growth forest characteristics, including snags, logs on the forest floor, large trees, and canopy gaps that enable establishment of multiple tree layers and diverse species composition; and (2) prevention of large-scale disturbances by fire, wind, insects, and diseases that would destroy or limit the ability of the reserves to sustain viable forest species populations. Small-scale disturbances by these agents are natural processes, and will be allowed to continue.”

1.5 Methodology

1.5.1 Analysis Methods and Assumptions

All of the stands identified for thinning treatments are located in either an FRZ or RS treatment along an emergency access route. There are two categories for thinning treatments: trees to be thinned are *larger than* 8 inches diameter at breast height (dbh) and trees to be thinned are *less than* 8 inches dbh.

1.5.1.1 Field Inventories and Stand Exams

In order to ensure that silvicultural prescriptions are consistent with the Klamath LRMP, field inventories were conducted to measure attributes of existing vegetation. Data were used to determine site quality, timber volume, basal area, stand density index (SDI), average size of live trees in terms of

quadratic mean dbh, number of trees per acre, tree growth, species present, and tree condition. All proposed thinning stands in the FRZs (with trees to be thinned larger than 8 inches dbh) were site reviewed by a silviculturist. A stand exam crew installed random plots and collected stand data that included basal area, trees per acre, volume per acre, canopy cover, site class, and stand density. The stands were stratified into six categories:

1. Douglas-fir mid-successional,
2. Douglas-fir mid- / late-successional,
3. white fir mid-successional,
4. white fir mid- / late-successional,
5. red fir late-successional, and
6. mixed-conifer late-successional.

The stand diagnoses and strata-specific prescriptions were developed based on the field information.

The thinning units were inventoried using the current Forest Inventory and Analysis User's Guide for the United States Department of Agriculture (USDA) Forest Service Pacific Southwest Region. The Common Stand Examination system was used to collect data from a series of random points located in a number of stands with a possible need for treatment. Each sample point consisted of five nested plots: (1) A variable-radius prism plot to gather data on large (greater than 4.9 inches dbh) live trees, (2) a 1/100-acre fixed-radius plot for live saplings and seedlings, (3) a 0.5-acre fixed-radius plot for ocular estimation of understory vegetation (brush species), (4) a variable-radius prism plot for snags, and (5) a 0.5-acre fixed-radius plot for ocular estimation, using a fuel photo series handbook for downed woody debris. The following data is recorded for each live tree sampled in variable-radius prism plots: species, diameter, crown position, live crown ratio, height, height to live crown, and status (condition class of live trees or snags). Additionally, height and age measurements were recorded for 10 dispersed trees to determine site index for areas in thinning units. Additional stand examination plots were installed by the silviculturist where additional data were needed.

The field data were then loaded into the Forest Vegetation Simulator (FVS) program, which is a forest growth model that predicts forest stand development following treatment. The model analyzed the field data collected for the six strata categories listed above. FVS calculates specific data for basal area and volume and models the information (such as canopy cover and stand density) based on data from local research, which is programmed into algorithms within the FVS. The model does not produce absolute values and approximates the natural processes.

Additional analyses included aerial photo interpretation and Forest Inventory timber type coverages in Geographic Information System (GIS). The Forest Inventory typing is vegetation-type mapping based on year 1995 aerial photographs. These were used to determine timber strata, size class, and densities. The GIS coverages were also used to determine land classification and allocation.

The topography and slope of and access to each treatment unit were used to determine the most appropriate system to be used for thinning. For treatment units in the Eddy Gulch LSR Project, ground-based (tractor) and cable yarding systems are proposed. Silvicultural prescriptions were based

on a desired future stand condition using stand exam data, FVS projections, aerial photograph interpretation, and field review.

The prescriptions are designed to space trees to meet the fire objective of reducing crown fire potential. The FVS data analysis simulated thinning the stand from below to produce the predicted changes. FVS thinning from below cuts all conifer trees starting at 8 inches dbh and moves up in size class until the field-identified basal area is reached. FVS also analyzed the spacing guideline data, which in this case, provides predictive stand data that better fits the actual stand change. Most of the field plots were visited by the interdisciplinary (ID) team silviculturist, who identified residual trees after treatment using the spacing guidelines. A comparison of the residual tree data from this prescription, with the thin-from-below data, indicated similar predicted results. The thin-from-below data were used because the larger number of sample plots provided more accurate stand data. Stand development was modeled for 5- and 30-year periods, using the proposed thinning (under Alternatives B and C) and with no thinning (under Alternative A), to display the differences between treating and not treating the stands.

The RS treatments along emergency access routes (roads or road segments) are long, linear management stands that traverse numerous vegetation types. The roads or road segments were inventoried, and the vegetation was classified into 1 of 3 categories (developed together by fuels and silviculture specialists) with associated generic prescriptions.

1.5.1.2 Prescription Development

A stand prescription was developed for each stratum shown in Appendix A (Table A-1 for Alternative B and Table A-2 for Alternative C). The basic prescription is based on a designated largest leave tree spacing (DxD). The largest tree is determined by its dbh measurement. The spacing indicates a minimum and maximum distance in which the largest leave tree must be selected. This prescription works best in areas where tree spacing is more important than stand variability. It works well in meeting the objectives of an FRZ. The concept is that the largest trees within a prescribed distance will be left, and all other trees greater than 8 inches between the largest leave trees will be cut and removed. The spacing requirement minimizes tree crown contact by thinning from below, with emphasis on thinning clumps of conifer trees.

The ID team silviculturist and fire/fuels specialist and the Klamath National Forest silviculturist and silviculture contract inspector visited a Rogue National Forest timber sale that had been marked using a DxD prescription. It was agreed that the DxD prescription would work well for the Eddy Gulch LSR Project.

The ID team silviculturist prepared draft DxD stand prescriptions for several white fir units in the Shadow Creek area. The forest silviculturist field reviewed these proposed prescriptions and agreed with using this prescription on the project.

An ID team fire/fuels specialist also field reviewed the above-mentioned draft prescriptions and agreed that they met the fire/fuels objectives.

Trees larger than the indicated maximum dbh will not be cut unless they fall under the hazard tree prescription (USFS 2005). The DxD spacing was individually prescribed for each stand. Each stand

was reviewed in the field, and the prescribed spacing was selected based on stand factors such as tree species, tree crown size, and tree age.

“Special Directions” (see the last column in Tables A-1 and A-2) are used to either emphasize or de-emphasize tree species selection. This was done by weighing dbh measurements by adding or subtracting inches to the indicated species dbh measurement. The Klamath National Forest Forestwide Late-Successional Reserve Assessment (forestwide LSR assessment) (USFS 1999) placed high value on retaining sugar pine, so most of the stand prescriptions have a special direction adding inches to the dbh measurement. White fir in some units did not meet stand objectives and was de-emphasized by subtracting inches from the dbh measurement. Also, see Table A-3 in Appendix A, which presents additional information, such as current stand conditions, treatment objectives, and prescriptions for each M Unit, and a summary of the management direction contained in the Klamath LRMP.

All stand prescriptions remain the same for Alternatives B and C, with the only difference being the amount of acres in M Units that would be treated; that is, Alternative C would treat 99 acres less than Alternative B because, under Alternative C, no new temporary roads would be constructed to access some of the treatment units.

Refer to the “Fuels Report” for the Eddy Gulch LSR Project (or the “Fire, Fuels, and Air Quality” section in the EIS) for an analysis of the effects that would result from implementation of Rx Unit treatments under Alternative B (17,524 acres) and the reduction in Rx Unit treatments under Alternative C (16,702 acres).

1.5.2 Scope of the Analysis

1.5.2.1 Analysis Area

Vegetation management activities have localized effects on vegetation attributes (such as canopy cover, tree density, and tree size) that are generally confined to the treated area. Therefore, the direct, indirect, and cumulative effects analyses of vegetation resources are geographically bounded to the Eddy Gulch LSR Project Assessment Area (see Maps B-2, B-3, and B-4 in Appendix B of this report).

1.5.2.2 Analysis Period

The timeframe for the effects analysis is 5 years for short-term effects and up to 30 years for long-term effects on vegetation. The western slope of the Klamath Mountains in the Klamath National Forest has a relatively high rate of vegetation establishment and growth due to high annual precipitation and productive forest soils. Within this time frame (up to 30 years following treatment), vegetation generally has sufficient opportunity to increase canopy cover, basal area, and tree density to a point where subsequent thinning would be needed to maintain stand vigor, health, and growth.

1.5.3 Definitions for Terms Used in this Resource Section

(Note: A full glossary can be found in Chapter 5 of the EIS.)

Climate Change — Climate is not the weather—it is the prevailing or general long-term weather conditions for an area, or for the entire planet. Weather is the state of the atmosphere at a particular place and time and is influenced by climate and many local factors. Climate change refers to our

long-term weather patterns and, in the environment, is caused by increasing levels of carbon dioxide and other greenhouse gases released into the atmosphere. Greenhouse gases trap heat in the earth's atmosphere. Over time, more and more heat is retained, leading to an increase in the earth's average surface temperature—global warming.

Ecosystem — A dynamic community of biological organisms, including humans, and the physical environment with which they interact.

Fire Severity — The degree to which a site has been altered or disrupted by fire; severity is affected by fire intensity and how long the fire remains at the site. In this document, fire severity is defined as tree mortality. It is a qualitative term used to describe the relative effect of fire on an ecosystem, especially the degree of organic matter consumption and soil heating. Thus, fires are commonly classed as low, moderate, and high severity.

Late-Successional Reserves — Large blocks of habitat that are distributed across the range of the northern spotted owl and spaced closely enough to facilitate dispersal of owls. LSRs are managed to provide habitat for late-successional and “old-growth” species.

Silviculture Prescription — A site-specific operational plan that describes the forest management objectives for an area. It prescribes the method for harvesting the existing forest stand and a series of silviculture treatments that will be carried out to establish a free-growing stand in a manner that accommodates other resource values, as identified.

Stand Structure — A description of the distribution of tree size classes (such as saplings, poles, small trees) within a stand. Understory and overstory are some other terms that are used in referring to stand structure.

Strata — Similar stands of trees that are combined (stratified) for data collection and stand analysis. Stands in the Eddy Gulch LSR Project Assessment Area were stratified by Society of American Foresters (SAF) forest type (for example, Douglas-fir or white fir) and successional stage (such as mid-successional) based on dominant / co-dominant average tree size.

1.5.4 Intensity of Effects

“Intensity” refers to the severity of effects or the degree to which the action may adversely or beneficially affect a resource. The intensity definitions used throughout this effects analysis are described below.

Negligible. Effects would be at the lowest levels of detection and would have no appreciable effect on resources, values, or processes.

Minor. Effects would be perceptible but slight and localized.

Moderate. Effects would be readily apparent and widespread and would result in a noticeable change to resources, values, or processes.

Major. Effects would be readily apparent and widespread and would result in a substantial alteration (beneficial or adverse) or loss of resources, values, or processes and would likely be permanent.

1.5.5 Measurement Indicators

There are four measures (or indicators) that were used to assess current stand structure in the Assessment Area. These same indicators were used to assess effects of taking no action and effects that could result from implementation either Alternative B or Alternative C.

Indicators for Stand Structure

1. Basal area,
2. SDI,
3. Tree size, and
4. Canopy cover.

Indicator: Basal area

Basal area is a measure of stand density or stocking. Basal area is the cross section area of a tree stem in square feet measured at breast height (4.5 feet above ground) and inclusive of bark, usually computed by using dbh or tallied through the use of basal area factor angle gauge. Stocking for an area, usually on a per-acre basis, is the sum of the basal areas for all trees in the area. It is a measure used to describe expected stocking levels for wildlife habitat.

Indicator: Stand Density Index

SDI, developed by Dunning and Reineke (1933), is another measure of stand density. It is the number of trees per unit area that a stand would have at a given average dbh.

SDI can also be used as a species-specific measure of tree competition for resources (nutrients, water, and sunlight). The calculated SDIs for the stand management proposals were evaluated based on indicated inter-tree competition levels. Long (1985) identified four levels of competition using the SDI ratings developed by Dunning and Reineke. The four levels are

1. onset of competition—25 percent of maximum SDI;
2. lower limit of full site occupancy—35 percent of maximum SDI;
3. lower limit of self thinning (initiation of mortality due to resource competition, remaining trees continue to grow)—60 percent of maximum SDI; and
4. maximum stocking (mortality = biomass accumulation = no net growth in stands)—100 percent SDI.

The maximum SDI for the major conifer species in stands in the Eddy Gulch LSR Project Assessment Area are

- 800 for red fir;
- 760 for white fir;
- 600 for Douglas-fir; and
- 430 for mixed-conifer (using ponderosa pine as the key species).

Indicator: Tree Size

Tree size (average diameter) is an important wildlife habitat attribute. The forestwide LSR assessment emphasizes larger conifer stocking levels, particularly for trees greater than 24 inches dbh.

Indicator: Canopy Cover

Canopy cover is the degree to which the canopy (forest layers above one's head) blocks sunlight or obscures the sky, expressed as a percent of ground area (is also referred to as canopy closure or crown cover). Canopy cover is another stand attribute that is used to describe wildlife habitat.

1.6 Affected Environment (Existing Conditions)

This section provides a description of the existing forest stand conditions for each of the four measurement indicators listed above in Section 1.5.5.

1.6.1 Historic Influences on Stand Structure

Pre-settlement Influences

Prior to European settlement, fire was the primary disturbance regime that affected the composition and structure of forests in what is now the Eddy Gulch LSR. The fires were either ignited by lightning or Native Americans, and given the frequency of those fires, the intensity of the fires varied, resulting in a mosaic (variety) of forest stands that differed from today's stands. In a study conducted about 50 miles from the Eddy Gulch LSR Project, Taylor and Skinner (1998) reported that, in the Douglas-fir-dominated forests of the Klamath Mountains, upper slopes (ridge tops) had more frequent fires and more severe fires than middle and lower slopes (Table 1).

Table 1. Median and range of median fire return intervals (years) for sites by aspect and slope position for plots on Thompson Ridge, Klamath Mountains, California.

Slope Position	N (samples)	Median Fire Return Interval (year)	Range (year)
Lower (2,000–3,100 feet)	17	19	5–87
Middle (3,100–4,060 feet)	27	14	6.5–116
Upper (4,060–5,020 feet)	16	10.5	4–37.5

Source: Taylor and Skinner 1998.

Moreover, lower slope positions experienced mostly (75 percent) low-severity fires, whereas upper slopes experienced mostly (63 percent) moderate- and high-severity fires, with the mid-slope positions being intermediate. Severe fires were defined to be those that had less than four “tall” stems per acre remaining after the fire.

Skinner and Taylor (1998) concluded, “The cumulative effect of fire severity variation across slopes suggests that forests with late-successional characteristics (such as multilayered canopy, high density of large-diameter trees, snags, and coarse woody debris) were more commonly found at lower slope positions as well as on north- and east-facing slopes. Upper slope positions, as well as intermediate positions on south- and west-facing slopes, were more likely to display a pattern of

scattered, remnant, older trees and patches, exhibiting some late-successional characteristics within a coarser-grained pattern largely of younger stands.”

In a study in the central Oregon Coast range, Impara (1997) also found that upper hillslope positions had higher frequency and severity of fire than lower hillslope positions. He noted, “An important feature of this result is that old-growth trees are more common at lower hillslope positions than at upper hillslope positions. This pattern of old-growth occurrence should be considered in studies of forest patterns and related management approaches to old-growth forests.”

Fire history also influenced the composition of stands in the Eddy Gulch LSR. Historically, stands in the Eddy Gulch LSR Project Assessment Area had a higher component of shade-intolerant species such as ponderosa, Jeffrey, and sugar pine in the overstory. These species are better adapted to the open stands created by frequent fires.

The ID team’s silviculturist reviewed photographs taken from the Eddy Gulch Lookout location in 1935 and from the same location in 1992. The Figure 1 photograph (1935) view area is east of the lookout towards the Deacon Lee trailhead and the Russian Wilderness Area. The Figure 2 photograph is of the same view area but was taken 57 years later in 1992. Note the road that is visible in the hardwood / brush fields in the 1935 photograph is totally obscured in the 1992 photograph by the conifer stands that now occupy the site.

The Figure 3 photograph (1935) is to the west of the lookout showing the upper portions of Eddy Gulch (right) and Crawford Creek (left). The Figure 4 photograph of the same view was taken in 1992. The southerly aspects in Crawford Creek in 1935 had large areas of hardwood / brush fields with scattered pockets of conifers. The 1992 photograph shows that conifer stands are now a major component of the landscape vegetation.

The northerly aspects on the upper slopes in Eddy Gulch did support less dense conifer stands. The stands appear to be less dense in 1935 than in the 1992 photograph.

The predominantly white fir conifer stands that developed in the hardwood / brush fields (as shown in the 1935 photos) have continued to grow and are now 70 years or more in age. Field examination of these stands indicates that they are densely stocked with a high level of inter-tree competition that is leading to poor stand health, higher fuel loads, and increased fire danger.

Figure 1. Photo taken in 1935—view area is east of Eddy Gulch Lookout.

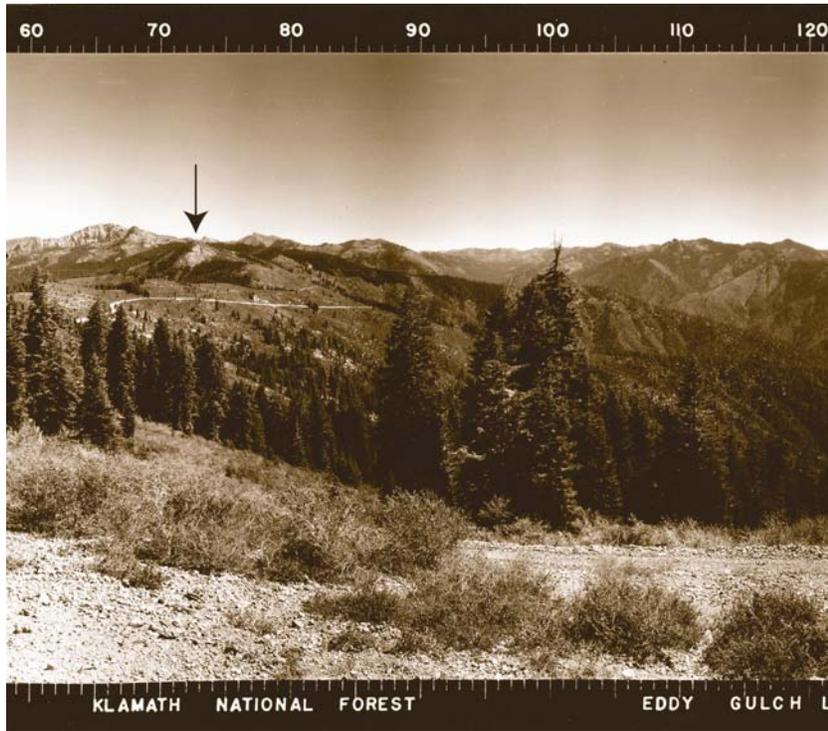


Figure 2. Photo taken in 1992—same view area as Figure 1.



Figure 3. Photo taken in 1935—view area is west of Eddy Gulch Lookout.



Figure 4. Photo taken in 1992—same view area as Figure 3.



Post-settlement Influences

Gold was discovered in about 1850 in the area that is now the Eddy Gulch LSR. Over the next four to five decades, miners removed much of the vegetation in the vicinity of the mining activities for tunnel timbers and structures and often burned the rest to expose the mineral resource (examples would be the lower portions of Whites Gulch and Eddy Gulch and areas around Black Bear Ranch). The result is a somewhat less-than-natural number of trees and stands over 130 years of age. With the creation of the Klamath National Forest shortly after the turn of the century, and the emphasis on fire suppression beginning about 1910, not only have forests returned to much of the potential forest land in the LSR, but most stands contain many more trees and other understory vegetation (along with limbs, logs, and other understory fuels) than would have been present under historical conditions. Approximately 84 percent of the Eddy Gulch LSR Project Assessment Area has not experienced fire since 1910. This has resulted in approximately 67 percent of the Assessment Area being classified as *severely departed* and approximately 28 percent classified as *moderately departed* from its historical biophysical conditions (Creasy 2008). Roughly 64 percent of the severely and moderately departed acres are in the true fir (genus *Abies*) zone, with the remaining 36 percent located in the lower elevations (Creasy 2008) (refer to the “Fuels Report” for further descriptions of departure from historical conditions).

1.6.2 Current Stand Structure

The current vegetation composition and structure in the Eddy Gulch LSR were shaped by physical and biological factors, primarily those that influence temperature, moisture, and disturbance. These factors include topography, aspect, soil conditions, hydrology, weather, and fire (USFS 1999). Fire suppression has had an effect on vegetation that would have existed historically or ordinarily in the presence of fire. The resultant mosaic of vegetation includes large areas of mid- and late-successional forest, interspersed with more open conifer stands mixed with hardwoods or younger stands created by disturbances.

1.6.2.1 Stand Structure in the Assessment Area

Historically, stands in the Eddy Gulch LSR Project Assessment Area had a higher component of shade-intolerant species such as ponderosa, Jeffrey, and sugar pine in the overstory. Currently, the dominant vegetation consists of true firs (red and white) in the upper elevations and Douglas-fir and mixed-conifer stands in the mid to lower elevations of the Assessment Area. Madrone and other hardwoods (such as black oak) are commonly found in stands below 4,000 feet elevation. Other common conifer species, which are scattered throughout the LSR in the lower and less-exposed areas, are ponderosa pine, sugar pine, incense-cedar, and knobcone pine. The dominant hardwood in the lower and more exposed areas is canyon live oak. The major vegetation types in the LSR include Douglas-fir, mixed-conifer-pine, white fir, red fir, and nonconifer vegetation. The mixed-conifer-pine forests occur below 5,000 feet and are found on dryer slopes. The Douglas-fir stands occur mostly on north-facing slopes below 5,000 feet. White fir increases in dominance with increasing elevation, north-facing slopes, and moisture. Red fir stands are found mostly on north-facing slopes above 5,500 feet and on south-facing slopes above 6,000 feet.

Forest stands can be described by dominant species and their distribution, successional stage (based on mean dbh of trees in the stand), or amount of canopy cover. The distribution of dominant species was described in the previous paragraph. The distribution and abundance of successional

stages and amount of canopy cover for forest stands in the Eddy Gulch LSR are depicted on Map B-1 (in Appendix B of this report) and Table 2 below. Approximately 30 percent of the Eddy Gulch LSR is characterized by late-successional forest. Approximately 43 percent of the late-successional and mid-successional stands are greater than 40 percent canopy cover.

Table 2. Current abundance of forest successional stages and canopy cover in the Assessment Area.

Stage / Canopy Cover	Mean DBH / Percent Canopy Cover	Acres
Late-Successional / Open	Over 25 inches / less than 40%	4,400
Late-Successional / Dense	Over 25 inches / greater than 40%	14,380
Mid-Successional / Open	12–25 inches / less than 40%	4,510
Mid-Successional / Dense	12–25 inches / greater than 40%	12,420
Early Successional / Pole	6–11 inches / greater than 40%	7,200
Early Successional / Sapling / Seedling	Plantations	2,310
Other Vegetation		16,680
Total		61,900

Source: USFS 1999.

1.6.2.2 Stand Structure in the M Units

All of the stands slated for thinning of crown fuels (removal of trees larger than 8 inches dbh in FRZs or the M Units described in detail in Chapter 2 of the EIS for the Eddy Gulch LSR Project) in the Assessment Area are located on ridgetops. The ridgetops were selected because they are optimum locations to increase resistance to wildfires (Millar et al. 2007). Each stand was evaluated, and the characteristics of those stands, by forest type and successional stage, are summarized in Table 3. All of the stands identified for treatment are mid- or late-successional stands, with a high proportion (over 50 percent) of trees less than 10 inches dbh. All of the stands exceed 60 percent of the maximum SDI, where mortality will likely increase as a result of competition for resources (such as nutrients, water, and sunlight). These stands are also very different than the remnant late-successional stands (described by Taylor and Skinner [1998] and Impara [1997]) that were present prior to European settlement. Table 3 shows current conditions for the four indicators: basal area, SDI, tree size, and canopy cover.

Table 3. Current stand structure on ridgetops where proposed M Units are located.

Summary of Current Strata Data		Summary of Current Conditions for Stand Structure Indicators (Basal Area, SDI, Tree Size, and Canopy Cover)							
SAF ^a Forest Type	CWHR ^b Serai Stage	TPA Total	TPA ^{c, d} >10"	BA ^e /acre >10"	Average DBH ^f >10"	TPA >24"	Canopy Cover (%)	SDI ^g	Consequence of SDI
DF ^h	MS ⁱ	441	135	192	16.1	5	73	405	Beyond self-thinning
DF	MS/LS ^j	235	120	249	19.5	20	72	425	Beyond self-thinning
WF ^k	MS	299	190	302	17.1	9	61	506	Beyond self-thinning
WF	MS/LS	275	124	284	20.5	29	58	479	Beyond self-thinning
RF ^l	LS	613	113	350	23.8	43	59	643	Beyond self-thinning
MC ^m	LS	255	159	320	19.2	28	69	453	Beyond self-thinning

Notes:

- | | |
|---|---------------------------|
| a. SAF = Society of American Foresters | h. DF = Douglas-fir |
| b. CWHR = California Wildlife Habitat Relationship | i. MS = mid-successional |
| c. TPA = trees per acres | j. LS = late-successional |
| d. > = greater than | k. WF = white fir |
| e. BA = basal area (measured as square feet per acre) | l. RF = red fir |
| f. dbh = diameter at breast height | m. MC = mixed-conifer |
| g. SDI = stand density index | |

1.6.2.3 Stand Structure in Roadside Treatments Along Emergency Access Routes

The Proposed Action would treat 44 miles of emergency access routes in FRZs and Rx Units (treatments would be similar to the FRZ or Rx Unit the route passes through) and 16 miles (with 154 acres of treatments) of RS treatments outside of FRZs and Rx Units—a total of 60 miles of RS treatments along emergency access routes. The following are the proposed RS treatments along the 16 miles of emergency access routes that occur outside FRZs and Rx Units (see Map B-4):

- **Route**—40N54 South Russian from the Forest Service bridge at the Assessment Area boundary to the intersection with the Rainbow Mine road and then along the road to the Rainbow Mine property line. The majority of the stand is in the South Russian Creek Riparian Reserve. Slopes are steep, except for the portion near the Forest Service bridge and the portion from the private bridge to the property boundary.
- **Route**—40N61 Whites Gulch from North Fork Salmon River bridge to 39 Road intersection. The lower portion of Whites Gulch, below the first switchback, has experienced heavy mining and logging activity. It is also located in the Whites Gulch Riparian Reserve. Conifer stocking is mostly Douglas-fir. The middle section has several large conifer plantations and significant portions of poor site conditions mostly supporting live oak. The upper section has several large conifer plantations intermixed with older true fir stands.
- **Route**—the 39 Road from the 1C02 intersection to intersection with FRZ 14. The topography traversed is generally steep (over 60 percent slopes). The lower-elevation vegetation is dense, consisting mostly of young Douglas-fir or mixed-conifer. The upper-elevation stands are older white fir stands intermixed with plantations (some older plantations are ponderosa pine).

1.6.2.4 Disturbances

The current condition of forest vegetation in the Assessment Area will not remain static because natural and human disturbances will continue to affect stand conditions and forest health. Major disturbances include insect and disease activity, weather, and wildfires; whereas, mining would have little effect on the Eddy Gulch LSR, as a whole, and is considered a minor disturbance in the Assessment Area. Insects, diseases, and weather-related events are the disturbances described below. The “Fuels Report” details the current fuels conditions in the LSR.

Insects and Disease

Insects and diseases create dead and down material and recycle nutrients into the ecosystem, but they can also increase the potential for high-intensity fires by increasing the amount of dead and down fuel. This can have secondary effects on sediment production and changes in vegetative character, landslides, and atmospheric conditions. The removal of frequent low-intensity fires (replaced by infrequent high-intensity fires) has encouraged insects and diseases to replace fire as the primary disturbance process. This has exacerbated the fire behavior potential on many sites (USFS 1995).

Insects

Insect levels play an important role in stand health. Insects commonly attack trees weakened by disease, mechanical damage, and inter-tree competition. Increases in insect levels can have major effects on stand health when large numbers of weakened trees, including dominant and co-dominant trees, are killed. This can alter the pattern of forest succession and increase fuel loads and the likelihood of a stand-replacing fire. Insect levels are cyclic and are not easily predicted in the long term. Existing stand density and health conditions were used to evaluate possible future activity levels.

High and moderate levels of insect-caused mortality can be found throughout the Eddy Gulch LSR. This mortality amplifies the risk of severe fire effects and can hamper the ability to control fires in areas containing dead and down fuel loading and dead trees (snags), which pose a significant safety hazard. The areas of primary concern inside the LSR include the historically high-mortality area from Grouse Point west, both forks of Crawford Creek, and a moderate-mortality area from Grasshopper Ridge to the northwest and also in Music Creek and Highland Creek. Very little recent insect-caused tree mortality was observed during the 2008 field season, and current insect activity appears to be at or below the endemic level.

Fir Engraver Beetle. The fir engraver beetle (*Scolytus ventralis*) attacks most true fir species in the western United States. The attacks by this under-the-bark burrowing beetle can result in patch kill around the bole, top kill, and tree mortality. Top kill and tree mortality are often associated with trees already weakened by root disease, overstocking, drought, and heavy dwarf mistletoe infection (Keen 1952).

Western Pine Beetle. The western pine beetle (*Dendroctonus brevicomis*) is the most devastating insect affecting ponderosa pine in California and Oregon. Normally, this beetle breeds in windfalls, unhealthy trees, or in trees weakened by drought, stand stagnation, fires, and beetle infestations, which usually lead to tree mortality (Keen 1952).

Diseases

Diseases play an important role in stand health. The potential problems created by diseases include weakening of trees, which leads to increased tree mortality or susceptibility to blow down or breakage. This can alter the pattern of forest succession and increase fuel loads and the likelihood of a stand-replacing fire. Field observations of current disease types and levels of occurrence/severity were used to roughly predict future levels.

Dwarf Mistletoe. Dwarf mistletoe (*Arceuthobium* spp.) is found throughout the Assessment Area. It has a definite influence on stand health, particularly where edaphic (soil-related) factors or stand density place other limits on tree growth and health. Dwarf mistletoe is a host-specific (capable of living solely on or in one species) parasitic seed plant. Field reconnaissance of the Assessment Area identified mistletoe infection in the major conifer species (Douglas-fir, white fir, incense-cedar, ponderosa pine, and red fir) that are present in the Assessment Area, indicating that several different dwarf mistletoe species are present. Conifer species most affected in the area are red fir, Douglas-fir, and ponderosa pine.

Dwarf mistletoe is an endemic disease, and its presence in the Assessment Area seems to be increasing, perhaps due to reduced fire occurrence. Mistletoe severity is usually described by a relative index for the amount of host crown affected (Hawksworth et al. 2002). The six-class dwarf mistletoe rating (DMR) system developed by Hawksworth (1977) is a commonly used method of rating mistletoe infection. Approximately 50 percent of the trees that are severely infected (DMR 6) will die within the next decade (Hawksworth and Geils 1990). Tree growth begins to slow noticeably when DMR 3 is reached. In Douglas-fir, height growth is reduced at all infection levels. At low DMRs, tree effects are difficult to demonstrate.

Dwarf mistletoe affects forest health most profoundly in the upper-elevation portions of the Assessment Area. Heavy infestations of dwarf mistletoe are common in the higher-elevation red fir stands. These areas are on ridges and coincident with increased presence of red fir. Skeletal soils create a situation where mistletoe, in combination with cytospora (described below), has reduced stand densities. Thinning, combined with the reintroduction of fire as a low-intensity disturbance force, is likely to reduce competition between trees and reduce the effects of mistletoe. Thinning to positively affect stand health is possible in stands with a DMR less than 3 (Muir and Geils 2002).

Dwarf mistletoe infections in Douglas-fir are common and generally rated as a moderate infection (DMR 3 to 4) when present. Significant amounts of branch deformity and witches broom are normally found in the lower third of the tree crown and often in close proximity to the ground. In most cases, the upper portion of the crown in mid-successional-size codominant or dominant trees is healthy and generally free of dwarf mistletoe. There are significant-size pockets of these trees in some stands. Dwarf mistletoe is also common in ponderosa pine and to a lesser extent found in incense-cedar.

Cytospora. Cytospora (*Cytospora abietis*) is a canker disease that affects red fir in the Assessment Area. This disease is closely associated with dwarf mistletoe. The progress of the disease starts with individual branch infections and proceeds in trees and stands to kill branches, until the crowns of trees are so weakened that fir engraver beetles, or other factors such as drought years, can successfully kill trees. Large areas of continuous fir forest offer little resistance to the spread of the canker. Larger openings can provide buffers to inhibit spread and are often responsible for breaks in

disease occurrence. Management practices to reduce the spread of cytospora and increase success of stand development include large openings and reintroduction of fire. Red fir stands and red firs in white fir stands near ridgetops in the eastern portions of the Assessment Area are heavily infested with cytospora and dwarf mistletoe. The infestations are heaviest on the north slopes.

Sugar Pine Blister Rust. Sugar pine blister rust (*Cronartium ribicola*) is endemic in the LSR. This introduced disease affects western white pine, whitebark pine, foxtail pine, and sugar pine. The disease is introduced by spores from the alternate host (gooseberry), usually on limb tips, and moves through the tree tissue toward the main trunk. In many cases, young trees are killed and older trees have tops killed. This disease can reduce tree vigor to a point where other factors, including mountain pine beetle, can kill host trees. Blister rust was observed in minor amounts in the reviewed stands.

Fomes Annosus. Fomes annosus (*Heterobasidion annosum*) is a disease that decays tree roots. Incense-cedar, ponderosa pine, and sugar pine are resistant to the strain that infects white fir and red fir. The disease is considered to be prevalent in higher-elevation true fir stands in northern California. Not all areas in these stands are infested, and not all trees within them are highly susceptible to infection (DeNitto 1989). Very little recent tree mortality, particularly centers with patterns of chronic mortality, was observed during the 2008 field season.

Wind and Snow Events

Field observations of the effects on vegetation from weather-related events over the past 10 to 20 years were used to describe current conditions and roughly predict the effects of these events on proposed stand management activities.

The Eddy Gulch LSR has experienced high wind events that have uprooted or broken off numerous conifer and large hardwood trees. These events periodically occur during heavy snow and high wind storms. The last widespread snow/wind event occurred in the mid-1990s, and most of these areas were salvage logged at that time to reduce the fuel load hazard.

Heavy snow and wind events occurred during the winter of 2007–2008. The damage to stands was limited in scope when compared to the event in the 1990s. Significant damage is mostly confined to the Klamath Basin area in Eddy Gulch LSR. A moderate amount of damage occurred on the ridge between the east and west forks of Shadow Creek. Pockets of minor damage are found scattered throughout the western portion of the Assessment Area.

1.7 Desired Stand Conditions

M Units (Mechanical Thinning Removing Trees Larger than 8 Inches Diameter at Breast Height)

During the planning phase for the Eddy Gulch LSR Project, the ID team considered public comments, Forest Service and U.S. Fish and Wildlife Service recommendations, pre-European stand conditions, and consequences of climate change to reduce the probability of stand-replacing wildfires in the forested landscapes. The desired condition is that ground, ladder, and crown fuels have been reduced in the M Units, and this will successfully retard the spread of passive or active crown fires and set those stands on a trajectory to be similar to conditions that were present prior to European settlement.

The objectives for establishing the desired stand conditions for the M Units in the FRZs are documented in the forestwide LSR assessment (USFS 1999) in “Chapter 4 Management Recommendations, Shaded Fuelbreak” (same as an FRZ) development. The emphasis is on interrupting fuel continuity through tree canopy spacing and treatments to reduce fuels.

The desired condition of stands in the M Units in the Eddy Gulch LSR Assessment Area was established using the SDI (Table 4), which is a tool for measuring stand health and for predicting future conditions. The desired condition SDI was described as 60 percent or less of the maximum SDI at 30 years after treatment for each forest type. This standard was used because it is the point where mortality (as a result of inter-tree competition) is initiated. When the SDI was established, other stand characteristics (such as basal area per acre and canopy cover) were calculated (see Table 6 in Section 1.8.1 below) and compared to the desired conditions described in Chapter 3 of the forestwide LSR assessment (USFS 1999).

Table 4. Desired stand structure for the upper third of slopes, as described in the forestwide LSR assessment.

Stand Structure (Aspect)	Klamath Forestwide LSR Assessment Desired Condition	
	Basal Area (square feet per acre)	Canopy Cover (percent)
DF ^a (NE ^b)	185–220	40–60
DF (SW) ^c	160–195	30
MC ^d (SW)	210–245	25
True Fir (NE)	300	40–60
True Fir (SW)	No data	No data

Source: USFS 1999.

Notes:

a. DF = Douglas-fir

c. SW = southwest

b. NE = northeast

d. MC = mixed-conifer

Chapter 3 of the forestwide LSR assessment (USFS 1999) contains descriptions of desired conditions for late-successional forest stands on the upper one-third of slopes for all LSRs on the Klamath National Forest (Table 4). “The descriptions are to be used to guide the development of the prescriptions, with development and maintenance of LS/OG [late-successional / old-growth] habitat as the ultimate objective of the treatment” (USFS 1999). The guides are for areas where habitat conditions are the primary objective.

The proposed variable-spacing thinning prescriptions were designed to achieve the forestwide LSR assessment objectives for shaded fuelbreaks (same as the FRZs), where the primary treatment objectives are fire/fuel related (USFS 1999, Chapter 4). The primary objective is to limit the potential of crown fires by interrupting vertical fuel continuity (ladder fuels) and tree crown contact (canopy spacing).

The variable-spacing thinning stand attributes were also compared with the guidelines for the “LS/OG” habitat attributes described in Chapter 3 of the forestwide LSR assessment (USFS 1999).

Additional emphasis would be given to retaining desired conifer species and all hardwoods. Post-treatment canopy cover would range from 32 to 50 percent (Table 5).

Table 5. General thinning prescriptions (for trees larger than 8 inches dbh) immediately after thinning.

Type (Seral Stage)	Basal Area ^a (square feet per acre)	Stand Density Index ^b	Approximate Tree Spacing (feet)	Canopy Cover (percent)
Douglas-fir (MS) ^c	132	189	25	48
Douglas-fir (LS)	191	244	28	50
White fir (MS)	190	262	23	37
White fir (LS)	200	251	29	38
Red fir (LS)	230	280	29	32
Mixed-conifer (LS)	200	254	28	50

Notes:

- a. Basal area—the combined area of the cross sections of tree boles at a height of 4.5 feet above the ground, generally given as square feet per acre.
- b. Stand Density Index—a measure of the density of a stand of trees based on the number of trees per unit area and dbh of the tree of average basal area.
- c. MS = mid-successional (dominant and codominant trees generally 14–18 inches dbh); LS = late-successional (dominant and codominant trees generally larger than 18 inches dbh)

Remaining Portions of Treatment Units

The desired condition in remaining portions of the FRZs, Rx Units, and RS treatments along emergency access routes is to increase the resilience to fire by reducing ground and ladder fuels and removing hazard trees that may block ingress or egress routes during an emergency event.

The Salmon River CWPP (SRFSC 2007) recommended the following canopy cover in conifer stands for shaded fuelbreaks along emergency access routes: late-successional: 70–100 percent; mid-successional (40–80 feet tall), 50–80 percent; and early successional (less than 40 feet tall), 50–70 percent. The Salmon River CWPP recommendations for canopy cover were used in the development of treatments along the emergency access routes located *outside* of the FRZs.

It is desirable that ground and ladder fuel trees that are cut along emergency access routes outside the FRZs are less than 10 inches dbh, but larger hazard trees may be cut if they present a safety hazard. Conifer trees could be thinned to a 20-foot spacing in young conifer stands that are generally less than 10 dbh. Under desired conditions, suppressed conifers less than 10 inches dbh will be cut in larger conifer stands if they are contributing to the fuel ladder. Smaller, suppressed hardwoods (generally less than 6 inches dbh) may be cut in some dense hardwood stands (mostly live oak) and dense young conifer / hardwood stands. No tree cutting, other than hazard trees, is prescribed in the Rx Units or in portions of the FRZs outside of the M Units, except for conifer plantations where trees could be thinned to a 20-foot spacing.

Disturbances

Insects

It is desirable to continue to have insect levels in the LSR, but they are generally maintained at endemic levels. It is important that insects do not reach levels that will create situations that will prevent the long-term sustainability of late-successional habitats (USFS 1999).

Diseases

While it is desirable to have levels of mistletoe in late-successional stands, too much of the disease could cause problems with allowing regeneration to get established as stands begin to

deteriorate. Historically, fire kept mistletoe at lower levels than what is observed in some areas today. Managers will have to be aware of some of the potential problems that may be encountered by allowing mistletoe levels to continue to increase in the coniferous vegetative types (USFS 1999).

Weather-related Events

Weather-related events will continue to affect stands in the LSR. It is desirable that fuel reduction activities, including salvage logging, occur following these events and where sufficient amounts of damage have led to undesirable increases in fuel loading.

1.8 Environmental Consequences

This section provides a summary of the direct, indirect, and cumulative effects of the three alternatives. For Alternatives B and C (the action alternatives), effects are discussed in terms of the prescriptions proposed for each treatment type. Prescriptions with similar effects on vegetation are grouped together for the purposes of this analysis:

- Mechanical thinning and removal;
- Mastication and hand cutting (used to treat only small trees, generally less than 10 inches dbh); and
- Underburning.

The detailed descriptions of the prescriptions for the various treatment types are presented in Chapter 2 of the EIS for the Eddy Gulch LSR Project.

1.8.1 Alternative A: No Action

Stand Structure

Indicators: Basal Area, Stand Density Index, Tree Size, and Canopy Cover

Direct and Indirect Effects

Maintaining the existing stand structure under Alternative A would favor shade-tolerant species such as white fir and incense-cedar. Currently, the older strata (mid-successional / late-successional and late-successional) are densely stocked (Tables 6a, b, and c) and are starting to show signs of deterioration, as indicated by smaller crowns and minor to moderate tree mortality levels. With no treatment, these conditions would continue, with increasing levels of tree mortality during the 30-year analysis period (Table 7).

SDIs for all strata are currently above the lower limit of self-thinning—60 percent SDI (refer to Table 3 above). Under Alternative A, SDIs would drop closer to the lower self-thinning level during the 30-year analysis period because stocking would be reduced as a result of tree mortality (Table 7). The exception is the mixed-conifer stands, where the SDI would still be well above the 60 percent SDI level after 30 years.

Over the 30-year analysis period, species composition would change in the Douglas-fir strata, with the Douglas-fir percent increasing and the hardwoods decreasing. The decrease in the percent of hardwoods would be a result of increased competition from the dense conifer tree stocking. In the white fir strata, the percent of white fir would increase with a reduction in the amount of red fir. A

major change from red fir to white fir would occur in the red fir stand. The mixed-conifer stand that is heavy with ponderosa pine would continue to increase the percent of ponderosa pine, basically changing to a ponderosa pine type (Table 8).

The larger trees in the older strata (MS/LS and LS) are densely stocked and are starting to show signs of deterioration, as indicated by smaller crowns and minor to moderate tree mortality levels. These conditions would continue with increasing levels of tree mortality (refer to Table 7). The smaller trees are heavily suppressed and mortality would be high.

During the 30-year analysis period (without treatment), mortality would reduce the number of trees greater than 10 inches dbh per acre by 14–24 percent in Douglas-fir and true fir stands. The loss of trees would reduce the canopy cover by 4–12 percent. At 30 years, 45 percent of the trees greater than 10 inches dbh would have died in the mixed-conifer stands. The basal area would be reduced; however, the SDI would still be above the desired condition, meaning mortality would continue. In all stands, most trees that had died during the first 5–10 years would fall, thereby increasing ground fuels, while most of the remaining standing trees would increase ladder fuels (Tables 6a, b, and c above).

Basal areas would increase in all strata over the 30-year analysis period (without treatment), except in the mixed-conifer stands (Tables 6a, b, and c). The basal area and number of larger trees (greater than 24 inches dbh) would increase as the residual trees continued to grow. The exception would be in the mixed-conifer stands where the high mortality would reduce the basal area and canopy cover. Any trees that died during this period would increase ladder fuels if they remain standing, and if they fall, would eventually increase large-material ground fuel loading.

Canopy cover in all stands would drop 5–10 percent during the 30-year analysis period (Tables 6a, b, and c) as a result of self-thinning or disturbance events.

Comparison with Late-Successional Guidelines

The Douglas-fir stands and mixed-conifer stands currently exceed the basal area and canopy cover guidelines (refer to Table 4) contained in the forestwide LSR assessment (USFS 1999).

For true fir stands, the forestwide LSR assessment only lists the stand basal area guidelines for stands located on north and east aspects. The canopy cover guidelines apply to all aspects and positions on the slope. Approximately 80 percent of true fir strata acres in M Units are located on south or west aspects. The true fir stands are currently at guideline levels. SDI calculations and field stand examinations indicate that minor to major amounts of tree mortality are occurring (the red fir stand being the worst). SDI data indicates that, with no treatment, tree mortality would increase during the 30-year analysis period (refer to Table 6).

Effects from Disturbance

Insects. Changes in insect activity usually are a result of stresses on a tree or stand. These stresses include overcrowding, drought–moisture stress, and fire. Until a stress factor exists, insect levels would remain at background, generally low, endemic levels. Current beetle activity is at or below the average endemic level. Beetle population levels tend to be variable, depending on many factors, including weather and tree damage and health. It is anticipated that the beetle population levels would tend to increase with the anticipated reduction in tree vigor and increase in tree mortality under Alternative A.

Table 6. Stand structure for M Units: comparison of current and 5- and 30-year stand data for Alternatives A, B, and C.

Current Strata Data		Table 6a. Summary of Current Conditions for Stand Structure Indicators (Basal Area, SDI, Tree Size, and Canopy Cover)						
SAF ^a Forest Type	CWHR ^b Seral Stage	TPA ^c Total	TPA >10 ^d	BA/ac ^e >10"	Average DBH ^f >10"	TPA >24"	Canopy Cover (%)	SDI ^g (this is for TPA Total)
DF ^h	MS ⁱ	441	135	192	16.1	5	73	405
DF	MS/LS ^j	235	120	249	19.5	20	72	425
WF ^k	MS	299	190	302	17.1	9	61	506
WF	MS/LS	275	124	284	20.5	29	58	479
RF ^l	LS	613	113	350	23.8	43	59	643
MC ^m	LS	255	159	320	19.2	28	69	453

Current Strata Data		Table 6a. Summary of Current Conditions for Stand Structure Indicators (Basal Area, SDI, Tree Size, and Canopy Cover)						
SAF Forest Type	CWHR Seral Stage	TPA Total	TPA >10"	BA/ac >10"	Average DBH >10"	TPA >24"	Canopy Cover (%)	SDI (this is for TPA Total)
DF	MS	441	135	192	16.1	5	73	405
DF	MS/LS	235	120	249	19.5	20	72	425
WF	MS	299	190	302	17.1	9	61	506
WF	MS/LS	275	124	284	20.5	29	58	479
RF	LS	613	113	350	23.8	43	59	643
MC	LS	255	159	320	19.2	28	69	453

Projected Strata Data		Table 6b. Alternative A: Summary of Predicted Conditions in 5 Years					
SAF Forest Type	CWHR Seral Stage	TPA >10"	BA/ac >10"	Average DBH >10"	TPA >24"	Canopy Cover (%)	SDI (TPA >10")
DF	MS	135	205	16.7	6	62	319
DF	MS/LS	113	251	20.1	21	62	349
WF	MS	185	315	17.7	12	56	462
WF	MS/LS	122	296	21.1	29	52	404
RF	LS	111	357	24.3	43	49	461
MC	LS	105	247	20.8	26	59	339

Projected Strata Data		Table 6d. Alternatives B and C. Summary of Predicted Conditions in 5 Years Post Project					
SAF Forest Type	CWHR Seral Stage	TPA >10"	BA/ac >10"	Average DBH >10"	TPA >24"	Canopy Cover (%)	SDI ^g (TPA >10")
DF	MS	68	140	19.4	6	48	198
DF	MS/LS	56	198	25.4	22	50	251
WF	MS	80	201	21.4	12	37	273
WF	MS/LS	53	208	26.9	29	38	257
RF	LS	52	235	28.7	33	32	284
MC	LS	57	206	25.7	28	50	260

Projected Strata Data		Table 6c. Alternative A: Summary of Predicted Conditions in 30 Years					
SAF Forest Type	CWHR Seral Stage	TPA >10"	BA/ac >10"	Average DBH >10"	TPA >24"	Canopy Cover (%)	SDI (TPA >10")
DF	MS	117	246	19.7	21	65	345
DF	MS/LS	94	267	22.8	26	62	354
WF	MS	145	355	21.2	36	56	484
WF	MS/LS	106	335	24.0	41	54	434
RF	LS	90	362	27.1	56	47	447
MC	LS	88	249	22.7	27	58	330

Projected Strata Data		Table 6e. Alternatives B and C. Summary of Predicted Conditions in 30 Years Post Project					
SAF Forest Type	CWHR Seral Stage	TPA >10"	BA/ac >10"	Average DBH >10"	TPA >24"	Canopy Cover (%)	SDI (TPA >10")
DF	MS	66	183	22.6	22	54	243
DF	MS/LS	55	226	27.5	29	54	279
WF	MS	74	254	25.1	38	42	323
WF	MS/LS	49	239	30.0	41	40	284
RF	LS	48	255	31.3	41	33	298
MC	LS	55	233	27.9	33	53	285

Notes:

- a. SAF = Society of American Foresters
- b. CWHR = California Wildlife Habitat Relationship
- c. TPA = trees per acre
- d. > = greater than
- e. BA = basal area per acre
- f. DBH = diameter at breast height
- g. SDI = stand density index
- h. DF = Douglas-fir
- i. MS = mid-successional
- j. LS = late-successional
- k. WF = white fir
- l. RF = red fir
- m. MC = mixed-conifer

Table 7. Eddy Gulch LSR strata data and stand structure: current, 30-year desired conditions, and 30-year conditions post-thinning in M Units and with no treatment.

Species Composition Strata Data		Stand Structure						
SAF ^a Forest Type	CWHR Seral Stage	Desired Current SDI 35%	All TPA ^b Current SDI	Trees Greater Than 10 Inches DBH				
				Desired SDI ^c at 30 Years SDI 60%	FVS ^d Predicted SDI at 30 Years Post Thinning	FVS Predicted SDI at 30 Years No Treatment	FVS Predicted 30-year Tree Mortality (per acre)	
							Post Thinning	No Treatment
DF ^e	MS ^f	210	405	≤360	243	345	-2	-16
DF	MS/LS ^f	210	425	≤360	279	354	-1	-19
WF ^e	MS	266	506	≤456	323	484	-6	-40
WF	MS/LS	266	479	≤456	284	434	-4	-16
RF ^e	LS	280	643	≤480	298	447	-4	-21
MC ^e	LS	150	415	≤258	285	355	-2	-71

Notes:

- a. SAF = Society of American Foresters
- b. TPA = trees per acre
- c. SDI = stand density index
- d. FVS = Forest Vegetation Simulator
- e. DF = Douglas fir; WF = white fir; RF = red fir; MC = mixed-conifer
- f. MS = mid-successional; LS = late-successional

Table 8. Percent species by strata: current, no thinning, and with thinning.

Strata / Year	Treatment	Douglas-Fir (%)	White Fir (%)	Red Fir (%)	Ponderosa Pine (%)	Sugar Pine (%)	Incense-Cedar (%)	Hardwoods (%)
Douglas-fir – mid-successional								
2008	Current	67			5			14
2038	No thinning	71			14			8
2038	With thinning	60			15			20
Douglas-fir – mid-successional / late-successional								
2008	Current	74	4			2		18
2038	No thinning	83	3			5		5
2038	With thinning	74			4	9		9
White fir – mid-successional								
2008	Current	6	77	16				
2038	No thinning		76	23				
2038	With thinning		80	19		3		
White fir – mid-successional / late-successional								
2008	Current	6	73	15		3		
2038	No thinning	5	80	8			3	
2038	With thinning	9	68	8			6	
Red fir – late-successional								
2008	Current		20	80				
2038	No thinning		63	37				
2038	With thinning		51	49				
Mixed-conifer – late-successional								
2008	Current	12			70	18		
2038	No thinning	8			90	2		
2038	With thinning	23			69	8		

Diseases. Diseases also need a stress factor to occur at more than background levels, where individual or small groups of trees of low vigor are attacked. Cytospora and dwarf mistletoe are well established in portions of the Assessment Area. Cytospora will tend to decline as the diseased red fir trees slowly die out and are mostly replaced by white fir. Dwarf mistletoe would continue to affect tree vigor and mortality in portions of the Assessment Area, with a minor increase during the 30-year analysis period. Both sugar pine blister rust and fomes annosus are minor in scope and are projected to remain so during the 30-year analysis period.

Wind and Snow Events. Wind and snow events have historically occurred in the Assessment Area and have caused variable levels of damage in the conifer stands. The heavy wind and snow events that occurred during the 2007 / 2008 winter season caused minor to moderate damage to several isolated stands. These events will continue to occur during the 30-year analysis period with unpredictable amounts of damage and increases in fuels.

Effect of Climate Change

Climate change will increase temperatures, the length of the fire season, and the number of acres burned (Lenihan et al. 2006, Westerling and Bryant 2006). Increases in temperature would result in replacement of Douglas-fir forests with Douglas-fir-oak forests (Lenihan et al. 2006). An increase in fire season length would increase the number of acres burned and mortality in conifer stands, leading to conversion to brushfields.

Changes resulting from temperature variations would likely be minor over the 30-year analysis period; however, changes in fire behavior could be substantial, dependent on the frequency and size of fires. Overall, the effects on the trees during the 30-year analysis period would be minor to moderate.

Cumulative Effects

Most other actions that may occur in the future would have little effect on forest vegetation, when considered at the landscape scale. The stands would remain overstocked until sufficient mortality occurs as a result of self-thinning or a wildfire. Changes in stand characteristics that occur from self-thinning would vary depending on stand age and condition. The reduction in the number of trees per acre from self-thinning in the younger, mid-successional stands would be beneficial in that it would reduce tree competition for nutrients, water, and sunlight. A reduction in the number of trees per acre in the older, late-successional stands would be detrimental if the stocking drops below the desired stocking level. These changes would occur gradually over time and would be a minor to moderate benefit in the younger stands and a moderate to major adverse effect in the older stands. In either case, the tree mortality would create additional ground and ladder fuels that would contribute to fire severity in the stands. The moderate to major adverse effects resulting from a wildfire would be immediate and long term.

Taking no action would affect each stratum and stand differently and at different times. Taking no action could eventually result in conditions that allow an insect or disease epidemic to occur. Different insects attack different species; for example, mountain pine beetles, western pine beetles, and Ips beetles (a genus of pine bark beetles) attack pine; Douglas-fir bark beetles attack Douglas-fir; and spruce bud worms and scolytus beetles attack Douglas-fir and true firs. All need specific conditions to weaken trees to the point that an epidemic can happen. Mixed-conifer and Douglas-fir stands are currently overcrowded. A multiyear drought could trigger an epidemic.

Large high-intensity wildfires could create a breeding ground for insects or diseases to build to an epidemic level. These populations could then attack surviving trees that were weakened by the fire. With predictions for warmer temperatures and possibly less precipitation in the future, it would be more likely that insects would find more stressed trees to infest.

Construction of a fuelbreak system west Black Bear Ranch would have no effect on stand conditions in the Assessment Area and alone would have little effect on reducing the size or intensity of a wildfire.

Conclusion

The inter-tree competition that would continue under the no-action alternative would kill individual trees, resulting in long-term minor to moderate adverse effects at the landscape or ecosystem level. A wildfire would have immediate adverse effects that would continue over the long-term. A wildfire would have major adverse effects on individual stands burned by active crown fires, but the effects would be minor to moderate at the landscape level. In the long term, the increased mortality would increase fuels and contribute to higher-severity fires. The fires would result in substantially more mortality, which would result in long-term major adverse effects at the landscape or ecosystem level. Similarly, a drought that triggers an insect or disease epidemic would have long-term major adverse effects at the landscape or ecosystem level.

1.8.2 Alternative B: Proposed Action and Alternative C: No New Temporary Roads Constructed

Both action alternatives are addressed together because effects would be similar. Under Alternative C, approximately 99 fewer acres would be treated by mechanical thinning than under Alternative B because the 1.03 miles of new temporary roads would not be constructed. Maps showing the proposed treatment units under Alternatives B and C are contained in Appendix B of this report.

Direct and Indirect Effects: Stand Structure

Indicators: Basal Area, Stand Density Index, Tree Size, and Canopy Cover

Mechanical Thinning and Removal in M Units

The thinning prescriptions (refer to Tables A-1 and A-2 in Appendix A of this report) would reduce the SDIs of all strata to below or close to the 35 percent SDI (lower limit of full site occupancy), except in the mixed-conifer stand. The 30-year projection of SDIs indicates that all strata (except mixed-conifer) would be below the lower limit of self-thinning (60 percent SDI) (refer to Tables 6d and e).

The mixed-conifer stand is an older, larger tree stand that is currently very heavy with ponderosa pine and sugar pine (88 percent). The 30-year projection is that the percent of Douglas-fir would increase from 12 to 23 percent. The actual SDI for the stand would then be higher, given the higher SDI for Douglas-fir. The 30-year SDI for the stand would probably be slightly above the 60 percent SDI.

The thinning prescriptions would reduce the strata densities for trees greater than 8 inches dbh by increasing the average spacing between trees (Table 9). White fir, Douglas-fir, red fir, and incense-cedar would be the primary species removed, but some ponderosa pine and a limited number of sugar pine may also be removed.

Table 9. Average spacing between trees.

Strata ^a / Year	Alternative A No Action	Alternatives B and C With Thinning	Strata ^a / Year	Alternative A No Action	Alternatives B and C With Thinning
	(tree spacing in feet)			(tree spacing in feet)	
DF MS			WF MS/LS		
5 years	18	25	5 years	19	29
30 years	19	26	30 years	20	30
DF MS/LS			RF LS		
5 years	20	28	5 years	20	29
30 years	22	28	30 years	22	30
WF MS			MC LS		
5 years	15	23	5 years	20	28
30 years	17	24	30 years	22	28

Note:

- a. DF = Douglas fir MC = Mixed-conifer
 WF = White fir MS = Mid-successional
 RF = Red fir LS = Late-successional

After thinning, the percent of Douglas-fir (refer to Table 8) in the young Douglas-fir strata would be reduced, with a corresponding increase in the percent of hardwoods as the thinning reduces the number of conifers per acre, which lessens the current competition with the hardwoods. The percent of Douglas-fir in the older strata would remain the same as the current percent of Douglas-fir. The amount of hardwoods would continue to drop as a result of the longer period of competition from the conifers, which has reduced the hardwood trees crown size and vigor. However, the amount of hardwoods would still be higher than under the no-action alternative.

The largest trees in the M Units (refer to Tables 6a, d, and e) would be retained, while generally the smaller trees would be removed, or if less than 8 inches dbh, would be thinned by underburning. Layering would be reduced. Five years after treatment, the number of trees greater than 10 inches dbh would be reduced (compared to the current stands) by 48 to 58 percent in Douglas-fir and true fir stands and 65 percent in mixed-conifer stands. This would reduce the basal area but increase the average dbh in each stand. Trees greater than 24 inches dbh would remain the same or increase, except in the red fir stands, where the number would decline by 25 percent as a result of thinning the clumps of larger trees. Canopy cover would be reduced, and the desired SDI would be achieved.

There would be little change in the number of trees greater than 10 inches dbh 30 years after treatment compared to the number of trees 5 years after treatment. However, the basal area, average dbh, and number of trees greater than 24 inches dbh would increase in all stands as a result of reduced competition and higher growth rates. The desired SDI would be achieved in all stands, except mixed-conifer.

The thinning treatments would reduce the strata densities for trees greater than 10 inches dbh by increasing the average spacing between trees (refer to Table 9). Ladder fuels would be reduced as a result of thinning from below to remove materials greater than 8 inches dbh. Tree mortality for the 30-year analysis period would be greatly reduced (refer to Table 7).

The thinning treatments would reduce the basal areas in all strata (refer to Tables 6a, d, and e). The basal areas would continue to be less than they would under the no-action alternative during the 30-year analysis period.

The thinning treatments would initially reduce canopy cover by 15 to 20 percent (refer to Tables 6a, d, and e), but it would increase back to the 40 to 55 percent range within the 30-year analysis period. The exception is the older, very decadent red fir stand that is heavily infested with cytospora and dwarf mistletoe. The proposed thinning would reduce the canopy cover by approximately 25 percent and remain at that level during the 30-year analysis period.

Comparison with Late-Successional Guidelines

The Douglas-fir and mixed-conifer stands would meet the forestwide LSR assessment guidelines for basal area and canopy cover at 5 years post-treatment, as shown in Table 10. The exception is the younger Douglas-fir mid-successional strata basal area. These strata would meet the basal area desired conditions within 30 years.

Table 10. Desired conditions for forest stands on the upper third of slopes compared with stand conditions at five years post-treatment.

Forest Type (Aspect)	Klamath Forestwide LSR Assessment Desired Conditions		Eddy Gulch LSR Alternatives B and C at Five Years Post-Treatment		
	Basal Area (square feet per acre)	Canopy Cover (percent)	Forest Type (Successional Stage)	Basal Area (square feet per acre)	Canopy Cover (percent)
DF ^a (NE ^b)	185–220	40–60	DF (MS ^e)	140	48
DF (SW) ^c	160–195	30	DF (MS / LS ^f)	198	50
MC ^d (SW)	210–245	25	MC (LS)	206	50
True Fir (NE)	300	40–60	WF ^g (MS)	201	37
			WF (MS / LS)	208	38
			RF ^h (L / S)	235	32
True Fir (SW)	No data	No data	WF ^g (MS)	201	37
			WF (MS / LS)	208	38
			RF ^h (L / S)	235	32

Notes:

- | | |
|-----------------------|---------------------------|
| a. DF = Douglas-fir | f. LS = late-successional |
| b. NE = northeast | g. WF = white fir |
| c. SW = southwest | h. RF = red fir |
| d. MC = mixed-conifer | e. MS = mid-successional |

The true fir stands (white fir) are close to the canopy cover guideline level (in the forestwide LSR assessment) for shaded fuel breaks (the FRZs). The red fir stands would be approximately 8 percent below the guidelines due to the advanced tree mortality already occurring in the stand. The basal area levels would be approximately 20 to 30 percent below the late-successional habitat guideline. The lower basal area level is prescribed to meet the tree spacing objective for FRZs.

The prescribed lower values for stand attributes in white fir and red fir stands in the Eddy Gulch LSR are more consistent with descriptions of stand characteristics prior to European settlement (Taylor and Skinner 1998). They contribute to increasing resistance to wildfires (Millar et al. 2007),

particularly by reducing the probability of passive and active crown fires. The prescribed lower values would also contribute to lower mortality as the climate becomes warmer in the future.

Mastication and Hand Cutting. The mastication and hand cutting treatments proposed under Alternatives B and C would be located on slopes less than 45 percent. The treatment would involve trees less than 10 inches dbh. The number of trees per acre would be reduced, leading to a reduction in inter-tree competition. The effect on canopy cover would be minor.

Underburning. Underburning would be used on slopes greater than 45 percent in the FRZs and in the Rx Units to remove trees less than 4 inches dbh. These treatments would reduce fuel hazards but would not affect the species composition, average tree size, or have little effect on canopy cover.

Effects from Disturbance

Insects. Current beetle activity is at or below the average endemic level. Beetle population levels tend to be variable, depending on many factors, including weather, tree damage, and health. The thinning treatments would reduce inter-tree competition and the potential for tree mortality by removing most of the trees that are projected to die in the no-treatment 30-year analysis. Long-term beetle activity in these stands would be less than under the no-action alternative due to the reduction in inter-tree competition. All treatments would contribute to increased tree vigor over the long term—a beneficial effect—which would reduce the probability of insect attack. However, there could be a short-term increase in insect activity immediately after thinning, resulting from an increase in recently down fuels (logging slash and / or trees killed by underburning).

Disease. All treatments would increase tree vigor. This would result in a reduced probability of successful insect attack—a beneficial effect. However, if thinning and mastication are not done carefully, mechanical injuries to residual trees could result in pathogens attacking these trees. The thinning prescriptions would remove a large number of red fir infected with cytospora and dwarf mistletoe. The remaining infected red fir would continue to slowly deteriorate as additional branches die and until the trees weaken to the point where mortality occurs. The mortality level during the 30-year analysis period would be minor. The thinning treatments would not change the status of the blister rust from the no-action alternative.

Implementation of the thinning treatments would increase the possibility of fomes annosus infections in the true fir stands through the creation of stumps and some residual tree bole damage. Tree growth would be slowed if infections occurred, but any associated tree mortality would mostly occur beyond the 30-year analysis period. The affects would be within the habitat objectives for an LSR.

Wind and Snow Events. The thinning treatments would result in more open stands, and depending on location, the residual trees would be more exposed to the wind. Field observations by the silviculturist during the 2008 field season indicate that previously thinned stands have a minor increase in damage when compared to stands that have not been thinned.

Climate Change. The thinning treatments would reduce inter-tree competition—a beneficial effect—which would help reduce the effects of climate change on these stands. This could reduce the overall affects on the treated stands to a minor level during the 30-year analysis period.

Cumulative Effects

The ongoing and future projects would have little to no effect on forest vegetation in the Assessment Area.

Conclusion

Mechanical thinning, mastication, and underburning would all result in a major improvement in the health and vigor of residual trees at a landscape or ecosystem scale; therefore, beneficial effects would be moderate to major over the long term. Mechanical thinning, especially, would create more open stands, which would reduce the potential for crown fires and which would be more similar to stand conditions that occurred prior to European settlement, thus mimicking historic disturbance patterns. The M Units would be located along ridgetops, where the most open stands were historically located. Each treatment would affect the stands to different degrees, increasing tree species diversity in stands in the Assessment Area. Mechanical thinning would reduce current basal area stocking by 25 to 45 percent and canopy cover by about the same amount. Mastication and underburning would reduce basal area by about 2 to 13 percent, with a minor change to canopy cover.

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Appendix A
Stand Prescriptions
and
Summary Table of Stand Conditions in M Units

Table A-1. Eddy prescription summary for Alternative B.

M Unit	Stand	Compartment	Acres	Strata ^a	DxD (feet) Prescription	Maximum DBH	Special Directions ^b
3	751	438	7	DF MS	16X32	28	SP+2"
4	752		33	DF MS	16X32	28	SP+2"
7(S)	755		19	DF MS	16X32	28	SP+2"
7(N)	773		14	DF MS	16X32	28	SP+2",PP-4"
8	756		5	WF MS	12X24	20	SP+2"
9	502	431	29	DF MS	16X32	28	SP+2"
10	757	438	32	WF MS	12X24	28	
11	758		3	WF MS	12X24	28	SP+2"
12	509	431	22	DF MS/LS	16X32	28	
13	303	433	32	WF MS/LS	12X24	28	
15	701	437	83	WF MS	12X24	28	SP+2"
	701		55	WF MS/LS	12X24	28	SP+2"
16	702		4	WF MS/LS	12X24	28	SP+2"
17	703		12	WF MS/LS	12X24	28	SP+2"
19	705		46	DF MS/LS	14X28	28	SP+2"
20	706		13	WF MS	12X24	28	SP+2"
21	707		108	DF MS	16X32	28	SP+2"
22	801		439	7	DF MS	16X32	28
23	802	42		WF MS/LS	12X24	28	SP+2",WF-4"
24	803	45		WF MS/LS	14X28	20	SP+2",WF-4"
25	804	27		WF MS	12X24	28	SP+2"
30	553	430	9	WF MS	12X24	28	SP+2"
31	351	416	20	WF MS/LS	14X28	20	
32	552	430	5	DF MS/LS	14X28	28	
35	805	439	4	WF MS	12X24	28	SP+2"
36	806		21	WF MS	12X24	28	SP+2"
37	708	437	12	WF MS	12X24	28	SP+2"
38	709		12	WF MS	12X24	28	
39	759	438	14	DF MS	16X32	28	SP+2"
40	760		7	WF MS	14X28	28	SP+2"
43	762		12	MC LS	16X32	20	SP+2"
51	554	430	12	DF MS	14x28	28	
52	710	437	19	DF MS/LS	14X28	28	SP+2",WF-4"
54	712		37	WF MS	12X24	28	SP+2"
60	807	439	17	RF LS	16X32	28	
61	808		25	WF MS/LS	12X24	28	SP+2",WF-4"
65	764	438	6	DF MS/LS	14X28	28	SP+2"
66	765		2	DF MS	16X32	28	SP+2"
73	306	433	26	WF MS/LS	12X24	28	
75	505	431	9	DF MS	14X28	28	SP+2"
76	506		8	DF MS	14X28	28	SP+2"
79	307	433	13	WF MS	12X24	28	
80	772	438	3	WF MS	16X32	28	SP+2"
Total Acres Treated in M Units			931				
Summary of Acres by Strata							
Strata	DF MS	DF MS/LS	WF MS	WF MS/LS	RF LS	MC LS	Total
Acres	262	98	281	261	17	12	931

Notes:

- a. DF = Douglas fir; WF = white fir; RF = red fir; MC = mixed-conifer, MS = mid-successional; LS = late-successional
- b. SP = sugar pine; PP = ponderosa pine; WF = white fir

Table A-2. Eddy prescription summary for Alternative C.

M Unit	Stand	Compartment	Acres	Strata ^a	DxD (feet) Rx	Maximum DBH	Special Directions ^b
3	751	438	7	DF MS	16X32	28	SP+2"
4	752		33	DF MS	16X32	28	SP+2"
7(S)	755		19	DF MS	16X32	28	SP+2"
7(N)	773		14	DF MS	16X32	28	SP+2",PP-4"
8	756		5	WF MS	12X24	20	SP+2"
9	502	431	29	DF MS	16X32	28	SP+2"
10	757	438	32	WF MS	12X24	28	
11	758		3	WF MS	12X24	28	SP+2"
12	509	431	22	DF MS/LS	16X32	28	
13	303	433	32	WF MS/LS	12X24	28	
15	701	437	57	WF MS	12X24	28	SP+2"
			55	WF MS/LS	12X24	28	SP+2"
16	702	437	4	WF MS/LS	12X24	28	SP+2"
17	703		7	WF MS/LS	12X24	28	SP+2"
19	705		46	DF MS/LS	14X28	28	SP+2"
20	706		13	WF MS	12X24	28	SP+2"
21	707	437	87	DF MS	16X32	28	SP+2"
22	801	439	7	DF MS	16X32	28	SP+2"
23	802		42	WF MS/LS	12X24	28	SP+2",WF-4"
24	803		30	WF MS/LS	14X28	20	SP+2",WF-4"
25	804		27	WF MS	12X24	28	SP+2"
30	553	430	9	WF MS	12X24	28	SP+2"
31	351	416	20	WF MS/LS	14X28	20	
32	552	430	5	DF MS/LS	14X28	28	
35	805	439	4	WF MS	12X24	28	SP+2"
36	806		7	WF MS	12X24	28	SP+2"
38	709	437	12	WF MS	12X24	28	
39	759	438	14	DF MS	16X32	28	SP+2"
40	760		7	WF MS	14X28	28	SP+2"
43	762		12	MC LS	16X32	20	SP+2"
51	554	430	12	DF MS	14x28	28	
52	710	437	19	DF MS/LS	14X28	28	SP+2",WF-4"
54	712		37	WF MS	12X24	28	SP+2"
60	807	439	17	RF LS	16X32	28	
61	808		25	WF MS/LS	12X24	28	SP+2",WF-4"
65	764	438	6	DF MS/LS	14X28	28	SP+2"
66	765		2	DF MS	16X32	28	SP+2"
73	306	433	26	WF MS/LS	12X24	28	
75	505	431	3	DF MS	14X28	28	SP+2"
76	506		8	DF MS	14X28	28	SP+2"
79	307	433	13	WF MS	12X24	28	
80	772	438	3	WF MS	16X32	28	SP+2"
Total Acres Treated in M Units			832				
Summary of Acres by Strata							
Strata	DF MS	DF MS/LS	WF MS	WF MS/LS	RF LS	MC LS	Total
Acres	235	98	229	241	17	12	832

Notes:

- a. DF = Douglas fir; WF = white fir; RF = red fir; MC = mixed-conifer, MS = mid-successional; LS = late-successional
- b. SP = sugar pine; PP = ponderosa pine; WF = white fir

Table A-3. Summary of stand conditions in M Units.

Stand Number	M Unit	Stand Diagnosis Layer 1	Layer 2	Layer 3	Treatment Objective	Prescription	Management Direction
303	13	<p><u>Diag.</u> Previous select harvest in the stand.</p> <p>South end (upslope) portion of unit is heavier to late-successional red fir changing to white fir with red fir down slope. Cytospora and dwarf mistletoe in the red fir (light to moderate 2-3 Hawksworth).</p>	Mid-successional size white fir with red fir.	Suppressed seedling/sapling conifers (60%, 30').	Reduce the likelihood of stand-replacing wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire/fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 12x24 spacing guides. This will reduce crown contact and fuel ladders. Recommend leave tree marking (LTM) for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention Visual Quality Objectives (VQO) in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are (1) protect existing late-successional habitat from threats (or habitat loss) that occur inside and outside the LSR, and (2) protect early and mid-successional vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).
306	73	Upper portion is white fir with Douglas-fir, incense cedar, and sugar pine. Lower portion is Douglas-fir with white fir (lower portion may have stability problems).	Suppressed sapling/pole conifer (20%, 30').	Suppressed seedling/sapling conifers (10%, 7').	Reduce the likelihood of stand-replacing wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire/fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 12x24 spacing guides. This will reduce crown contact and fuel ladders. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing late-successional habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect early and mid-successional vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).

Table A-3. Summary of stand conditions in M Units (continued).

Stand Number	M Unit	Stand Diagnosis Layer 1	Layer 2	Layer 3	Treatment Objective	Prescription	Management Direction
307	79	<p><u>Agg 1:</u> (50%) White fir with heavy mix of Douglas-fir and lesser amounts of incense cedar, sugar pine and red fir. Douglas-fir mistletoe is moderate to heavy (3-6 Hawksworth). Stand vigor is declining (short leader growth, thinning crowns, dead tops, and tree mortality)</p> <p><u>Agg 2:</u> (50%) – Douglas-fir sapling/pole, dense or M/P stocking mixed with chinquapin and snowbrush.</p>	Suppressed sapling/pole conifer (30%, 25').	Suppressed seedling/sapling conifers (30%, 8').	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide “anchor” lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire/fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 12x24 spacing guides. This will reduce crown contact and fuel ladders. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing late-successional habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect early and mid-successional vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).
351	31	A mid-successional to late-successional white fir stand with red fir.	Moderate to light of suppressed sapling/pole size conifer trees (40%, 50').	Moderate suppressed seedling/sapling conifers (20%, 12').	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide “anchor” lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire/fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 14x28 spacing guides. This will reduce crown contact and fuel ladders. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 20 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).

Table A-3. Summary of stand conditions in M Units (continued).

Stand Number	M Unit	Stand Diagnosis Layer 1	Layer 2	Layer 3	Treatment Objective	Prescription	Management Direction
502	9	<u>Diag.</u> Stand was underburned within last 20 years. Very old selective cut and more recent individual tree harvest. Dense mid-successional size mostly Douglas-fir with ponderosa pine and sugar pine.	Light stocking of suppressed sapling/pole Douglas-fir and white fir (10%, 50').	Suppressed seedling/sapling conifers with deer brush and Oregon grape in more open areas (25%, 10').	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire/fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 16x32 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).
505	75	<u>Diag.</u> Stand was underburned within last 20 years. Very old selective cut and more recent individual tree harvest. Mid-successional size, moderate to dense canopy closure stand of mostly Douglas-fir with ponderosa pine, sugar pine and limited amount of knobcone pine. Mistletoe light to moderate in ponderosa pine (2-4 Hawksworth) 25% of ponderosa pine trees and light infection in Douglas-fir (1-2 Hawksworth).	Generally open.	Suppressed seedling/sapling live oak and madrone) (50%, 15').	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire/fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 14x28 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).

Table A-3. Summary of stand conditions in M Units (continued).

Stand Number	M Unit	Stand Diagnosis Layer 1	Layer 2	Layer 3	Treatment Objective	Prescription	Management Direction
506	76	<p><u>Diag.</u> Stand was underburned within last 20 years. Very old selective cut and more recent individual tree harvest.</p> <p><u>Agg 1:</u> 75% Layer 1 – Pockets of dense mid-successional size mostly Douglas-fir with ponderosa pine.</p> <p><u>Agg 2:</u> 25% Layer 1 Heavy burn with very scatter S stocking (<25%) of conifers and heavy brush (live oak and deerbrush) with seedling/sapling conifers (100%, 6').</p>	Generally open	Suppressed seedling/sapling deerbrush (60%, 6').	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide “anchor” lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire/fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 14x28 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).
509	12	A mid-successional Douglas-fir stand with a significant number of late-successional old growth Douglas-fir, ponderosa pine and sugar pine scattered through the stand.	Suppressed sapling/pole size conifers with live oak, madrone and black oak (30%, 41').	Moderate suppressed seedling/sapling conifers, small white oak and live oak (30%, 10').	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide “anchor” lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire/fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 16x32 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).

Table A-3. Summary of stand conditions in M Units (continued).

Stand Number	M Unit	Stand Diagnosis Layer 1	Layer 2	Layer 3	Treatment Objective	Prescription	Management Direction
552	32	<p><u>Diag.</u> Long unit along the major ridge between N. Fork and S. Fork of Salmon River. Narrow portion of stand near intersection of 39N24 and 39N41.</p> <p>A mid-successional size Douglas-fir stand with ponderosa pine and incense cedar. Variable stocking ranging from P to D (25 to 60%) canopy closure.</p>	Suppressed sapling/pole conifers in dense layer 1 areas but healthy in open areas.	Suppressed seedling/sapling conifer, small oak, madrone, huckleberry oak, and manzanita.	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire/fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 14x28 spacing guides. This will reduce crown contact and fuel ladders. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).
553	30	<p><u>Diag.</u> Long unit along the major ridge between N. Fork and S. Fork of Salmon River. Narrow portion of stand below of 39N24.</p> <p>Mostly a mid-successional size white fir stand with sugar pine and Douglas-fir. North portion along ridge top is older late-successional white fir with red fir and sugar pine.</p>	Suppressed sapling/pole conifers (30%, 35').	Suppressed seedling/sapling conifer with small amount of snowbrush and huckleberry oak.	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire/fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 12x24 spacing guides. This will reduce crown contact and fuel ladders. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).

Table A-3. Summary of stand conditions in M Units (continued).

Stand Number	M Unit	Stand Diagnosis Layer 1	Layer 2	Layer 3	Treatment Objective	Prescription	Management Direction
554	51	A mid-successional size Douglas-fir stand with ponderosa pine, incense cedar and sugar pine. Mistletoe in ponderosa pine.	Suppressed sapling/pole conifers and live oak (40%, 15').	Suppressed seedling/sapling conifer, live oak, hazel, and scrub oak (20%, 8').	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire/fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 14x28 spacing guides. This will reduce crown contact and fuel ladders. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).
701	15	<u>Diag.</u> 60% A mid-/late-successional size with pockets of decadent old growth. White fir with Douglas-fir, sugar pine, and incense cedar. <u>Agg 1</u> Consists mostly of mid-successional size class trees with some old growth present. <u>Agg 2</u> <u>Diag.</u> 40% A mid-successional to young late-successional size stand. Overstocked white fir.	Moderate stocking of suppressed mid successional size trees, mostly white fir. Suppressed sapling/pole size trees (30%).	Light stocking of suppressed seedlings/saplings and brush. Suppressed seedling/sapling size trees with brush (20%).	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked conifer portions of the stand to reduce crown density to a level that facilitates the fire/fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 12x24 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).

Table A-3. Summary of stand conditions in M Units (continued).

Stand Number	M Unit	Stand Diagnosis Layer 1	Layer 2	Layer 3	Treatment Objective	Prescription	Management Direction
702	16	<u>Diag.</u> Overstocked true fir stand mid-successional to late successional in tree size. Overstocked mid-successional size class trees.	Moderate stocking of suppressed sapling/pole size trees (35%, 40').	Suppressed seedlings/saplings (10%, 8').	reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked conifer portions of the stand to reduce crown density to a level that facilitates the fire/fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 12x24 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ)
703	17	Overstocked true fir (white fir) stand older mid-successional to young late-successional in tree size. Most trees < 24 inches dbh.	Suppressed sapling/pole size trees (60%, 40').	Suppressed seedlings/saplings with huckleberry oak (50%, 6').	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked conifer portions of the stand to reduce crown density to a level that facilitates the fire/fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 12x24 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 Klamath National Forest (KNF) LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).

Table A-3. Summary of stand conditions in M Units (continued).

Stand Number	M Unit	Stand Diagnosis Layer 1	Layer 2	Layer 3	Treatment Objective	Prescription	Management Direction
705	19	<p><u>Agg 1</u> Douglas-fir with ponderosa pine and sugar pine older mid-successional to young late-successional with scattered old growth (Douglas-fir, sugar pine, and ponderosa pine). Variable stocking with heavy crown competition in dense portions but leave tree crowns are in good shape. Several pockets of mistletoe in the Douglas-fir, confined to lower third of bole.</p> <p><u>Agg 2</u> A large (approx. 2 acres) stand of scrub oak / live oak below road and above stand south portion of stand.</p>	Suppressed sapling / pole size trees (<30%).	Suppressed seedlings / saplings with heavy scrub oak in more open portions of stand (40%).	Objectives: reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked conifer portions of the stand to reduce crown density to a level that facilitates the fire / fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 14x28 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).

Table A-3. Summary of stand conditions in M Units (continued).

Stand Number	M Unit	Stand Diagnosis Layer 1	Layer 2	Layer 3	Treatment Objective	Prescription	Management Direction
706	20	<p><u>Agg 1 Diag.</u> White fir with an old-growth inclusion of Douglas-fir, sugar pine, and ponderosa pine.</p> <p>Mid-successional size class, dense stand of mostly white fir with scattered old-growth individual trees or pockets.</p>	Suppressed sapling / pole (30%, 50').	Suppressed seedling / sapling conifers with brush (25%, 15', scrub oak and chinquapin).	reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked conifer portions of the stand to reduce crown density to a level that facilitates the fire / fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 12x24 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).
707	21	<p>The upper portion of the stand (above 4,400 feet) is mixed conifer (4 M size / density stocking) with mostly Douglas-fir, ponderosa pine and sugar pine. Heavy snow bole breakage (07 / 08) in the pines</p> <p><u>Agg 1 Diag.</u> Douglas-fir with significant amount of ponderosa pine and some sugar pine, variable stocking due to hardwoods and very old selective logging (+70 yrs).</p> <p>Mid-successional size class trees with stocking ranging from moderate to dense.</p>	Black oak and pole size conifer trees. The black oak is starting to die out due to the conifer competition. The larger black oaks have significant dead limbs in the crowns.	<p>Limited amount of suppressed seedling / sapling conifers and black oak with deer brush.</p> <p>The lower portion of the stand (below 4400 feet) is predominantly Douglas-fir (4M size / density stocking) with significant black oak and a minor amount of madrone in lowest portion.</p>	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked conifer portions of the stand to reduce crown density to a level that facilitates the fire / fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 16x32 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy Gulch LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).

Table A-3. Summary of stand conditions in M Units (continued).

Stand Number	M Unit	Stand Diagnosis Layer 1	Layer 2	Layer 3	Treatment Objective	Prescription	Management Direction
		<p><u>Agg 2 Diag.</u> Douglas-fir stand with variable stocking due to hardwoods and very old selective logging (+70 yrs).</p> <p>Douglas-fir mid-successional size class. Moderate but variable stocking on the flatter ground due to hardwoods and previous older, selective logging. Mostly dense stocking on steeper slopes.</p>	Black and madrone with some suppressed sapling and pole size conifers.	<p>Varies from open to moderate (<30%) cover of small suppressed conifers and brush.</p> <p>Significant mistletoe infection in 10 to 20% of the Douglas-fir. Heavy infection (2 to 4 Hawksworth) in lower half of crowns. Crowns above infection display good growth and development. The trees are out growing the infection and are generally needed for stocking.</p>			
708	37	<p><u>Diag.</u> Overstocked whit fir stand with red fir and Douglas-fir, mid-successional in tree size. A light infestation of cytospora and mistletoe in the red fir.</p> <p>Overstocked mid-successional size class trees.</p>	Moderate stocking of suppressed sapling / pole size trees (30%, 20').	Suppressed seedlings / saplings (20%, 10').	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked conifer portions of the stand to reduce crown density to a level that facilitates the fire / fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 12x24 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).

Table A-3. Summary of stand conditions in M Units (continued).

Stand Number	M Unit	Stand Diagnosis Layer 1	Layer 2	Layer 3	Treatment Objective	Prescription	Management Direction
709	38	A mid-successional size white-fir stand with Douglas-fir, ponderosa pine and red fir. Stocking ranging from M to D canopy closure.	Suppressed sapling / pole conifers (20%, 30').	Suppressed seedling / sapling conifer, heavier in M stocking areas (30%, 30').	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire / fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 12x24 spacing guides. This will reduce crown contact and fuel ladders. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRLP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).
710	52	<u>Agg 1</u> : Late-successional Douglas-fir with a significant amount of ponderosa pine and some white fir. Dense stocking with generally good crowns. Light infestation (<5%) of mistletoe present in Douglas-fir (1 to 2 Hawksworth). Mortality occurring in pockets of ponderosa pine.	Suppressed sapling / pole size trees with a lot of low dead limbs. Some black oak (5%).	Suppressed seedlings / saplings with moderate brush (live oak, hazel, and deerbrush 50%).	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked conifer portions of the stand to reduce crown density to a level that facilitates the fire / fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 14x28 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).

Table A-3. Summary of stand conditions in M Units (continued).

Stand Number	M Unit	Stand Diagnosis Layer 1	Layer 2	Layer 3	Treatment Objective	Prescription	Management Direction
712	54	<p><u>Diag.</u> A ridgetop (<35% slope) stand locate on the main ridge between the north fork and the south for of the Salmon River. Variable stand density with dense pockets of timber that need thinning.</p> <p><u>Agg 1</u> Mostly mid-successional white fir with red fir (60 to 80 yrs) and some scattered pockets of late-successional old growth (Douglas-fir, ponderosa pine and sugar pine with mistletoe in Douglas-fir and ponderosa pine). Red fir along ridge top is heavily infested with cytospora and mistletoe.</p>	Suppressed sapling / pole size trees (<20%)	Suppressed seedlings / saplings with brush dying out under denser conifer pockets.	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked conifer portions of the stand to reduce crown density to a level that facilitates the fire / fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 12x24 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).
		<p><u>Agg 2</u> Significant inclusions of rocky soil (35%) with scattered conifers and heavy brush (manzanita, chinquapin, and scrub oak). Recommend masticate brush.</p>					

Table A-3. Summary of stand conditions in M Units (continued).

Stand Number	M Unit	Stand Diagnosis Layer 1	Layer 2	Layer 3	Treatment Objective	Prescription	Management Direction
751	3	A of mid-successional size class, dense Douglas-fir stand with a few ponderosa pine. Light mistletoe infestation in Douglas-fir (<10%, 2-3 Hawksworth).	Suppressed sapling / pole size conifers (40%, 30') and smaller black oak (10%, 30').	Scattered live oak, suppressed seedlings / sapling (<10%, 15')	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire / fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 16x32 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).
752	4	A mid-successional, dense mixed conifer stand of mostly Douglas-fir with ponderosa pine and sugar pine. Moderate to heavy mistletoe infestation in Douglas-fir and ponderosa pine – mostly in lower half of crown (2-4 Hawksworth). Scattered large old growth in northern portion below 38N17 road.	Hardwoods – mostly madrone with some black oak, live oak and chinquapin.	Suppressed sapling / pole (20%, 20').	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire / fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 16x32 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).

Table A-3. Summary of stand conditions in M Units (continued).

Stand Number	M Unit	Stand Diagnosis Layer 1	Layer 2	Layer 3	Treatment Objective	Prescription	Management Direction
755	7(S)	Mid-successional size Douglas-fir with some ponderosa pine. Limited mistletoe in ponderosa pine (10% of ponderosa pine trees, 1-2 Hawksworth). Some taller black oak with small, healthy crowns (few dead limbs).	Suppressed sapling / pole conifers (60%, 40') with black oak and live oak.	Suppressed seedling / sapling conifers with live oak (15%, 8').	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire / fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 16x32 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ)
756	8	<u>Diag.</u> Signs of very old tractor logging. Slope 40-50%. Access for cable logging would be up fireline on ridge top from intersection of 39N04 and 39N23. Ridge has pitches of 20 to 35%. Mid-successional size, white fir with Douglas-fir and ponderosa pine. Limited mistletoe infestation in Douglas-fir.	Suppressed sapling / pole conifer.	Suppressed seedling / sapling conifers plus brush (deerbrush, choke cherry and scrub oak).	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire / fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 12x24 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 20 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).

Table A-3. Summary of stand conditions in M Units (continued).

Stand Number	M Unit	Stand Diagnosis Layer 1	Layer 2	Layer 3	Treatment Objective	Prescription	Management Direction
757	10	Variable stand of young mid-successional size, white fir with some Douglas-fir and red fir. Trees are smaller in western portion. Dense crown closure above road and moderate to dense crown closure below the road.	Suppressed sapling / pole conifer (60%, 30').	Suppressed seedling / sapling (10%, 3').	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire / fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 12x24 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).
758	11	Diag. Previous tractor logging on flatter slopes above road. Stand extends uphill to 35%+ slopes. Could access with temp spur from the east. Variable crown density, mid-successional size, white fir with Douglas-fir, ponderosa pine and sugar pine. Minor mistletoe infestation in Douglas-fir and ponderosa pine.	Suppressed sapling / pole conifer under dense overstory but okay in open areas.	Suppressed seedling / sapling conifers brush (live oak, chinquapin, hazel, scrub oak, and snowbrush - 40%, 7').	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire / fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 12x24 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).

Table A-3. Summary of stand conditions in M Units (continued).

Stand Number	M Unit	Stand Diagnosis Layer 1	Layer 2	Layer 3	Treatment Objective	Prescription	Management Direction
759	39	Mid-successional size, Douglas-fir with ponderosa pine and sugar pine. Variable stocking with dense areas needing thinning. Mistletoe infestation in ponderosa pine (1-2 Hawksworth) west end. A few scattered large trees >24 inches.	Suppressed sapling / pole conifer under dense mid-successional size conifers but growing well in more open portions of stand.	Heavy brush (deerbrush, hazel and scrub oak – 70%, 8').	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide “anchor” lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire / fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 16x32 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).
760	40	Mid-successional size, white fir with Douglas-fir. A few scattered large trees >24 inches.	Suppressed sapling / pole conifer (50%,50').	Suppressed seedling / sapling, scrub oak (15%, 8').	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide “anchor” lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire / fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 14x28 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).

Table A-3. Summary of stand conditions in M Units (continued).

Stand Number	M Unit	Stand Diagnosis Layer 1	Layer 2	Layer 3	Treatment Objective	Prescription	Management Direction
762	43	Older mid-successional size, mixed conifer with ponderosa pine, Douglas-fir and sugar pine. Moderate mistletoe infestation in ponderosa pine (3-4 Hawksworth). Very limited mistletoe in Douglas-fir.	Suppressed sapling / pole conifer (20%, 40').	Suppressed seedling / sapling conifers, live oak, deerbrush, and scrub oak (70%, 7') - south.	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire / fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 16x32 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 20 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).
764	65	Young mid-successional size, Douglas-fir with ponderosa pine white fir, and sugar pine. Dense crown closure	Suppressed sapling / pole conifer (25%, 30').	Suppressed seedling / sapling conifers, brush (live oak, and scrub oak - 20%, 6').	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire / fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 14x28 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).

Table A-3. Summary of stand conditions in M Units (continued).

Stand Number	M Unit	Stand Diagnosis Layer 1	Layer 2	Layer 3	Treatment Objective	Prescription	Management Direction
765	66	Dense young mid-successional size Douglas-fir with scattered old ponderosa pine at the top.	Suppressed sapling / pole conifers (50%, 30').	Suppressed seedling / sapling conifers with live oak (15%, 8').	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire / fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 16x32 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).
772	80	Very dense mid-successional size, white fir with Douglas-fir and ponderosa pine. Scattered trees >24 inches dbh. Mistletoe in ponderosa pine, generally on west end.	Suppressed sapling / pole conifer (40%, 40').	Suppressed seedling / sapling conifers plus brush (deerbrush, hazel and scrub oak – limited to small openings).	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire / fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 16x32 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).

Table A-3. Summary of stand conditions in M Units (continued).

Stand Number	M Unit	Stand Diagnosis Layer 1	Layer 2	Layer 3	Treatment Objective	Prescription	Management Direction
773	7N	<p><u>Diag.</u> Narrow strip along ridge top that can be endlined to the skid trail. Rocky in places, several old skid trails access ridge top. Southern portion has better soil and stand extends below 39N47.</p> <p><u>Agg 1</u> (portion above road): Young mid-successional size, mixed conifer with Douglas-fir and ponderosa pine. Stocking ranges from poor to dense.</p> <p><u>Agg 2</u> (portion below road): Mid-successional size, Douglas-fir with ponderosa pine and sugar pine. Dense stand, including hardwoods. Mistletoe in ponderosa pine is 3-6 Hawthorn.</p>	<p>Suppressed sapling / pole conifers with scrub oak and live oak (40%, 30').</p> <p>Suppressed sapling / pole conifer with black oak, live oak, and madrone (40%, 50').</p>	<p>Scrub oak and live oak (70%, 4').</p> <p>Suppressed seedling / sapling conifer with live oak (40%, 10').</p>	<p>Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.</p> <p>Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.</p>	<p>Thin the overstocked stand to reduce crown density to a level that facilitates the fire / fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 16x32 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.</p>	<p>This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).</p>

Table A-3. Summary of stand conditions in M Units (continued).

Stand Number	M Unit	Stand Diagnosis Layer 1	Layer 2	Layer 3	Treatment Objective	Prescription	Management Direction
801	22	<p><u>Diag.</u> The stand consists of predominantly Douglas-fir with a minor amount of ponderosa pine and madrone.</p> <p>Consists of young mid-successional to mid-successional size class trees. Some mistletoe present – light (<2 Hawksworth).</p>	Suppressed sapling / pole size trees (Douglas-fir, ponderosa pine, and white fir) and madrone (<30%).	Suppressed seedlings (40%, 15').	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide “anchor” lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire / fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 16x32 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).
802	23	<p><u>Diag.</u> Multi-layered, mixed conifer, mid to late-successional stand with heavy inter-tree competition. White fir with Douglas-fir and some ponderosa pine and sugar pine.</p> <p>Consists of late mid-successional to young mid-successional size class trees.</p>	Moderate to heavy stocking of suppressed sapling / pole size trees.	Light stocking of suppressed seedlings and brush.	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide “anchor” lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire / fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 12x24 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).

Table A-3. Summary of stand conditions in M Units (continued).

Stand Number	M Unit	Stand Diagnosis Layer 1	Layer 2	Layer 3	Treatment Objective	Prescription	Management Direction
803	24	<p><u>Diag.</u> Multi-layered, mixed conifer, mid to late-successional stand with heavy inter-tree competition in the upper portion. The lower portion of the stand tends to be more open where tree mortality is higher (< 10%) due to inter-tree competition. Mostly white fir with some Douglas-fir, incense cedar, ponderosa pine and sugar pine.</p> <p>Consists of late mid-successional to young late-successional size class trees</p>	Pockets of moderate to heavy stocking of suppressed sapling / pole size trees	Light stocking of suppressed seedlings and brush.	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire / fuels objectives of preventing ground fires from spreading into the crowns. Thinning will be done from below using 14x28 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for leave trees. All other conifer trees 8 inches dbh and less than 20 inches dbh will be cut.	<p>This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management</p> <p>Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events.</p> <p>This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).</p>

Table A-3. Summary of stand conditions in M Units (continued).

Stand Number	M Unit	Stand Diagnosis Layer 1	Layer 2	Layer 3	Treatment Objective	Prescription	Management Direction
804	25	<p>Diag. A white fir stand with red fir, fairly uniform in age and stocking. There is heavy cytospora / mistletoe infestation in the north portion of the stand at the intersection of roads 39N58 and 39N58 B spur. The infestation decreases in severity in the lower portion of the stand (down to the 39 road). Only the first 200 to 300 feet below the 39 road needs thinning. The stand below is more open and has springs / wet areas and small meadows.</p> <p>Consists of mid-successional size class trees</p>	Generally open.		Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire / fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 12x24 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	<p>This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).</p>
805	35	<p>Diag. A white fir stand with red fir, fairly uniform in age and stocking.</p> <p>Consists of older mid-successional size class trees</p>	Sapling / pole size trees. Minor fuel ladder (<30%).	Pockets of brush.	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire / fuels objectives of preventing ground fire from spreading to the crowns. This will reduce crown contact and ladder fuels. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	<p>This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).</p>

Table A-3. Summary of stand conditions in M Units (continued).

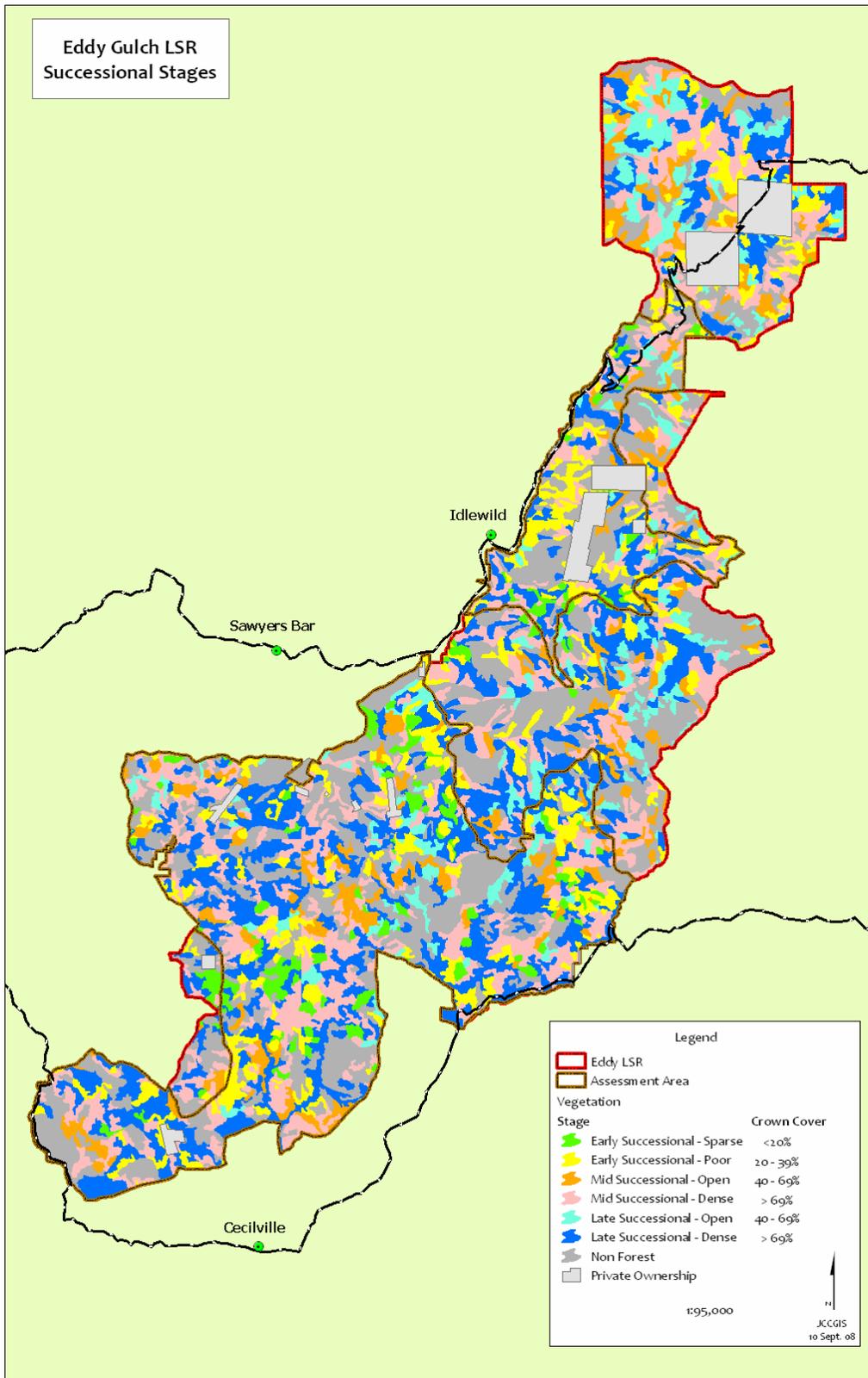
Stand Number	M Unit	Stand Diagnosis Layer 1	Layer 2	Layer 3	Treatment Objective	Prescription	Management Direction
806	36	<u>Diag.</u> A variable stand with aggregations ranging from pockets of older late-successional to young mid-successional. Approximately 20 to 30% of the stand will not have volume to harvest (precommercial). Remainder of stand has overstocked mid to late-successional aggregations to thin. Consists of late-successional size class trees (pockets).	Variable stocking with pockets of suppressed sapling / pole size trees.	Scattered pockets of suppressed sapling / seedlings with heavy ground fuel load.	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire / fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 12x24 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).
807	60	<u>Diag.</u> Multi-layered, red fir with white fir, late-successional stand with heavy infestation of cytospora and dwarf mistletoe. Moderate to heavy mortality (<10 to 40%). Moderate to heavy damage to red fir crowns from the cytospora / mistletoe. Consists of late-successional size class trees	Variable stocking with pockets of suppressed sapling / pole size trees	Scattered pockets of suppressed sapling / seedlings with heavy ground fuel load.	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire / fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 16x32 spacing guides. This will reduce crown contact and ladder fuels. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events. This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).

Table A-3. Summary of stand conditions in M Units (continued).

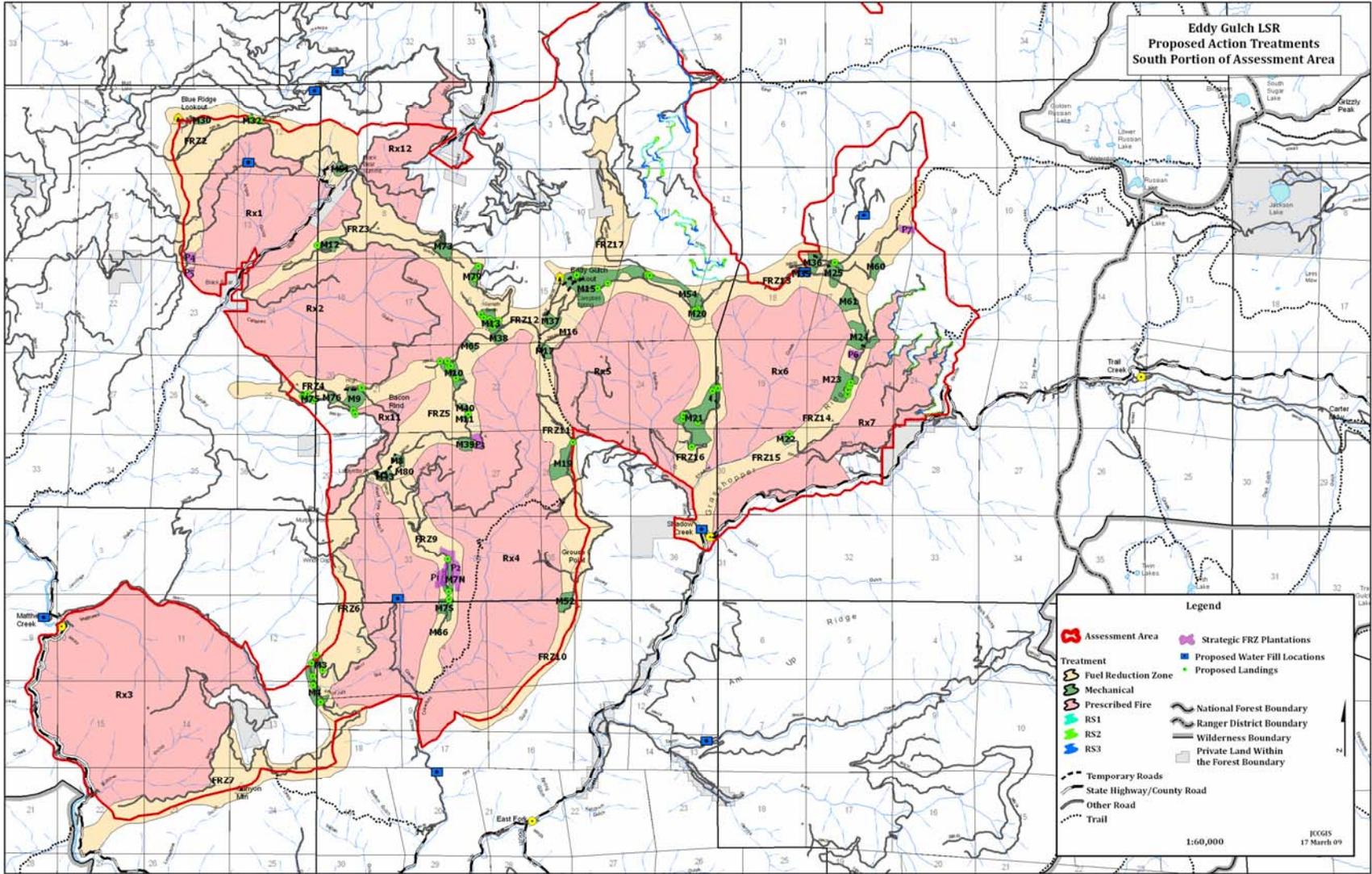
Stand Number	M Unit	Stand Diagnosis Layer 1	Layer 2	Layer 3	Treatment Objective	Prescription	Management Direction
808	61	<p><u>Diag.</u> Variable stand ranging from young mid-successional to late-successional tree size. Stocking is variable with heavy crown competition in most of stand but some areas do not need commercial thinning.</p> <p>Consists of young late-successional to late successional size class trees</p>	Moderate to light of suppressed sapling / pole size trees (20 to 40%).	Moderate suppressed seedling / sapling and brush (30 to 35%).	Reduce the likelihood of catastrophic wildfires that would result in the loss of late-successional forest, intended to interrupt fuel continuity, provide "anchor" lines, and reduce the potential wildfire severity and extent.	Thin the overstocked stand to reduce crown density to a level that facilitates the fire / fuels objectives of preventing ground fires from spreading to the crowns. Thinning will be done from below using 12x24 spacing guides. This will reduce crown contact and fuel ladders. Recommend LTM for the leave trees. All other conifer trees greater than 8 inches dbh and less than 28 inches dbh will be cut.	<p>This stand is located in the Eddy LSR. Local land classification places the stand in Reg. Class 3 Partial Retention VQO in the 1994 KNF LRMP. The 1999 Forest-Wide LSR Assessment Management</p> <p>Recommendations that apply are: (1) protect existing LS/OG habitat from threats (or habitat loss) that occur inside and outside LSRs and (2) protect mid and early-seral vegetation from loss to large-scale disturbance events.</p> <p>This stand is covered under Activity Design Criteria 9. Shaded Fuelbreak (FRZ).</p>

Appendix B
Maps

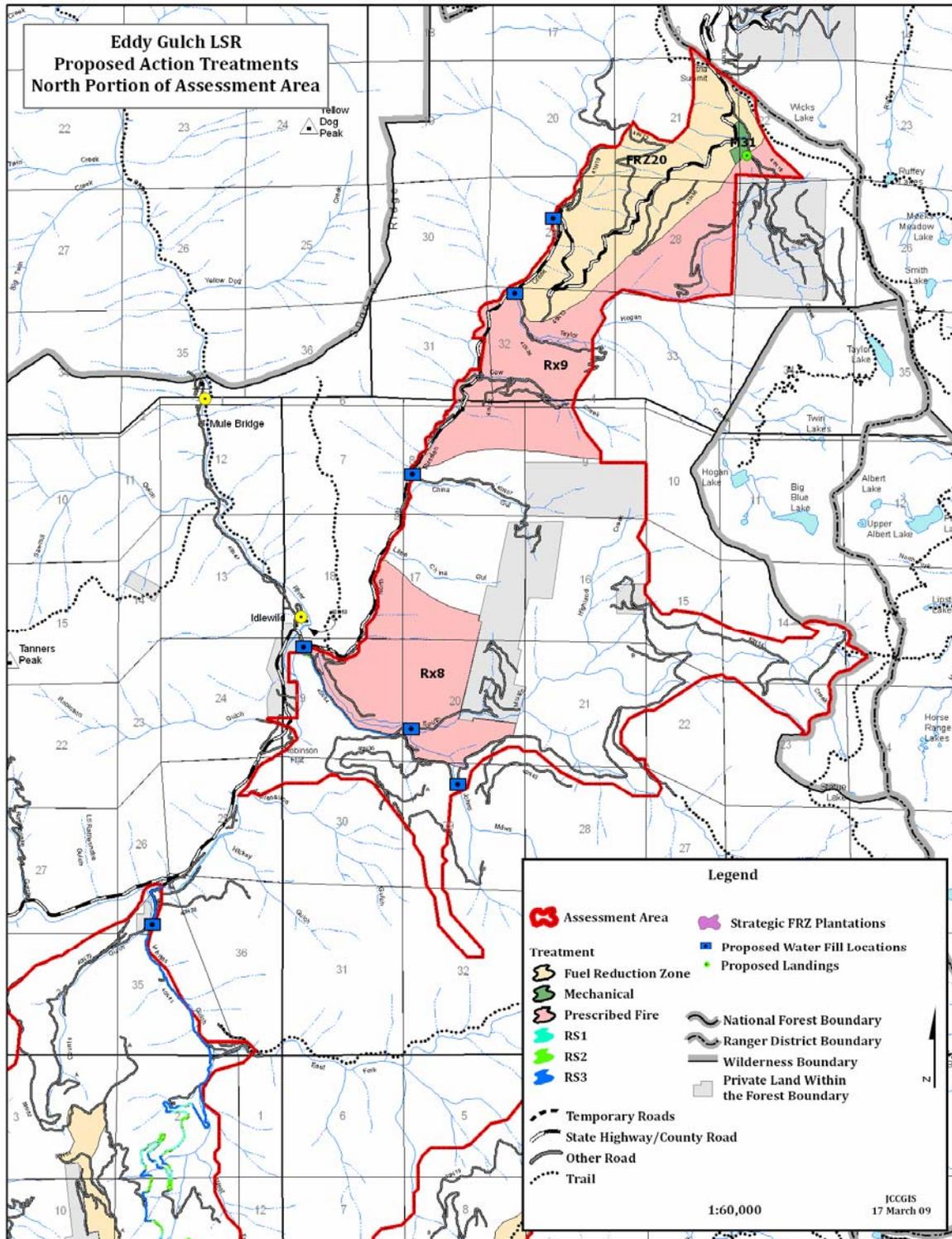
Map B-1. Eddy Gulch LSR Successional Stages.



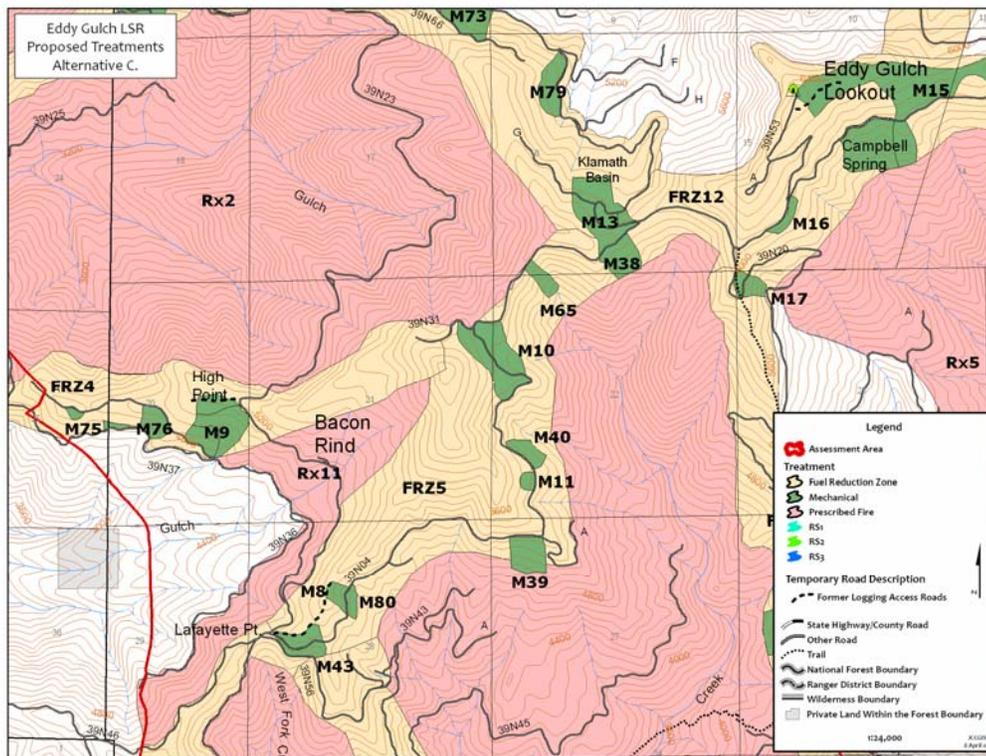
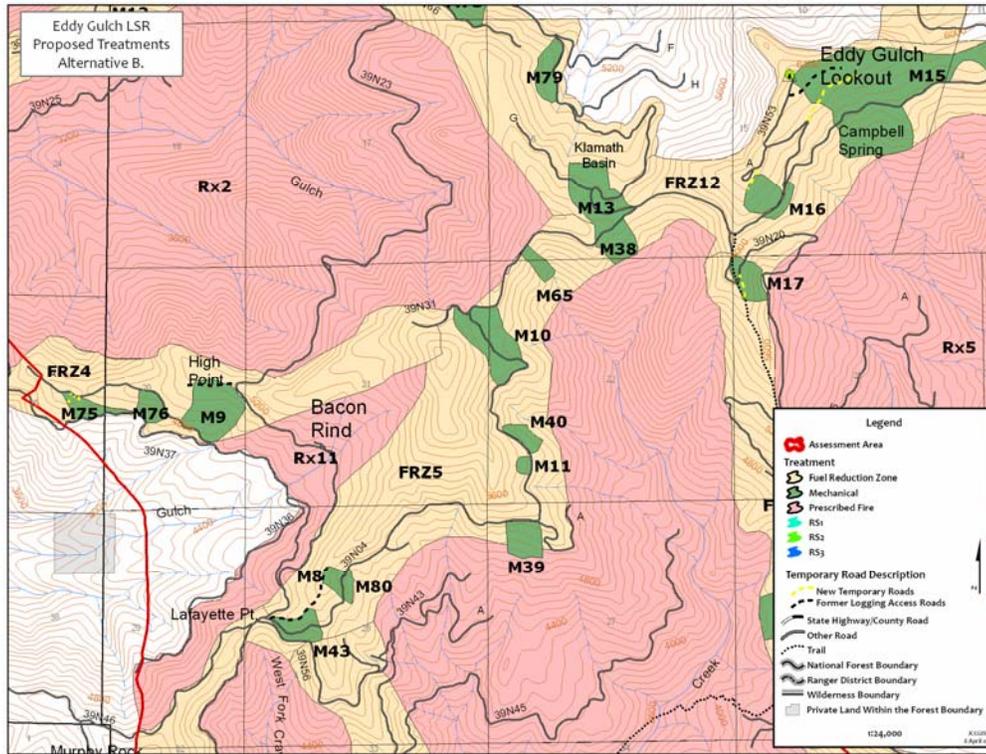
Map B-2. Proposed treatment units in the south portion of the Eddy Gulch LSR Project Assessment Area.



Map B-3. Proposed treatment units in the north portion of the Eddy Gulch LSR Project Assessment Area.



Map B-5a. View 1: Alternative B—configuration of treatment units *with construction* of 1.03 miles of new temporary roads and Alternative C—configuration of treatment units *without construction* of 1.03 miles of new temporary roads.



Map B-6a. View 2: Alternative B—configuration of treatment units *with construction* of 1.03 miles of new temporary roads and Alternative C—configuration of treatment units *without construction* of 1.03 miles of new temporary roads.

