

5-4 Treatments to Reduce Fire Risk and Maintain Late-Successional Forest in Gotchen LSR

Need for Change

Desired Condition. Twentieth century management in the Gotchen area has allowed multiple-canopy forests to develop and be maintained through fire exclusion. Old-growth that once dominated the landscape have been removed through partial timber harvest. Stands today are generally more dense and differ in species composition. These stands, primarily grand fir, are generally less fire tolerant and have a greater susceptibility to insects and other pathogens than the historic stands. One of the consequences of the change in stand composition is the continuing spruce budworm infestation.

The west portion of the LSR has been historically dominated by grand fir at lower elevation and subalpine fir at the higher elevations. However, prior to fire exclusion, the dry grand fir zone in the east portion of the LSR was comprised of open park-like stands of ponderosa pine and Douglas-fir. In the past few years stands in the Gotchen LSR have been infested with spruce budworm, with the most defoliation, mortality and resulting fuels accumulation occurring in the south and east areas of the LSR.

The desired condition within the moist grand fir zone in the west portion of the Gotchen LSR is to maintain the current large acreage of late-successional forest. (See Gotchen LSR Desired Condition, p. 3-15.)

In the easterly portion where the grand fir stands are more at risk of loss from insects and disease, and thereby subjecting the

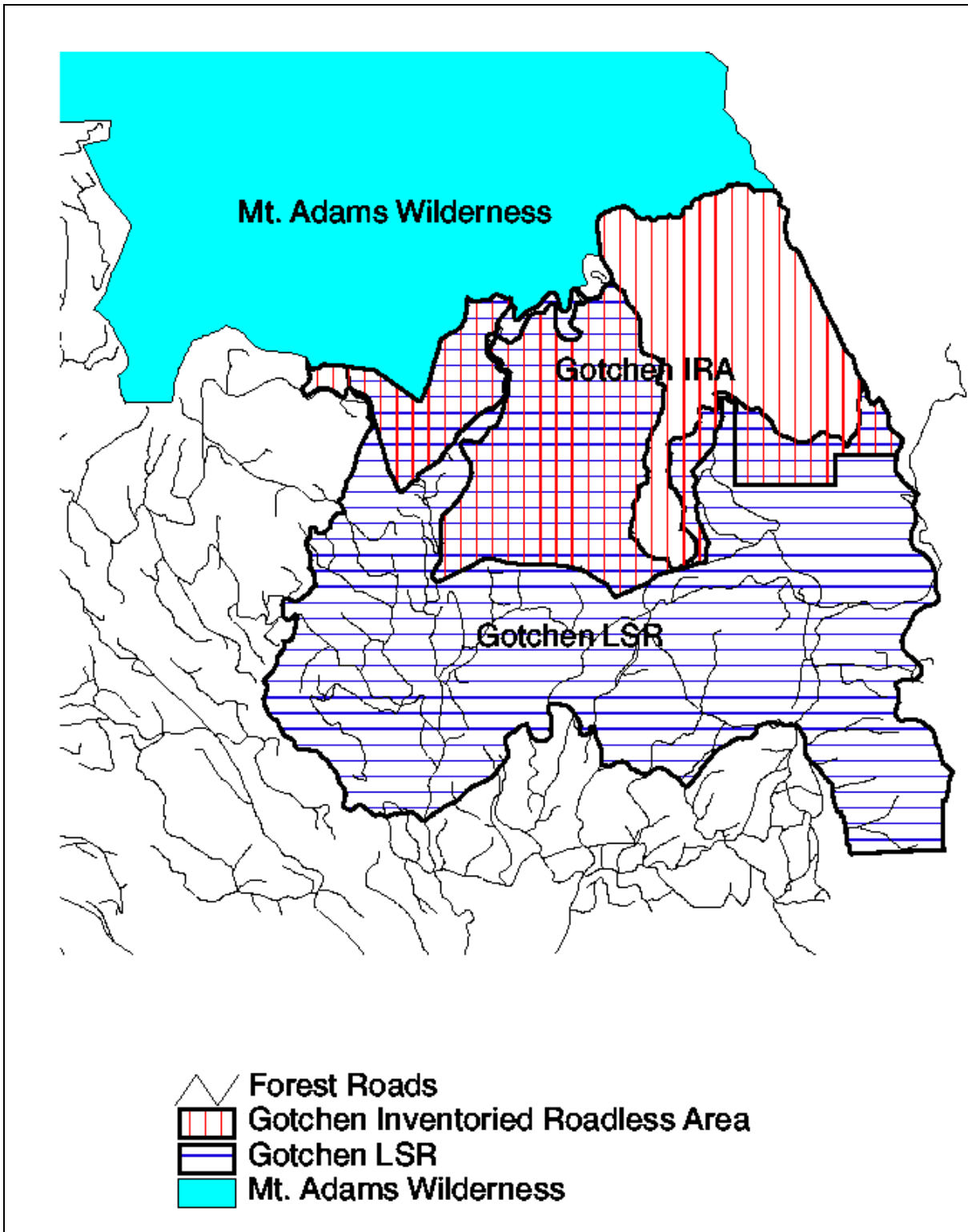
entire LSR to loss from fire, the desired condition is a mosaic of stands containing fire tolerant, and more insect and disease resistant species intermingled with the healthy grand fir stands. This could be accomplished in the eastern portion of the LSR by increasing the amount of single-story, large-tree forests comprised of early-seral tree species (ponderosa pine, western larch, Douglas-fir) that are maintained by underburning or similar fuel treatments. These early-seral species typically comprise eastern Cascade old-growth forest.

Probability of catastrophic loss to fire will be reduced throughout the LSR by developing a central fuel break. An east boundary fuel break will be developed if conditions warrant.

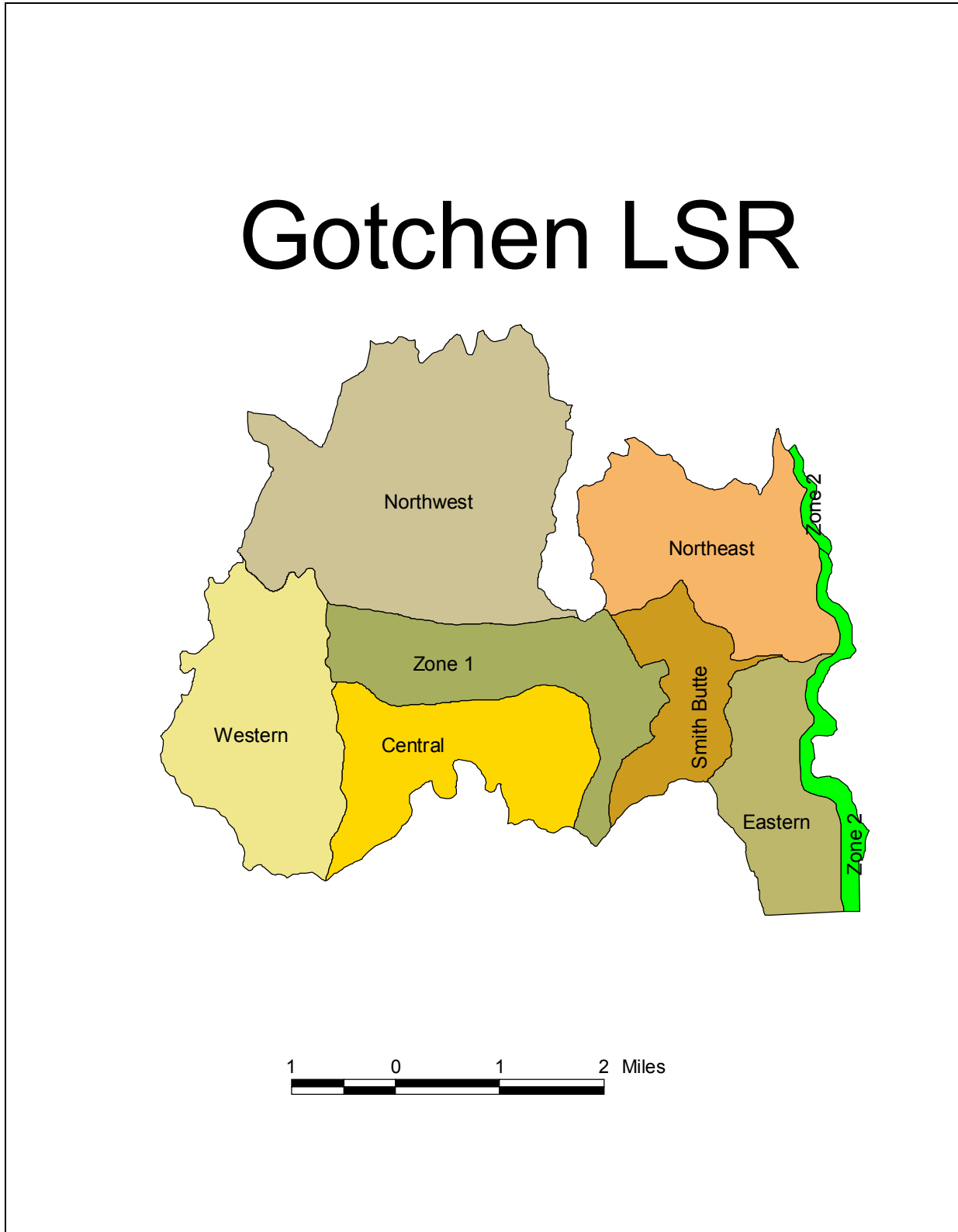
Existing Condition. The northern portion of the LSR overlaps the Gotchen Creek Inventoried Roadless Area. The southern portion of the LSR is heavily roaded (See Map 5-2, page 5-15.)

Many of the current stands in the Gotchen LSR have developed following fire exclusion and selective removal of ponderosa pine and Douglas-fir during the 20th century. Large portions of these stands are now stocked with 80-100 year old stands of grand fir and Douglas-fir, with some residual overstory of old-growth ponderosa pine, Douglas-fir, and western larch. These stands are late-successional, but they may not be sustainable in the long-run. In the past 10 years, increasing amounts of insect and disease activity has caused a decline in tree health. Because of current insect and disease activity, forest stands have become increasingly susceptible to large-scale stand replacement fire. Even without fire, we are losing old-growth ponderosa pine and Douglas-fir. These older trees are under increasing stress, brought on by competition in today's more dense conifer stands.

Map 5-2 Gotchen LSR and Inventoried Roadless Areas



Map 5-2A Gotchen LSR Assessment Areas



In general, stands in the dry grand fir zone function as dispersal habitat for spotted owls. The more moist grand fir stands in the west function as nesting, roosting and foraging habitat.

In 1997, when the LSRA was initially prepared, spruce budworm were present in the LSR but not viewed as an imminent threat of a stand replacing disturbance. Insects and disease had caused widespread pockets of defoliation. Aerial and field reconnaissance in 1998 determined the budworm population was expanding in severity and extent, resulting in defoliation, top kill and fuel accumulation. The risk of stand replacing fire had become moderate to high in all but the westerly portions of the LSR as Fuel Model 10 (heavy fuel concentration) became more prevalent across the landscape.

The LSR is partitioned into two fuel break treatment zones and six forest health assessment areas, see Map 5-2A, page 5-16. The two treatment zones were areas included in the 1997 LSRA to reduce the risk of a large-scale, stand-replacing fire by providing fuel breaks along the easterly boundary and through the middle of the LSR. The six assessment areas were added to address fuels and declining stand conditions associated with the spruce budworm infestation. See REO exemption letter, page 5-21.23.

Existing conditions and management options specific to each of the treatment zones and assessment areas are summarized by area beginning on page 5-19 and in Table 5-3B, page 5-21.17 and

Table 5-3C, page 5-21.18.

FIRE HAZARD AND PROBABILITY

Chapter 6 assesses fire risk for the LSRs Forestwide. Table 6-1 indicates a fire frequency of one fire per 16 years per thousand acres or about one fire in the Gotchen LSR each year.

The potential sources of fire occurrence within the Gotchen LSR include the following:

Dispersed campsites. Due to topography and vegetation, there are many dispersed sites throughout the LSR. These sites are not inventoried, and are difficult to regulate. Many of these sites, which are often located along user-made roads, are used during the summer and autumn months. Unattended campfires, and fire starts from automobile exhaust systems coming in contact with cured grass on high clearance, primitive wheel tracks are potential causes for fire.

Other recreational use. The area attracts many day-use recreationists including hunters, hikers, berry pickers, bikers, and sight seers. Smoking may be the primary fire risk from these recreationists.

Travel corridors. Many forest visitors drive on the LSR's numerous primitive roads during the summer and early fall. Cured grass, which is highly flammable, is often encroaching on the road or growing between the wheel tracks.

Lightning. Thunderstorms are a common summer occurrence. These storms are accompanied by lightning, erratic winds, and, most often, precipitation. Although rain can limit the actual number of ignitions, the main factor that determines whether a fire starts is the fuel loading in the area that the lightning strikes. When lightning strikes areas of high fuel loading, fires are likely, regardless of precipitation.

Each assessment area was given an adjective rating of high, moderate or low based on fuels accumulation and historic occurrence of

lightning (See the Existing Condition for each assessment area beginning on page 5-21.17).

Fire Behavior. While the probability of occurrence may not have changed significantly, fuels loading and thus the consequences of a fire start has increased in much of the southern portion of the LSR from a Fuel Model 8 to Fuel Model 10. Maps 6-6 and 6-8 on pages 6-14 and 6-16 depict expected fire rate of spread and fire flame length for potential fire occurrence during the warmest, driest period of late summer - early fall, based on an analysis conducted in 1997. As depicted on these maps, many of the areas in Gotchen where a high rate of spread and long flame lengths are expected lie outside of the two fuel break treatment zones. Map 5-2B Fuel Model 10 Locations, page 5-21.1, portrays distribution of Fuel Model 10. When compared to Map 6-6, page 6-14 and Map 6-8, page 6-16, Map 5-2B gives an indication of how the risk of high-intensity fire increased throughout the LSR between 1997 and 1999.

Fire will occur in the LSR. The probability of fire occurrence by lightning or human causes is estimated for each assessment area in Table 5-3B, page 5-21.17.

With the help of the *BEHAVE* fire behavior model, fire behavior and resistance to control can be predicted. This program uses fuel models, topography, and weather models to predict and rate fire behavior in terms of *low*, *moderate*, or *high*. These ratings are good indicators of fire line intensity and resistance to control, and/or rate of spread as follows:

- **Low** - Fires can be attacked and controlled directly with ground crews building fire line and will be limited to burning in understory vegetation.
- **Moderate** - Hand built firelines alone would not be sufficient in controlling fires. Heavy equipment and retardant drops would be more effective.
- **High** - The most hazardous conditions in which serious control problems would occur i.e., torching, crowning, and spotting. Control lines would have to be established

well in advance of flaming fronts, and heavy equipment and backfiring might be necessary to widen control lines.

Management Strategy. Twelve distinct stand conditions have been identified in the LSR (nine stand types, two fuel models, and one habitat type). Management treatment is recommended for each stand condition. These treatments would be applied in keeping with a five part strategy to maintain the LSR on a path toward the desired future condition.

First, the development of early seral tree species will be promoted throughout the LSR by managing stocking within existing plantations and future plantations that result from salvage (see Treatment Description, Groups 1-3). This stocking control should lower the risk of stand disturbance now and in the future. Also, the occurrence of stands managed in this way on the landscape should reduce the overall risk of the LSR to large stand replacement fires.

Second, mature stand treatments (see Treatments Description, Groups 4-7, page 5-21.2) are proposed to reduce fuel hazard by salvaging dead and dying trees, treating ground fuels, and, particularly in the eastern areas, promoting the development of fire and insect resistant tree species. The intention is to maintain the late-successional attributes where they exist, so that stands remain suitable habitat for late-successional species

Third, high fuel levels (Fuel Models 8 and 10) would be treated by mechanical methods and underburning. See Map 5-2B, page 5-21.1.

Fourth, two fuel break zones have been identified to reduce the likelihood of a large-scale fire in the LSR. Zone 1 was delineated to break up the concentration of fuels across the LSR by taking advantage of natural fire barriers, roads and thinned plantations. Zone 2 is a fuel break up to ¼ mile wide adjacent to the Forest boundary on the east side of the LSR. Within these zones, the combination of the proposed treatments will create a mosaic of stands with reduced fuel loads and stand densities in which crown fire is unlikely. Consequently, these

zones would slow advancing fire and provide opportunities to control a fire.

Fifth, budworm infected owl nest sites may be sprayed with the pesticide Bt to preempt loss of critical owl nesting habitat.

In summary, this approach seeks to accomplish the following:

- Maintain current late-successional forests.
- Foster future stability by managing the species composition of younger stands so that they develop into more ecologically stable late-successional forest.
- Apply treatments that promote more ecological stability in late-successional forests that have a structure prone to disturbance.
- Reduce the threat of stand replacing fire in the LSR as a whole.

This approach recognizes that the current risk of stand replacement disturbance rose from low to moderate between 1997 and 1999 and has the potential to increase rapidly.

Treatment Criteria and Stand Conditions

Candidate stands and conditions for treatments to minimize the risk of large-scale disturbance and loss of late-successional habitat are comprised of nine Stand Groups, two Fuel Models and owl nest sites.

Group 1 - Young Plantations. A mosaic of plantations occurs throughout the southern portion of the Gotchen LSR. They are generally healthy stands, are currently not late-successional habitat, and have low amounts of fuels. They present good opportunities as areas to maintain in a low-risk category as they grow and develop. They also serve as potential “anchors” for adjacent treatments to minimize disturbance risks.

Group 2 – Maturing Plantations. These are primarily densely stocked, Douglas-fir dominated stands less than 80 years old. Like the Young Plantation in the southern portion of the LSR, they would also be maintained in a low risk category and would serve as potential “anchors” for adjacent treatments to minimize disturbance risks.

Group 3 - Lightly Stocked Stands. These are very open, lightly stocked stands (less than 40 percent canopy closure), primarily grand fir. Often, root diseases or insects have caused mortality and resulted in the open condition. Since they are already open, these stands no longer function as late-successional habitat, and are excellent candidates to be reforested with early seral ponderosa pine and Douglas-fir. These stands are typically Fuel Model 10.

Group 4 - Dead and Dying Stands. These are partially stocked stands (less than 40 percent canopy closure) with mortality from insects and diseases (root disease, spruce budworm, fir engraver beetle and others). These are stands that have continuing mortality from insects and diseases, and may soon resemble the open stands mentioned in Group 3, above. Typically, a combination of root diseases, high stem density and insects are causing a decrease in tree vigor and eventual mortality, especially in grand fir. As with Group 3, these stands no longer function as late-successional habitat. These stands are often Fuel Model 10.

Group 5 - Declining Stands. These are partially stocked stands (greater than 40 percent canopy closure) with mortality from pathogens (root disease, spruce budworm, fir engraver beetle and others). These are stands that have continuing mortality from pathogens, similar to Groups 3 and 4. Typically, a combination of root diseases and insects are causing a decrease in tree vigor and eventual

mortality, especially in grand fir. These stands still function as late-successional habitat, but will lose that function in the future 5-10 years. These stands are often Fuel Model 10.

Group 6 - Remnant Old Growth. These stands contain at least a partial stocking of large, old-growth ponderosa pine and Douglas-fir, with secondary canopies composed primarily of grand fir. These ecologically valuable legacy features are at risk from competition from dense understory grand fir. These stands are typically Fuel Model 8.

Group 7 - Mature Grand Fir. These are stands fully stocked with grand fir, containing few overstory old-growth trees. These stands may be candidates for creation of small openings (group selection), to initiate development of early seral species without sacrificing their current status as late-successional, suitable owl habitat. These stands are typically Fuel Model 8.

Group 8 - Boundary Grand Fir. These are grand fir stands along the Forest boundary in the LSR. Stands subject to treatment within this group are those within one-quarter mile of the LSR boundary. This area may be important in providing connectivity to late-successional habitat on Yakama Nation lands to the east. These stands are typically Fuel Model 8.

Group 9 - Dense Lodgepole Pine located north and east of Smith Butte. Mature lodgepole pine stands are susceptible to mountain pine beetle, although little is present today. Significant mountain pine beetle mortality would increase fire hazard, threatening adjacent late-successional stands. Younger, harvested lodgepole pine stands have areas of heavy slash. Lodgepole pine stands

provide important habitat for northern 3-toed and black-backed woodpeckers. The black-backed woodpecker is a rare/locally endemic species. Dense, unthinned stands provide habitat for snowshoe hares which are the prey base for lynx. These stands may be Fuel Model 8 or 10.

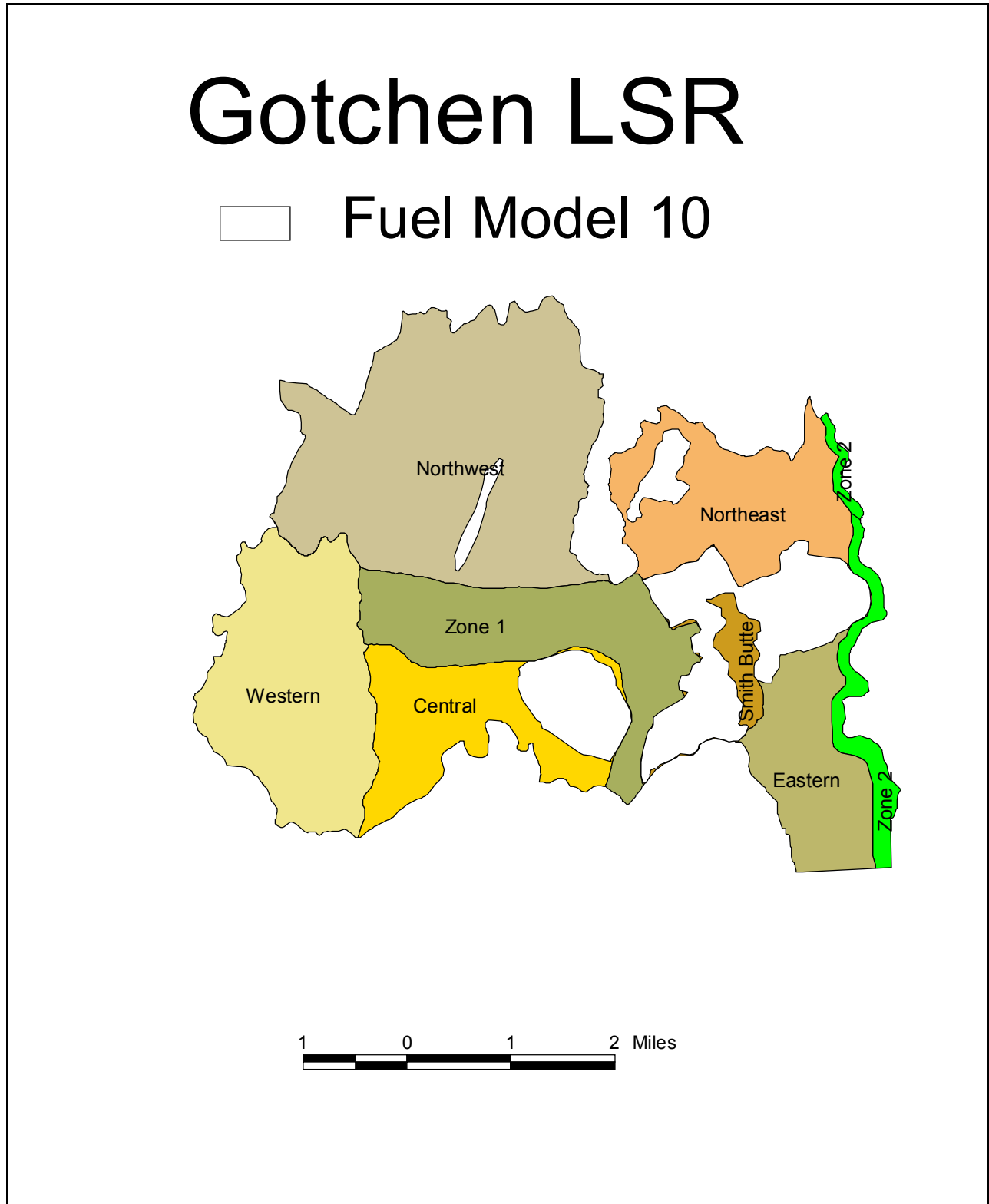
Fuel Models 8 and 10. The majority of the LSR falls into either Fuel Model 8 or Fuel Model 10 as described in *General Technical Report INT-122 Aids to Determining Fuel Models for Estimating Fire Behavior, April 1982*. In the northern most portion of the LSR, moss is the primary conveyor of fire. Moss has not been described in a fuel model.

Fuel Model 8 generally produces slow-burning ground fuels with low flame lengths. An occasional jackpot may be encountered. Usually, these fuels only pose fire hazards under severe weather conditions involving high temperatures, low relative humidities, and high wind speeds. Fuel Model 8 is most often associated with Stand Groups 6 through 9.

Fuel Model 10 generally has fires that burn in the surface fuels and ground fuels with greater intensity than the other timber litter models such as Models 8 and 9. Crowning, spotting, and torching of individual trees are much more frequent in this model. Controlling fires in this fuel model is difficult. Fuel Model 10 is most often associated with Stand Groups 3 through 5 and portions of Stand Group 9.

Spotted Owl Nest Sites are located throughout the LSR. Of the six known sites, five are presently occupied. The best 100 acres surrounding the nest site is a high priority for protection from budworm and fire.

Map 5-2B Fuel Model 10 Locations5-1



Treatments Description

Table 5-3, page 5-21.4, summarizes the treatment prescriptions, resulting fire hazard, suitability as late-successional habitat, particularly for the northern spotted owl and whether each is exempt from REO review.

Stand Group 1 - Young plantations. This treatment is described in detail in section 5-1 *Young Stand Thinnings*, page 5-1. Thinning these stands should not only promote growth, but should help to maintain the sites in a low fire-risk situation. Young stand thinning may be applied in young stands throughout the Gotchen LSR. This treatment is exempt from REO review.

Stand Group 2 - Maturing Plantations. This treatment is described in detail in section 5-2 *Commercial Thinning*, page 5-6. Commercial Thinning may be applied to candidate stands less than 80 years old wherever they occur in the LSR. This treatment is exempt from REO review.

Stand Group 3 - Lightly Stocked Stands. These stands should be reforested with primarily ponderosa pine and Douglas-fir to provide an early seral component for future stands. Pathologists should be consulted to determine presence of root diseases, and for advice on reforestation tree species to use. Since the objective is to provide long-term growing space for these trees, wide spacings of planted trees should be used. Exact spacing guidelines should be based on individual site characteristics. This treatment would be applied throughout the LSR. This treatment is exempt from REO review.

Stand Group 4 - Dead and Dying Stands. These stands will be harvested, consistent with NWFP Salvage Guidelines, to remove dead and dying trees not needed to meet LSR objectives and to reduce the risk of large-scale, stand-replacing fire. Harvested areas will be reforested with early seral tree species, as discussed under

Stand Group 3. Early seral tree species should be maintained.

These stands do not function as late-successional habitat; reforestation should help to regrow a late-successional stand that is more resistant to large-scale disturbance. This treatment could be applied throughout the LSR, although the initial focus should be in and adjacent to Treatment Zone 1. Treatments in Stand Group 4 are subject to REO review.

Stand Group 5 - Declining Stands. These stands should be treated to remove dead and dying trees to reduce fire risk, and reforested as described for Stand Group 3.

Group 5 stands still function as late-successional habitat, but may not in the near future, because continued tree mortality may reduce the stands below minimum stocking levels. Treatment should only be in stands where an interdisciplinary team, including biologists, determines that the stand will not function as late-successional habitat within the next 5 years. At present, most candidate stands for this treatment are in Treatment Zone 1 and the southern portions of the LSR. Stand Group 5 Treatments are subject to REO review.

Stand Group 6 - Remnant Old Growth. In these stands, it would be beneficial to thin in the immediate vicinity of individual old-growth trees, removing understory and mid-canopy grand fir and western hemlock. This would lessen competitive stress on the older trees, and reduce risk of mortality from crown fires by removing ladder fuels. This treatment should remove approximately ½ of the shade-tolerant trees that are in the immediate vicinity (within 2 crown widths), and should not be applied to more than ½ of the old-growth trees in an area. This treatment should be applied throughout the LSR. This treatment is exempt from REO review.

Stand Group 7 - Mature Grand Fir. Two treatments may be applied in these stands,

and both may be applied in a given stand where appropriate.

First, to add structure and provide an early seral species component, small openings (approximately 1 tree length by ½ tree length in size) may be created and reforested with ponderosa pine, Douglas-fir, and western larch seedlings. No more than 20 percent of the acreage on a landscape should contain these small openings.

Second, stands may receive a light thinning to enhance stand resilience after insect attack. Thinning should concentrate on removing mid-canopy trees, and should harvest no more than 25 percent of stand basal area. At least 40 percent canopy closure of conifers should remain to allow stands to continue to function as spotted owl dispersal habitat. Any large early-seral trees will be retained. This treatment is exempt from REO review.

Stand Group 8. Boundary Grand Fir.

Treatment in these stands consists of thinning to approximately 40 percent canopy closure, to provide a partial fuel break, yet maintain connectivity with the Yakama Nation lands to the east. This treatment is exempt from REO review.

Stand Group 9. Dense Lodgepole Pine Stands.

Slash in young managed stands with heavy fuels concentrations should be hand piled, as necessary, to reduce fire risk.

Mature stands should be monitored for mountain pine beetle. A 3-step monitoring procedure is recommended by specialists at the Westside Insect and Disease Technical Center:

1. Apply risk-rating to lodgepole pine stands. This risk-rating gives an estimate of potential for mountain pine beetle outbreaks.
2. Track occurrence of nearby mountain pine beetle activity, annually, by monitoring annual insect and disease

detection flights.

3. If risk-rating indicates high potential for outbreak of mountain pine beetle, and if monitoring shows mountain pine beetle in the vicinity or in stands in the LSR, contact entomologists at the Westside Insect and Disease Technical Center for a field review. If, in their opinion, there is a high likelihood that a mountain pine beetle outbreak is imminent or beginning, consider timber harvest and/or fuels treatments to manage fuel levels at an acceptable risk to the LSR.

Stand Group 9 Treatments are subject to REO review.

Fuel Models 8 and 10. Fuel models overlay the stand conditions described by the stand groups. Areas with Fuel Models 8 and 10 may be treated based on either the stand conditions, as described above, or the fuels conditions. Areas of Fuel Model 8 would be treated primarily by handpiling and machine piling along roads in the northern two assessment areas within Stand Group 7. Areas of Fuel Model 10 larger than 10 acres in size would be treated by removing dead and dying fuels, handpiling, machine piling or chipping. Roadside areas would be highest priority for treatment to expand the effectiveness of a road's function as a fuel breaks and reduce the risk hazard from human caused fire starts along roads.

Fuel Model 10 Treatments, other than those along key roads as described in the Three-Year Action Plan, are subject to REO review. Roads identified in the Three-Year Action Plan are:

80, 8040, 8040020, 8020, 8020021,
82, 8200060, 8200181, 8225, 8225101

Table 5-3 Treatment Summary

Stand Group, Fuel Model, or Treatment Area Component	Prescription	Late-Successional Forest Function		Potential Location of Treatment	Fire Hazard Post Treatment	Fire Tolerant Late Successional Forest in the Future	Exempt from REO Review
		PRE TREATMENT	POST TREATMENT				
Young plantations (SG 1)	Young stand thinning	No	No	Within plantations throughout LSR	Low	Yes	Yes
Maturing Plantations (SG 2)	Commercial thinning	No	No	Throughout LSR w/in dense stands of Douglas-fir	Low	Yes	Yes
Lightly Stocked Stands (SG 3)	Retain existing early seral spp., reforest with ponderosa pine and Douglas fir	No	No	Throughout LSR except Boundary	Low	Yes	Yes
Dead and dying Stands (SG 4)	Salvage and Reforest	No	No	Throughout LSR except Boundary	Low	Yes	No
Declining Stands (SG 5)	Salvage/reforest when mortality will result in loss of late successional habitat within 5 years.	Yes/No	No	Throughout LSR except Boundary	Low	Yes	No
Remnant Old Growth (SG 6)	Thin shade-tolerant spp. from immediate vicinity of individual remnant old growth	Yes	Yes	Throughout LSR	Moderate to Low	Yes	Yes
Mature Grand Fir (SG 7)	Create small openings, regen with early seral spp. Thin to enhance tree resilience	Yes	Yes	Treatment Zone 1, Smith Butte, Central and Northeast	Moderate to High	Difficult to determine; depends on future stand health	Yes
Grand fir along the Forest Boundary (SG-8)	Create partial fuel break with thinning to 40% canopy closure	Yes	Yes	Treatment Zone 2	Moderate Low to	Yes	Yes
Lodgepole Pine (SG 9)	Remove suppressed, dying fuels. Pile existing slash concentrations Consider treatments if mt. pine beetle outbreak is likely.	No	No	Lodgepole pine stands east and north of Smith Butte	Moderate to Low	No	No
Fuel Model 8	Chip, handpile, machine pile underburn	Yes	Yes	Throughout LSR	Moderate to Low	Yes	Yes
Fuel Model 10	Remove suppressed, dying fuels, chip, handpile, machine pile	Yes	Yes	Throughout LSR	Moderate to Low	Yes	Yes along key roads identified in the 3-year Action Plan. No for rest of LSR.
Known Spotted Owl Nests	Spray best 100 acres of habitat with Bt	Yes	Yes	Throughout LSR	Moderate to Low	Yes	Yes

Assessment Area Objectives

The ID Team assessed ecological functions at the landscape scale and attributed functions to each assessment area. The purpose of this assessment was to ensure that risk reduction activities would not jeopardize ecological functions. Management objectives were formulated to address the functions provided by each assessment area.

Table 5-3A Management Objectives by Assessment Area, describes the objectives of each assessment area. The objectives define the limits of silvicultural and risk reduction activity

that could occur within the given assessment area. For example, one of the objectives of the Eastern Assessment Area is to maintain connectivity for spotted owl dispersal. Treatment activity would be permitted only to the extent that the connectivity function would not be diminished.

Objectives for Treatment Zones 1 and 2 are not included in Table 5-3A. The objective for Treatment Zone 1 is to provide a central fuel break, which would serve as an anchor from which to suppress wildfires. The objective of Treatment Zone 2 is to serve as a shaded fuel break that provides dispersal quality habitat for spotted owls and other late-successional species.

Table 5-3A Management Objectives by Assessment Area

Eastern	Smith Butte	Central	Western	Northwest	Northeast
Maintain connectivity for spotted owl dispersal (primary function)	Maintain connectivity for spotted owl dispersal (primary function)	Maintain connectivity for spotted owl dispersal (primary function)	Maintain NRF function (primary function) for existing pair	Maintain NRF function (primary function) for existing pair	Maintain connectivity for spotted owl dispersal (primary function)
Maintain NRF function for <i>King Mt.</i> pair home range.	Maintain NRF function for <i>Smith Butte</i> pair home range.	Maintain NRF function for existing owl pair home range.	Maintain connectivity for spotted owl dispersal	Maintain connectivity for spotted owl dispersal	Maintain NRF function for existing owl pair home range.
Maintain lodgepole community in 10% of the treatment area at 33% in each successional stage.	Maintain lodgepole community in 10% of the treatment area at 33% in each successional stage.				Maintain lodgepole/sub alpine community at 33% in each successional stage.
Reduce volatility and spread potential to prevent fire spreading to adjacent areas.	Reduce volatility and spread potential to prevent fire spreading to adjacent areas.	Maintain low volatility and spread potential	Maintain low volatility and spread potential	Maintain low volatility and spread potential	Reduce volatility and spread potential to prevent fire spreading to adjacent areas.
Decrease likelihood of human caused fire starts	Decrease likelihood of human caused fire starts				Maintain upland meadows from conifer encroachment
			Protect potential bull trout habitat	Protect potential bull trout habitat	

Application of Treatments on the Landscape

The composition of each area in the LSR was considered with respect to the management objectives, stand groups and treatment criteria to identify management options in each of the eight areas in the LSR. This section discusses the unique features of each area and the management options they provide.

Existing conditions for each Assessment Area are summarized in Table 5-3B, page 5-21.17. Management Options are summarized in Table 5-3C, page 5-21.18.

TREATMENT ZONE 1 (1,800 ACRES)

EXISTING CONDITION

Stand Group	Percent
SG-1 Young Plantations	25%
SG-2 Maturing Plantations	
SG-3 Lightly Stocked	
SG-4 Dead and Dying	15%
SG-5 Declining	20%
SG-6 Legacy Old Growth	10%
SG-7 Mature Grand Fir	30%
SG -9 Dense Lodgepole	

This fuel break area, located in the center of the LSR, has large acreage of existing open forest (mostly plantations), and ties in with other areas of low risk, such as existing roads and the Aiken Lava Bed. Treatments within this area should increase the percentage of area in early seral/open forest condition, while maintaining connectivity of late-successional forest across the LSR.

The fuel loading along roads in the area is high. Treatment Zone 1 was located to take advantage of the network of existing roads and plantations. Since the intent is to utilize these roads and

plantations as anchors for controlling fire, any future road closure would be by gate and legal closure order rather than obliteration or a more permanent barrier.

This is a historically fire prone area which is subject to lightning. The likelihood of a lightning caused fire is considered moderate. The likelihood of a human caused fire, especially during hunting season, is considered to be moderate because the area is popular with hunters in the fall.

The potential for fires within this area to spread to other portions of the LSR is considered to be moderate.

Although nesting, roosting and foraging habitat (NRF) are present, the primary habitat function for the spotted owl is as connectivity and dispersal habitat

MANAGEMENT OPTIONS

The area lends itself to underburning. It is relatively flat, contains large trees, several plantations, and is roaded. Reintroducing fire into the ecosystem would not only treat fuels to reduce the risk of catastrophic fire, but would also retard succession to grand fir dominated stands. There is a need for silvicultural treatment prior to re-introduction of fire into Stand Groups 4 and 5. Removal of dead and dying trees within Groups 4 and 5 would reduce fuels enough to allow underburning followed by underplanting with budworm resistant species such as ponderosa pine and western larch. Typically after treatment, the Group 4 and 5 stands would retain about 20 percent to 25 percent canopy closure.

Approximately 15 percent of the assessment area (about 270 acres) contains Group 4 stands, and an additional 20 percent contains Group 5

stands. These collapsing stands contain heavy fuel loads, which pose a high threat to the entire assessment area as well as adjacent areas of the LSR. These stands would be treated by removing the dead and dying trees, and reforesting with more sustainable early-successional species such as larch, Douglas-fir, and ponderosa pine. Reducing the fire risk by removing dead and dying trees, treating existing fuels, and establishing more stable early successional species would move these acres towards a more sustainable condition.

In the western portion of Treatment Zone 1 there are opportunities to thin around legacy trees (SG-6) to relieve them of stress from competing grand fir.

TREATMENT ZONE 2 (400 ACRES)

EXISTING CONDITIONS

Stand Group	Percent
SG-1 Young Plantations	10
SG-2 Maturing Plantations	10
SG-3 Lightly Stocked	0
SG-4 Dead and Dying	0
SG-5 Declining	0
SG-6 Legacy Old Growth	0
SG-8 Mature Grand Fir	70
SG-9 Dense Lodgepole	10

These are lands within ¼ mile of the Forest boundary running the full north - south length of the LSR. All the mature grand fir stands within this area would be managed as Group 8 stands.

The northern half of the treatment zone is adjacent to Yakama Nation lands, the southern half is adjacent to state and private lands.

There are several user-made roads in the southern portion of the treatment zone. These roads provide access to the Forest from the private lands to the east.

The Yakama Nation, whose lands lie to the immediate east of the Forest boundary, have taken an aggressive policy towards treating the spruce budworm infested stands and the resultant fuels on their side of the line. The Yakama are harvesting grand fir stands, treating activity fuels, and regenerating to budworm resistant species.

The Group 8 stands are stocked with budworm susceptible species. At present, they are relatively healthy, and the adjacent landowners - especially the Yakama Nation and Campbell Group - are aggressively treating their budworm infested stands and resultant fuels.

The treatment zone is primarily stocked with grand fir. Prior to fire exclusion, the area was stocked with ponderosa pine and Douglas-fir. Grand fir stands within areas where grand fir was not historically present appear to be more susceptible to budworm infestation.

Approximately 25 percent of the grand fir stands have been thinned, and are relatively healthy.

Except for pockets of Fuel Model 10, fuel loading is at acceptable levels (Fuel Model 8).

The likelihood of ignition of fire from natural causes is unknown. This is the eastern-most portion of the Forest, and is subject to lightning. The likelihood of a lightning-caused fire start on either side of the Forest boundary is considered moderate.

The potential for fire to affect adjacent areas of the LSR is moderate.

MANAGEMENT OPTIONS

The creation of a shaded fuel break along the Forest boundary would give the LSR protection from off-Forest disturbance. We would not implement the fuel break unless the current conditions change. The triggering events would be:

- Fuels accumulation to Fuel Model 10 on lands adjacent to the Forest
- The Group 8 stands start to show evidence of decline and fuel build-up.

Managing this area as Treatment Zone 2 gives us the flexibility to create a fuel break along the entire length of the Forest boundary should the triggering events occur sometime in the future.

EASTERN ASSESSMENT AREA (1,300 ACRES)

EXISTING CONDITIONS

Stand Group	Percent
SG-1 Young Plantations	15
SG-2 Maturing Plantations	10
SG-3 Lightly Stocked	0
SG-4 Dead and Dying	10
SG-5 Declining	5
SG-6 Legacy Old Growth	0
SG-7 Mature Grand Fir	50
SG-9 Dense Lodgepole	10

The assessment area is primarily stocked with grand fir. Grand fir stands are less resistant to fire than the ponderosa pine stands which dominated the area prior to fire exclusion. It is believed that grand fir stands within areas that were historically stocked with ponderosa pine are more susceptible to budworm infestation than those that have been continuously dominated by grand fir.

Fuel loading is high (Fuel Model 10) within about 30 percent of the area. The fuel loading along Forest Road 82, the

main travel route through this area, is high (Stand Group 9 with Fuel Model 10).

The assessment area contains a network of existing roads and plantations. Since the intent is to utilize these roads and plantations as anchors for controlling fire, any future road closure would be by gate and legal closure order rather than obliteration or a more permanent barrier.

The probability of a lightning caused fire is moderate; this was historically a fire-dominated ecosystem. The fire cycle in this area is from 5 to 45 years. Because the area is popular with hunters, the likelihood of ignition from people, especially during hunting season, is considered to be moderate.

The potential of fires within this area to spread to other portions of the LSR is considered moderate, particularly in the fall when prevailing winds are from the east.

Although nesting, roosting and foraging habitats (NRF) are present, the primary habitat function for the spotted owl is as connectivity and dispersal habitat.

MANAGEMENT OPTIONS

The area lends itself to underburning. It is relatively flat, contains large trees, several plantations, and is roaded. Reintroducing fire into the ecosystem not only treats fuels to reduce the risk of catastrophic fire, but also retards succession to grand fir dominated stands. There is a need for silvicultural treatment prior to re-introduction of fire into Stand Groups 4 and 5. Removal of dead and dying trees within Groups 4 and 5 would reduce fuels enough to allow underburning followed by underplanting with budworm resistant species such as Douglas-fir, ponderosa pine and

western larch. Typically, after treatment, the Group 4 and 5 stands would retain about 20 percent to 25 percent canopy closure.

The Group 7 stands, which are comprised of budworm host species (80 percent grand fir, 20 percent Douglas-fir and other), are candidates for budworm infestation. However, many of these stands have recently been thinned, have low fuel loading, are relatively healthy, and are currently functioning as late-successional habitat. These stands would not be subject to silvicultural treatment unless they decline to Stand Group 4 and 5.

**SMITH BUTTE ASSESSMENT AREA
(1,000 ACRES)**

EXISTING CONDITION

Stand Group	Percent
SG-1 Young Plantations	0
SG-2 Maturing Plantations	25
SG-3 Lightly Stocked	0
SG-4 Dead and Dying	15
SG-5 Declining	15
SG-6 Legacy Old Growth	0
SG-7 Mature Grand Fir	35
SG -9 Dense Lodgepole	10

The assessment area is primarily stocked with grand fir and lodgepole pine. Prior to fire exclusion, the area was stocked with ponderosa pine and Douglas-fir. Grand fir stands within areas historically stocked with ponderosa pine are quite susceptible to budworm infestation.

Fuel loading is extremely high (Fuel Model 10) within about 70 percent of the area. Stands in this area have suffered the heaviest level of damage and mortality from insects and disease. Due to mortality and dead tops on defoliated trees, the fuel buildup will continue even if the budworm infestation subsides.

Fire volatility would be very high due to heavy/flashy fuels.

Due to the assessment area's fuel loading, stand conditions, topography, and location, the risk of a fire start in this area consuming a large portion of the LSR is high.

This assessment area also has several hundred acres of lodgepole pine stands with heavy fuel concentrations.

The area contains a network of existing roads and plantations. As in the Eastern Assessment Area, the intent is to use these roads and plantations as anchors for controlling fire.

The assessment area is a historically fire prone area. There are numerous snags present, a prominent topographic feature (Smith Butte), and the area is subject to lightning. For these reasons, the probability of a lightning caused fire is considered high.

Although there is a known owl nest within the assessment area, the primary habitat function for spotted owls is as connectivity and dispersal habitat.

Approximately 200 acres of the assessment area are being considered for possible establishment of a Research Natural Area. The two hundred contiguous acres of unmanaged grand fir is considered to be unique.

MANAGEMENT OPTIONS

Approximately 15 percent of the assessment area (about 150 acres) contains Group 4 stands, and an additional 15 percent contains Group 5 stands. These collapsing stands contain heavy fuel loads, which pose a high threat to entire assessment area as well as adjacent areas of the LSR. These stands would be treated by removing the dead and dying trees, and

reforesting with more sustainable early-successional species such as larch and ponderosa pine. Reducing the fire risk by removing dead and dying trees, treating existing fuels, and establishing more stable early successional species would move these acres towards a more sustainable condition.

The Smith Butte Assessment Area contains about 350 acres of Stand Group 7. These stands would not be treated unless they begin to decline to Stand Group 5.

Portions of the Smith Butte Assessment Area are suitable for underburning. These are the flat, roaded areas containing stands of large trees as well as plantations. Reintroducing fire into the ecosystem will serve to treat fuels and suppress succession to grand fir dominated stands.

CENTRAL ASSESSMENT AREA (1,800 ACRES)

EXISTING CONDITIONS

Stand Group	Percent
SG-1 Young Plantations	5
SG-2 Maturing Plantations	0
SG-3 Lightly Stocked	0
SG-4 Dead and Dying	15
SG-5 Declining	15
SG-6 Legacy Old Growth	20
SG-7 Mature Grand Fir	45
SG-9 Dense Lodgepole	0

The northeastern third of the assessment area is primarily stocked with grand fir. Prior to fire exclusion, the area was stocked with ponderosa pine and Douglas-fir. The western two thirds of the assessment area contains about 350 acres of grand fir stands with a relatively large component of old-growth ponderosa pine.

The assessment area is a dry, historically

fire-prone area. Fuel loading is high (Fuel Model 10) within about 30 percent of the area.

The northeastern portion of the assessment area has suffered insect and disease damage and mortality. Heavy fuel loads (Fuel Model 10) are present within about 30 percent of the Central Assessment Area (about 560 acres). Due to mortality and dead tops on defoliated trees, the fuel buildup will continue even if the budworm infestation subsides. Due to the assessment area's fuel loading, stand conditions, and location, the risk of a fire start in the northeastern portion consuming a large portion of the LSR is high.

The probability of a lightning caused fire is moderate; this was historically a fire-dominated ecosystem. The fire cycle in this area is from 5 to 45 years. The risk of human caused fires is believed to be moderate based on its popularity as a recreation destination.

The potential for fires within this area to spread to adjacent areas of the LSR is high if the fire occurs within the northeastern third of the assessment area because of heavy fuels. It is relatively low for the remaining two thirds.

The assessment area contains a network of existing roads and plantations. As in the Eastern and Smith Butte Assessment Areas, the intent is to use these roads and plantations as anchors for controlling fire. Road closures should provide for easy access for fuels management and fire suppression.

The area provides spotted owl NRF, connectivity and dispersal habitat.

MANAGEMENT OPTIONS

The Stand Groups 4 and 5 in the northeastern third of the Assessment Area contain heavy fuel loads, which pose a high threat to entire assessment area as well as adjacent areas of the LSR. The Group 4 and 5 stands in this assessment area are intermixed and, for practical purposes, would be treated as one stand type comprising almost a third of the treatment area. There are opportunities to enhance the stability of these stands by removing the dead and dying trees, and reforesting with more sustainable early-successional species such as larch and ponderosa pine.

The Central Assessment Area contains over 850 acres of Stand Group 7. Although relatively healthy at present, the Group 7 stands in the western portion of the assessment area are stocked primarily with budworm host species. If pathogen or insect activity increases within these stands, they should be assessed for treatment to increase stand resilience, reduce fuel loads, stand densities, and the risk of catastrophic disturbance.

With approximately 340 acres of Stand Group 6, and relatively good access, the Central Assessment Area provides the opportunity to thin around legacy trees to relieve them of stress from competing grand fir. The Central Assessment Area lends itself to underburning. It is relatively flat, contains large trees, and is roaded. In some areas there will be a need for silvicultural treatment to reduce ladder fuels prior to re-introduction of fire into the landscape. Reintroducing fire not only treats fuels and reduces the risk of catastrophic fire, but also suppresses succession to stands dominated by grand fir.

WESTERN ASSESSMENT AREA (2,400 ACRES)

EXISTING CONDITIONS

Stand Group	Percent
SG-1 Young Plantations	15
SG-2 Maturing Plantations	5
SG-3 Lightly Stocked	0
SG-4 Dead and Dying	0
SG-5 Declining	0
SG-6 Legacy Old Growth	30
SG-7 Mature Grand Fir	50
SG-9 Dense Lodgepole	0

The stands in the Western Assessment Area are primarily stocked with grand fir having Douglas-fir and ponderosa pine components. Although the Western Assessment Area is a transition zone to cooler moister conditions, and therefore not as dry as the more easterly assessment areas, it is still within the relatively dry grand fir zone. Prior to fire exclusion, the area was stocked with ponderosa pine, Douglas-fir, and grand fir. Grand fir stands that were historically stocked with a grand fir component are somewhat less susceptible to budworm infestation than those historically stocked with ponderosa pine.

With the exception of pockets of Fuel Model 10, most of the assessment area is Fuel Model 8.

The Western Assessment Area contains a network of existing roads and plantations. Since the intent is to utilize these roads and plantations as anchors for controlling fire, road closures should provide for easy access for fuels management and fire suppression.

Because it is somewhat more moist than the easterly assessment areas, the probability of a lightning caused fire is low. This was historically a fire-

dominated ecosystem. The fire cycle in this area is from 70 to 250 years. The popularity of the area with recreationists earns it a moderate risk of human caused fire.

The potential of fires within this area to spread to other portions of the LSR is considered to be low.

The Western Assessment Area provides the spotted owl with nesting roosting and foraging habitat.

MANAGEMENT OPTIONS

The assessment area contains over 1,400 acres of mature grand fir stands. The Group 7 stands are stocked with budworm host species (60 percent grand fir, 20 percent Douglas-fir), and are susceptible to budworm infestation. However, many of these stands have recently been thinned, have low fuel loading, are relatively healthy, and are currently functioning as late-successional habitat. If these stands remain healthy, they would not be considered for silvicultural treatment.

If the triggering events do occur, small-scale thinning to enhance stand vigor would be considered as a test of its efficacy in maintaining stand health.

With approximately 960 acres of Stand Group 6, and a relatively good access, the Western Assessment Area provides the opportunity to thin around legacy trees to relieve them of stress from competing grand fir.

There is a need for silvicultural treatment prior to re-introduction of fire into the landscape. The area lends itself to underburning. It is relatively flat, contains large trees, several plantations, and is roaded.

NORTHWESTERN ASSESSMENT AREA (4,300 ACRES)

EXISTING CONDITION

Stand Group	Percent
SG-1 Young Plantations	0
SG-2 Maturing Plantations	0
SG-3 Lightly Stocked	0
SG-4 Dead and Dying	0
SG-5 Declining	0
SG-6 Legacy Old Growth	40
SG-7 Mature Grand Fir	60
SG-9 Dense Lodgepole	0

The Northwestern Assessment Area's stands are stocked with grand fir, Douglas-fir and ponderosa pine components. Like the Western Assessment Area, this area is a transition zone to cooler moister conditions, and therefore not as dry as the more easterly assessment areas. The southern three-quarters of the assessment area is within the grand fir zone. The northern quarter of the assessment area is within the mountain hemlock zone. Prior to fire exclusion, the area was stocked with ponderosa pine, Douglas-fir, and grand fir. Stands historically stocked with a grand fir component are somewhat less susceptible to budworm infestation than those historically stocked primarily with ponderosa pine.

The stands within the mountain hemlock zone are stocked with lodgepole pine and subalpine fir. These stands are 80 to 90 years old, are approaching the end of their life cycle, and are starting to decline.

Except for pockets of Fuel Model 10, the majority of fuels within the grand fir zone portion of the assessment area is at Fuel Model 8. In the mountain hemlock zone, moss in addition to foliage, is a significant contributor to crown fire.

As stands start declining in the mountain hemlock zone, fuels (in addition to moss) will start to build up and transition into Fuel Model 10.

The western third of the assessment area contains a small network of roads and plantations. These roads and plantations will be utilized as anchors for controlling fire. Any future road closure would be by gate and legal closure order rather than a more permanent barrier. The majority of the Northwestern Assessment Area is unroaded.

Because it is somewhat more moist than the easterly assessment areas, the probability of a lightning caused fire is low. This was historically a fire dominated ecosystem. The fire cycle in this area is from 70 to 250 years. Because of its limited access, the risk of a human caused fire is considered low.

The potential of fires within this area to spread to other portions of the LSR is considered to be low. However, suppression would be difficult since most of the Northwestern Assessment Area is unroaded.

From a landscape perspective, maintaining the stand health and reducing fire risk in the Northwestern Assessment Area would help protect late-successional habitat within the adjacent Mt. Adams Wilderness where management options are restricted.

The Northwestern Assessment Area provides the spotted owl with nesting roosting and foraging and dispersal habitat.

MANAGEMENT OPTIONS

The Northwestern Assessment Area contains over 2,200 acres of Stand Group 7. About 75 percent of the stocking consists of budworm host species (grand fir, and Douglas-fir), and are susceptible to budworm infestation. However, most of these stands have low fuel loading, are relatively healthy, and are currently functioning as late successional habitat.

Commercial thinning is not considered appropriate for the following reasons:

1. Although comprised of budworm host species (mostly grand fir), the stands are considered to be somewhat less susceptible to budworm infestation relative to the dry site grand fir stands within the LSR. The Northwest Assessment Area is within the moist grand fir zone.
2. The analysis area functions as NRF habitat for the spotted owl. The mature grand fir stands are functioning as late-successional habitat. A minor amount of budworm-induced mortality could improve the structural complexity of the stands.

Risk reduction salvage would not be considered in these stands unless the following triggering events occur to change the current situation:

- Fuel buildup increases to where Fuel Model 10 occurs on a minimum of 10 contiguous acres.
- Budworm activity increases to level *BS* 2 for 2 years, or *BS* 3 for 1 year.
- Stands show a marked evidence of stand decline.

While the Northwestern Assessment Area contains approximately 1,500

acres of Stand Group 6, opportunities to thin around legacy trees will be limited by access.

**NORTHEASTERN ASSESSMENT AREA
(2,100 ACRES)**

EXISTING CONDITION

Stand Group	Percent
SG-1 Young Plantations	0
SG-2 Maturing Plantations	0
SG-3 Lightly Stocked	0
SG-4 Dead and Dying	0
SG-5 Declining	5
SG-6 Legacy Old Growth	35
SG-7 Mature Grand Fir	50
SG-9 Dense Lodgepole	10

Approximately 85 percent of the stands within the assessment area are stocked with budworm host species. These stands are less resistant to fire than the ponderosa pine stands which characterized the area prior to fire exclusion. The Northeastern Assessment Area is primarily stocked with grand fir. Other species present include Douglas-fir, lodgepole pine, subalpine fir, and remnant ponderosa pine. Prior to fire exclusion, the area was stocked with ponderosa pine, Douglas-fir, and lodgepole pine. Grand fir stands within areas historically stocked with ponderosa pine are more susceptible to budworm infestation.

The southern three-quarters of the assessment area is within the grand fir zone. The northern one-quarter of this assessment area is within the mountain hemlock zone. The stands within the mountain hemlock zone are stocked with lodgepole pine and subalpine fir. These stands are around 90 years old, are approaching the end of their life cycle, and are starting to decline. Between 15

percent and 30 percent of the trees in these stands have dead tops, which ultimately contribute to fuel buildup.

Fuel loading is high (Fuel Model 10) within about 20 percent of the Northeastern Assessment Area. The lodgepole stands within the grand fir zone are overstocked and contain a large amount of ladder fuels. Within the mountain hemlock zone, moss is the primary carrier of fire. There is no fuel model to describe moss carried fire.

The Northeastern Assessment Area is mostly unroaded; the existing network of roads and partial cut units is quite limited. There are no plantations within the assessment area. The intent is to utilize the few roads and partial cuts as anchors for controlling fire. Road closures would be by gate and legal closure order rather than a more permanent barrier. Due to the more uneven topography, location, and existing use patterns, gates would be a more effective tool for road closure than within the other five assessment areas.

The probability of a lightning caused fire is moderate; this was historically a fire-dominated ecosystem. The fire cycle in this area is from 5 to 45 years. Because of limited accessibility, the risk of a human caused fire is considered low.

The potential of fires within this area to spread to other portions of the LSR, particularly in the fall when the prevailing winds are from the east, is considered to be moderate.

There is a known spotted owl activity center on the south side of Snipes Mountain. The stands in this area contain small (one acre) patches of large ($\geq 30''$ dbh) Douglas-fir, grand fir, and subalpine fir. The understory is

relatively clear and open. Fuels are relatively light. The owls, which are banded, have moved out of the site, and are known to nest on Yakama lands to the east. The site, which is probably the highest elevation nest site on the Forest (4,400'), is presently unoccupied. There has been no modification of the habitat, and the reasons for the nest abandonment are unknown.

The Northeastern Assessment Area may contain lynx habitat.

From a landscape perspective, maintaining the stand health and reducing fire risk in the Northeastern Assessment Area would help protect late-successional habitat within the adjacent Mt. Adams Wilderness where management options are restricted

MANAGEMENT OPTIONS

About one-half of the assessment area contains Group 7 stands. These stands are relatively healthy, and are currently functioning as late-successional habitat. However, their age (80-90 years), species composition (grand fir, subalpine fir, and lodgepole pine) place them at risk of declining into Group 5 stands. These stands would not be treated unless the following triggering events occur to change the current condition:

- Fuel buildup increases to where Fuel Model 10 occurs on a minimum of 10 contiguous acres.
- Budworm activity increases to level *BS 2* for 2 years, or *BS 3* for 1 year.
- Stands show a marked evidence of stand decline.

If the triggering events do occur, small scale thinning to enhance stand resilience may be considered, as well as risk reduction salvage and fuel treatment.

Table 5-3B Existing Condition by Assessment Area

Assessment Area Attribute	Eastern 1,300 acres	Smith Butte 1,000 acres	Central 1,800 acres	Western 2,400 acres	Northwest 4,300 acres	Northeast 2,100 acres)
Potential for fire to affect other areas	Moderate due to patchy fuels	High	High in SE portion, low in rest of the treatment area	Low	Mod. potential to spread into Wilderness due to moss component	Moderate
Risk of fire from other area	Low to Mod. from off Forest via east winds	Moderate	High from Smith Butte via east wind	Low	Low	Low to Mod from off Forest via east winds
Fuel Model 8 (% treatment area)	70%	25%	70% but at risk to go to FM 10 due to BS 3	95%	95%	85%
Fuel Model 10 (acres)	30%	75%	30% but at risk to increase	5%	5%	15%
Fire Volatility	High due to flashy fuels	Very High due to heavy/ flashy fuels	Low	Low	Moderate	Moderate
Rate of Spread	Moderate	High	Low, but at risk to go to high due to BS 3	Low	Moderate	Moderate
Probability of ignition						
a) Lightning	a) Mod	a) High	a) Mod	a) Mod	a) Mod	a) Mod
b) Human	b) Mod	b) Mod	b) Mod	b) Mod	b) Mod	b) Mod
% SG 4 (Loss of LS Function)	10%	15%	15%	0	0	0%
% SG 5, (Loss of LS function)	5%	15%	15%	0	0	5%
% SG 6 (Fully Stocked w/Old Growth)	0	0	20%	30%	40%	35%
% SG 7	50%	35%	45%	50%	60%	50%
a) suscept. to budworm	a) High	a) High	a) High	a) High	a) Mod due to spp.	a) High
b) benefit from resilience thin	b) Low, already thinned	b) Mod, some areas need thinning	b) Low, already thinned	b) Low, already thinned	b) Mod. due to age	b) Mod. due to age
% SG 9 (Mature lodgepole pine)	10%	10%	0	0	0	10%
Spotted Owl function	Primarily connectivity, some NRF	Primarily connectivity, some NRF	Primarily NRF, also provides connectivity	Primarily NRF	Primarily NRF	Primarily connectivity, some NRF
Presence of legacy groves	Low	Low	Low	Moderate	High	Moderate
Lynx Function						
a) denning	a) Low	a) Mod.	a) Mod.	a) Mod.	a) High	a) High
b) forage	b) Moderate	b) Mod.	b) Mod.	b) Mod.	b) High	b) High
Potential Bull Trout Habitat	No	No	No	Yes	Yes	No
Special Features	Lodgepole	Meadow, Bats, Lodgepole	Sub alpine fir, wet meadows	Oak groves		Lodgepole

Table 5-3C Management Options by Assessment Area

Assessment Area Attribute	Treatment Zone 1	Eastern	Smith Butte	Central	Western	Northwest	Northeast
Underburning	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Risk Reduction Salvage Groups 4 and 5 and underplant.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Thin Group 7 Stands to enhance resilience.	Yes	No	Yes	Yes	No	No	Yes
Legacy Tree Culturing	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Roadside Fuel Reduction	Yes	Yes	Yes	Yes	No	Yes	Yes
Lodgepole Pine Mgt	No	Yes	Yes	No	No	No	Yes

Triggers

In the context of this Assessment, triggers are the criteria that lead to further analysis under NEPA, which in turn, may result in a decision to implement a management activity.

Table 5-3D, page 5-21.19, summarizes, by assessment area, the criteria that may lead to a proposal for silvicultural activity within the LSR. Management activities exempted from further REO review are summarized in Table 5-3 (page 5-21.4).

Three-Year Action Plan

Table 5-3E, page 5-21.19, is a three-year action plan of risk reduction activities. Some of these activities require REO review prior to implementation (see Table 5-3). This action plan is a projection of activities the Forest may implement in and adjacent to the Gotchen LSR over the next three years. Silvicultural treatments in the adjacent

Matrix land allocation are not subject to REO review.

Matrix activities shown are those believed to contribute to the sustainability of the LSR by reducing risk in surrounding lands. For some activities funded through timber sales, it may be necessary to bundle LSR activities with adjacent Matrix activities to assemble commercially viable sales. If budworm or other pathogen activity intensifies and risk increases beyond that which is anticipated, this tentative schedule would be adjusted to respond to the situation within the framework established by this assessment. Decisions to implement any of these activities will be made with public involvement through the NEPA process.

The action plan was developed in pursuit of the objectives described in Table 5-3A. In developing the plan, the Forest placed the highest priority on those actions which reduce the risk of large scale stand replacing fire. The lowest priority for action are those activities which do little to reduce the risk of fire

throughout the LSR, and/or those activities for which the required

triggering event has yet to occur.

Table 5-3D Triggers

Assessment Area Component	Treatment	Eastern, Smith Butte, Central, and Western Assessment Areas, Treatment Zone 1	Northeast and Northwest Assessment Areas	Treatment Zone 2 (Forest Boundary)
SG-4 Dead and dying stands	Risk Reduction Salvage Reforest w/ non-host species	Where SG-4 occurs	Where SG-4 occurs	N/A
SG-5 Declining stands	Risk Reduction Salvage Reforest w/ non-host species	Where SG 5 occurs in TZ 1, ≥ 20% of Assessment Areas	≥ 20% of treatment area	N/A
SG-6 Remnant Old Growth	Old Growth Culturing	Where SG-6 occurs	Where SG-6 occurs	N/A
SG-7 Mature grand fir stands	Thin from below to increase stand resilience and/or small group selection. Maintain 40% canopy cover.	Fuel Model 10 ≥ 10 acres, or stand can benefit from resilience thin East, Smith Butte, Central only	Northeast only: Fuel model 10 ≥ 10 acres. Budworm @ BS 2 in 2 years, or BS 3 for 1 year. Fuel models exceed FM 8. Evidence of stand decline. Resilience thin or group select adjacent to roads as test	N/A
SG-8 Boundary grand fir stands	Thin from below, maintaining at least 40% canopy cover	N/A	N/A	Fuel buildup on adjacent non-National Forest lands
SG-9 Dense Lodgepole pine stands	See SG-9, page 5-3	Applicable to Eastern and Smith Butte. Where it occurs.	N/A	N/A
FM 8	Treat fuels, underburn	No need to act except Treatment Zone 1	SG 7 showing signs of decline and fuels starting to build	Where it exists.
FM 10	Treat fuels, remove dying and suppressed trees	≥ 10 acres	≥ 10 acres	Where it exists
Aerial Spray	Aerial Spray Bt.	Within best 100 acres adjacent to owl nest	Within best 100 acres adjacent to owl nest	N/A

Table 5-3E Three-Year Action Plan

Project Description	Year 1 Acres	Year 2 Acres	Year 3 Acres
Roadside Commercial thinning as a fuel treatment within the LSR	450	400	0
Young stand management (Thinning and fuels treatment)	200	200	200
Fuels treatment along key roads and small wood removal (hand piling and chipping)	100	100	0
Salvage and reforestation (Group 4 and 5 stands).	400	0	0
Bt spraying of selected sites inside LSR (100 acre owl cores)	600 (Nests)	0	600 (Nests)
Forest boundary area (Matrix)	800 (Matrix)		800 (Matrix)
Underburning	400	400	400
Regeneration harvest in Matrix	150	0	0
Legacy tree culturing throughout LSR (Clearing around selected trees)	100	0	0
Commercial thinning timber sale (LSR & Matrix).	550	0	0
Commercial thinning within Boundary Treatment Area (TZ 2)	0	0	0

CRITERIA

The following describes the stand and landscape level criteria used to prioritize activities for the three year action plan portrayed in Table 5-3E. All activities discussed in the Management Options section are not necessarily priorities for the near future. For more detail on the treatments see Treatments Description, page 5-21.2.

Roadside stand and fuel treatments These treatments include roadside commercial and precommercial thinning, and roadside fuel treatments such as cutting and piling fuels for chipping. Highest priority for fuels reduction and silvicultural treatments are areas which are described by the following four attributes.

- Presence of Fuel Model 10 or SG 9
- High fire volatility
- Moderate to high risk of ignition
- Moderate to high potential for the fire to affect other areas
- Along key roads

Treatment of these fuels reduces risk of human caused fires from roadside ignitions while increasing the effectiveness of roads as fuelbreaks.

Young Stand Management would include pre-commercial thinning, pruning and fuel reduction throughout the LSR to promote the development of late-successional habitat. Management of lodgepole pine plantations would be considered separately from other plantations to optimize habitat for snowshoe hare, the prey base for lynx.

Risk Reduction Salvage of collapsing Group 4 and 5 stands, and reforestation with non-budworm host species will occur primarily in Treatment Zone 1, the extreme

southwest portion of the Smith Butte Assessment Area, and the southeastern portion of the Central Assessment Area. The stands identified for risk reduction salvage in the Smith Butte and Central Assessment Areas are, for the most part, adjacent to Treatment Zone 1. The salvage of these collapsing stands would, in effect, increase the size and effectiveness of the original central fuel break (Treatment Zone 1).

Targeted spraying the best 100 acres of habitat adjacent to the known spotted owl nests with Bt would protect nesting/roosting habitat from possible budworm defoliation. Targeted spraying such as this has been shown to be an effective short-term (1-2 year) treatment. Population sampling of spruce budworm will be used to determine the necessity of spraying. Only those owl nests with high budworm populations would be sprayed. Spraying along the Matrix south of the LSR will also be assessed.

Underburning would occur within the Eastern Assessment Area and within the western portion of the Central Assessment Area. These underburns would occur in areas with low potential for catastrophic fire, and where there is a low to moderate risk of fire spreading in from other areas. The primary purpose of the underburns would be to reintroduce fire on the landscape to maintain low fuels levels and suppress succession to grand fir.

Regeneration harvest within the adjacent Matrix is a part of the overall landscape level strategy for reducing the risk of catastrophic fire within and around the LSR. Matrix stands exhibiting budworm damage would be proposed for harvest and conversion to non-host species such as ponderosa pine.

Legacy tree culturing will occur primarily in the Central, Western, and Northwestern Assessment Areas. These treatments would likely be packaged with harvest in the Matrix as well as roadside commercial thinning to make an economically viable sale. As described in the treatment for Stand Group 6, the understory within the immediate vicinity of individual legacy trees would be thinned to lessen the competitive stress to these trees, and, to reduce the chance of mortality from crown fires by removing ladder fuels.

Commercial thinning timber sale within the LSR, but away from key roads is considered a low priority for action. However, commercial thinning within the adjacent Matrix, would, in all likelihood, be coupled with legacy tree culturing, roadside commercial thinning, and Matrix regeneration in order to make a viable timber sale.

Many of the mature grand fir stands within the LSR have already been commercially thinned. The majority of the non-thinned mature grand fir are located within the Northwest and Northeast Treatment Areas. Within the Northwest Assessment area, commercial thinning would not be prescribed for the following reasons:

1. Although comprised of budworm host species (mostly grand fir), the stands are considered to be somewhat less susceptible to budworm infestation relative to the dry site grand fir stands within the LSR. The Northwest Assessment Area is within the moist grand fir zone stocked with pine.
2. The analysis area functions as NRF habitat for the spotted owl; the mature grand fir stands are functioning as late successional habitat. Some budworm-induced mortality would improve the structural complexity of the stands.

Within the Northeast Assessment area, commercial thinning is considered to be low priority for the following reasons:

1. At present, the mature grand fir stands are relatively healthy; there is evidence of only minor amounts of budworm activity.
2. The mature grand fir stands are functioning as spotted owl dispersal habitat. Some budworm induced mortality would only improve the structural and complexity of the stands.

Commercial Thinning within Treatment Zone 2 to create a forested fuel break is at present not a high priority for action. The Yakama Nation has been aggressively treating budworm infested stands and the resultant fuels on the tribal lands adjacent to the Forest boundary. This has greatly reduced the potential for catastrophic damage to the LSR from fire originating on the tribal lands. If fuels start building on the tribal lands in the near future, we would schedule a commercial thin to create a fuel break as the need arises.

Other Activities Conducted In Conjunction With Treatments

Treatments should consider development of snags and down wood. See 5-5 *Snag Management* and 5-6 *Down Wood Management*, which follow, for details. It may be possible to partially cover snag and down wood requirements by existing mortality, or anticipated future mortality from live trees with poor vigor. Designing treatments to include untreated patches of forest, in which snag retention may be more feasible, may help in maintaining adequate existing snags.

Where possible, utilize K-V funds from projects for precommercial thinning of adjacent plantations.

Treatments should provide for management of fuel conditions through use of prescribed fire or mechanical/hand treatment methods as described in Chapter 6.

Monitoring Plan

Declining Stands (Stand Group 5) The health of Stand Group 5 should be monitored to validate our ability to predict their decline to nonsuitable habitat within 5 years.

Underburning within the LSR or in similar stands in the matrix should be monitored to assess its effectiveness in reducing fuels, suppressing grand fir regeneration, and effects on residual stand mortality.

Spotted Owl Nest Sites should be monitored to determine occupancy and fecundity. Nest sites should also be monitored to assess the effects of Bt spraying on owl behavior.

Implementation monitoring should follow treatment activities (including follow-up work such as snag creation). Formal or informal stand examination should be conducted to estimate stand density, snag, and down wood levels in treated areas. Area of small openings and untreated areas should be estimated by walk-through examination and review of maps or photos. If projects cover large areas, sampling of a portion of the area or a portion of stands (i.e. 20 percent) may be sufficient.

Literature Cited

Fischer, William C; Miller, Melanie; Johnston, Cameron M.; Smith, Jane Kapler; Simmerman, Dennis G.; and Brown, James K. Fire Effects Information System: Users Guide. USDA Forest Service, Intermountain Research Station, General Technical Report INT-GTR-327.

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MEMORANDUM

DATE: September 1, 1999

TO: Nancy Graybeal, Acting Regional Forester, Forest Service, Regions 6

FROM: Donald R. Knowles, Executive Director

SUBJECT: Regional Ecosystem Office Review of the Amendment to the Gifford Pinchot 1997 Forestwide Late-Successional Reserve Assessment for Risk-Reduction Treatments in the Gotchen Late-Successional Reserve

Summary

The Regional Ecosystem Office (REO) and the interagency Late-Successional Reserve Work Group have reviewed the amendment to the Gifford Pinchot 1997 Forestwide Late-Successional Reserve Assessment (LSR) for risk-reduction treatments in the Gotchen Late-Successional Reserve (LSR). The REO finds that the LSRA, as amended, provides a sufficient framework and context for future risk-reduction projects within the LSR. In addition, future risk-reduction activities described in the amended LSRA that meet its criteria and objectives, and which are consistent with the Standards and Guidelines (S&Gs) of the Northwest Forest Plan (NFP) are exempt from future REO review, except for those projects noted below, which would remain subject to REO review. In addition, based on new information and changed conditions within and surrounding the LSR (see below), REO has also withdrawn our previous exemption for reviewing treatments in SG-4 stands.

Basis for the review

Under the S&Gs for the NFP, a management assessment should be prepared for each large LSR (or group of smaller LSRs) before habitat manipulation activities are designed and implemented. As stated in the S&Gs, these assessments are subject to the REO review. The REO review focuses on the following:

1. This review considers whether the assessment contains sufficient information and analysis to provide a framework and context for making future decisions on projects and activities. The eight specific subject areas that an assessment should generally include are found in the NFP S&Gs (page C-11). The REO may find that the assessment contains sufficient information or it may identify topics or areas for which additional information, detail, or clarity is needed. The findings of the REO review are provided to the agency or agencies submitting the assessment.
2. The review also considers treatment criteria and potential treatment areas for silvicultural, risk-reduction, and salvage activities if addressed in the LSRA. When treatment criteria are clearly described and their relationship to achieving desired late-successional conditions are also clear, subsequent projects and activities within the LSR(s) may be exempted from the further REO review, provided they are consistent with the LSR criteria and NFP S&Gs. The REO authority for developing criteria to exempt these actions is found in the S&Gs (pages C12, C-13, and C-18). If such activities are not described in the LSRA and exempted from future review in this memorandum, they remain subject to future REO review.

Scope of the Assessment and Description of the Assessment Area

The Gifford Pinchot National Forest submitted a document titled "Gotchen LSR Proposal for Amendment of the Forest Wide Late-Successional Reserve Assessment." Additional supporting information included: (1) a 'white paper', titled "Thinning and the western spruce budworm," which described effects of certain silvicultural manipulations on the spruce budworm and helped support some of their treatment rationale, (2) a document prepared by the fire/fuels planner dated July 26, 1999, titled "Addendum of fire/fuels inputs for the Gotchen LSR Amendment"; and (3) a topographic map of the LSR showing the key roads where fuel reduction activities would occur in the LSR. In addition, members of the LSR work group made two field trips (October 23, 1998 and July 27, 1999) to look at conditions described in the assessment and discuss some of the proposed treatment areas.

The Gotchen LSR is a 15,000 acre LSR and the driest LSR on the Forest, with much (86%) of it being in the grand fir vegetation zone. The LSR is described in a Forest-wide LSRA that has already been reviewed by REO (November 18, 1997 REO memo) and certain activities described in that assessment have been exempted from future REO review. Since that review, a spruce budworm outbreak that was originally described as light has increased in extent and severity within and outside of the LSR. The Forest is amending their original LSRA to address these changed conditions. This amendment modifies the original LSRA in the following ways: (1) additional treatments would occur in stands typed as fuel models 8 & 10; (2) *Bacillus thuringiensis* (Bt) would be sprayed in the immediate vicinity (the best 100 acres of habitat) of known spotted owl nests to reduce canopy loss to spruce budworm; (3) treatments originally limited to certain zones would occur in other portions of the LSR; and (4) fuels reduction, including commercial thinning, would occur in dense, mature lodgepole pine stands as part of roadside fuel reduction projects. Except for this treatment in dense lodgepole pine stands, the stand groups, stand prescriptions, and anticipated effects described in the original LSRA remain unchanged.

Review of the Assessment

The REO reviewed the amended LSRA in light of the eight subject areas identified in the S&Gs (page C-11) and finds that the amended LSRA provides a sufficient framework and context for designing future actions. The following treatments described in this amendment (as summarized

in Table 1 of the amendment) are exempt from future REO review: (1) treatments in fuel model 8 along roads within the northern two assessment areas in SG-7 stands; (2) treatments in fuel model 10 that are along key roads as identified in the supplemental map provided to REO (3) treatments of mature grand fir (SG-7) in the Smith Butte, Central, and Northeast portions of the LSR; (4) spraying of Bt in the immediate vicinity of known spotted owl nests (5) the expansion of Treatment Zone 2 to create a fuel break in grand fir stands along the eastern LSR boundary (SG-8); and (6) the treatment of dense, mature lodgepole pine stands along key roads, as identified in the supplemental map provided to REO, to reduce fuels.

Projects not exempted from REO review

Treatments in mature lodgepole pine stands, SG-9, not described above, remain subject to REO review as per the 1997 LSRA. In addition, the following treatments are subject to future REO review. Criteria describing these projects sufficiently to exempt them from further review may be developed and submitted to REO at a later date. Examples of factors that could be considered in developing these criteria include topography, aspect slope, distance from a high-risk area, location on the landscape as part of a landscape wide fuel break, potential to protect valuable late-successional habitat, ability to meet assessment area objectives, etc.

Dead and Dying Stands (SG-4): This treatment would remove dead and dying trees from those stands that are partially stocked and declining and have less than 40% canopy closure. The original LSRA stated, "this treatment could be applied throughout the LSR, although the initial focus should be in the proposed treatment zone." However, the condition of the LSR has changed greatly since the original review. The 1997 LSRA described the spruce budworm condition of the Gotchen LSR on page 4-42 as, "The severity of the current outbreak is light, defoliation and some top kill. Being on the western edge of the outbreak area, a slightly higher moisture regime may temper the ultimate impact of this outbreak on the Gotchen LSR. However, there are many stands that are very susceptible...To the extent standing dead and down fuels increase, the hazard potential for catastrophic fire also increases." The 1999 amendment states that the budworm outbreak in and around the LSR has increased in extent and severity, markedly increasing defoliation and fuels buildup with a corresponding increase in the probability of a large-scale stand-replacing fire. Because the extent and amount of this stand type has significantly changed since the original review, REO would like to review this treatment or see more specific criteria before exempting this activity from future review. While reducing fuel loads may be warranted in portions of the LSR to help reduce the risk of large-scale disturbances, small areas of disturbance are valuable components of late-successional systems and retention of some of these pockets is valuable to late-successional species.

Declining Stands (SG-5): This treatment would occur in partially stocked and declining stands with greater than 40% canopy closure where it is determined that these stands will cease to function as late-successional habitat within the next 5 years. The purpose of this treatment is to reduce the potential fuel buildup and subsequent risk of a large-scale, stand-replacement event. The amendment proposes to consider treating these stands throughout the LSR. While the reduction of existing and potential fuel buildup may be warranted in places throughout the LSR, these stands also provide interim value to late-successional species that would be lost if treated.

Fuel Model 10 treatments: This treatment would treat suppressed, dying fuels throughout the LSR via removal, chipping, handpiling, or machine piling. This treatment would be primarily applied along roadsides. Treatments in stands meeting the condition of fuel model 10 that are not along key

roads as identified on the supplemental map provided to REO and part of an integrated roadside fuels reduction treatment remain subject to REO review.

Conclusions

This amendment to the 1997 Gifford Pinchot Forestwide LSRA is specific to risk-reduction treatments in the Gotchen LSR. Based on the review of the documentation and discussions with Forest staff, the REO finds that the LSRA, as amended, provides a sufficient framework and context for decision makers to proceed with project development and analysis. In addition, activities described in this amended LSRA are exempt from future REO review with the following exceptions: treatments in fuel model 10 stands that are not part of fuel treatments along key roads as identified on the supplemental map provided to the REO, treatment of SG-4 stands, and treatment of SG-5 stands. Additionally, treatments in mature lodgepole pine stands, SG-9, not described above, remain subject to REO review as per the 1997 LSRA.

cc:

REO RIEC, LSR Work Group

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