

Chapter 2 - Alternatives, including the Proposed Action

This chapter describes and compares the alternatives considered for the Hehe LSR Thin Project. It includes a description and map of each alternative considered. This section also presents the alternatives in comparative form, defining the differences between each alternative and providing a clear basis for choice among options by the decision maker. Some of the information used to compare the alternatives is based upon the design of the alternative (i.e., acres of skyline logging versus helicopter logging, miles of temporary roads construction) and some of the information is based upon the environmental, social and economic effects of implementing each alternative (i.e., percentage of treatment units in projected detrimental soils classes, big game habitat variables, number of log truck loads, logging cost per mbf, and present net values).

Alternative 1 – No Action

Alternative 1 is the No Action alternative where the proposed project does not take place. No further activities would take place to manage the stands by thinning. The No Action alternative provides a benchmark, or a point of reference for describing the environmental effects between the action alternatives.

Action Alternatives

The action alternatives were developed based on the purpose and need for the action and the significant issues. The purpose and need for the project was established by the Responsible Official (i.e. District Ranger). The significant issues were identified by the interdisciplinary team (IDT) after preliminary analysis and review of public comments from scoping. Significant issues are approved by the Responsible Official. The significant issues as used to formulate the alternatives which meet the purpose and need, prescribe mitigation measures, and focus the analysis of environmental effects. The significant issues for the project are: road management, interior habitat, effects on spotted owls, and fuel loadings

Alternative 2

Alternative 2 is designed to provide a high level of public access to the area by keeping most of the roads open. This alternative would implement only some of the road closures proposed in the Middle Fork District Supplemental Road Analysis. Any road closures would be low cost and low intensity designs to allow for re-opening of the roads in the short-term. This alternative would thin the least amount of acres of second growth plantations. Thinning acres were chosen based upon open road access and stand densities. The alternative includes the most protection (least disturbance) around spotted owl sites. Post-thinning fine fuel treatments were designed to meet Forest Plan guidelines on about 50 percent of the treatment areas.

This alternative would commercially thin about 3,186 acres of 35-60 year old stands. The stands would be thinned to a variety of densities ranging from about 50-100 trees per acre.

Approximately 650 acres would receive a light thinning, about 1,573 acres moderate thinning, and 963 acre a heavy thinning. Various prescription elements of variable density thinning would be employed such as leaving un-thinned patches, maintaining no thin buffers and protection for riparian areas and special habitats, creating small openings by clearing around and releasing dominant trees and from landing areas, and varying the tree spacing among the units. The thinning has the silviculture objective of accelerating development of late-successional forest conditions in the LSR.

Log removal would be accomplished by two types of yarding systems. This alternative would yard about 1,996 acres with skyline and 1,189 acres with helicopters.

The proposed yarding systems would require the new construction of about 3.9 miles of temporary roads to access the thinning areas, and the maintenance and reconstruction of about 102.1 miles of haul route roads. This alternative would replace numerous culverts on perennial and non-perennial streams and ditch relief drainages throughout the project area. One large fish bearing stream culvert at Pernot Creek on Road #1831 would also be replaced. This alternative would close about 4.4 miles of road after thinning operations. The road closures would rehabilitate and store the roads in a hydrologically stable condition by berming the roads closed and installing waterbars. This alternative would leave about 27 miles of roads which have been blocked by fallen trees or road failures in the current closed conditions. These roads include the end of Road #1831, #1831-382, and the #1834-390.

The alternative would mitigate the post-thinning fuels by yarding tops and machine piling at landings on about 1,996 acres. The alternative would also machine pile and burn about 190 acres within 40 feet of open roads and landings in or adjacent to thinning areas.

Alternative 2 would thin about 1,138 acres of Riparian Reserves. The no thin (no-cut) portion of the Riparian Reserves would be established at approximately 200 feet on Hehe and Alder Creeks to provide additional protection to these listed fish streams. Table 1 displays and compares the Riparian Reserve prescriptions between the action alternatives.

This alternative would protect established spotted owl sites with less than 40 percent of their 1.2 mile radius home range in suitable habitat by not thinning within 0.7 miles of the sites. All three thinning intensities, light, moderate, or heavy would be allowed beyond the 0.7 miles. If the owl sites are established and have greater than 40 percent suitable habitat conditions within 1.2 mile home range, light to moderate thinning is allowed within 0.25 to 0.7 miles of owl sites. If the owl sites are resident single owls and suitable habitat conditions are less than 40 percent within 1.2 mile radius home range, light to moderate thinning is still allowed within 0.25 to 0.7 miles.

The alternative includes the creation of snags and down woody debris in the thinned stands, invasive plant surveys and control measures along roads and landing areas, decommissioning of

roads, instream habitat enhancements on the portions of Hehe, Alder, Tiller, and Fall Creeks, disassemble the Hehe Creek log collection rack, and firewood administration.

A listing and summary of the unit prescriptions for Alternative 2 can be found in Appendix C.

Table 1 - Riparian Reserve Prescriptions

Stream Type	Riparian Prescriptions		
	Alternative 2	Alternative 3	Alternative 4
Listed fish segments on Hehe and Alder Creeks	200 ft. wide no-cut buffers, 200-340 ft. thinned to meet riparian objectives	170 ft. wide no-cut buffers, 170-340 ft. thinned to meet riparian objectives	170 ft. wide no-cut buffers, 170-340 ft. thinned to meet riparian objectives
Fish-bearing Class I	100 ft. wide no cut buffers, 100-340 ft. thinned to meet riparian objectives	100 ft. wide no-cut buffers, 100-340 ft. thinned to meet riparian objectives	100 ft. wide no-cut buffers, 100-340 ft. thinned to meet riparian objectives
Fish-bearing Class II	100 ft. wide no-cut buffers, 100-340 ft. thinned to meet riparian objectives	100 ft. wide no-cut buffers, 100-340 ft. thinned to meet riparian objectives	60 ft. wide no-cut buffers, 60-90 ft. thinned to 50% canopy closure, 90-340 ft. thinned to meet riparian objectives
Non fish-bearing (Class III) permanently flowing streams, ponds and small wet areas less than 1 acres	100 ft. no-cut buffers, 100-170 ft. thinned to meet riparian objectives	100 ft. no-cut buffers, 100-170 ft. thinned to meet riparian objectives	60 ft. no-cut buffers, 60-90 ft. thinned to 50% canopy closure 90-170 ft. thinned to meet riparian objectives
Non- fish-bearing (Class IV) intermittent flowing streams, small wet areas	60 ft. no-cut buffers, 60-170 ft. thinned to meet riparian objectives	60 ft. no-cut buffers, 60-170 ft. thinned to meet riparian objectives	25 ft. no-cut buffers on areas with stream side slopes < 30 %, 25-90 ft. thinned to 50% canopy closure, 90-170 thinned to meet riparian objectives, 60 ft. no-cut on >30% slopes, 60-90 ft. thinned to 50% canopy closure, 90-170 ft. thinned to meet riparian objectives

The no-cut buffers would include all of inner gorge and the entire primary shade zone. Adjacent trees would be felled away from the no-cut buffer. Underburns would be discouraged from entering the no-cut zones on the smaller Class III and IV streams, but some low intensity backing fires would be permitted.

The outer portion of the Riparian Reserves would be thinned to meet riparian and terrestrial objectives. These objectives include maintaining and restoring species composition and structural diversity, and providing for habitat to support well-distributed populations of native plants, invertebrates and vertebrate riparian-dependent species.

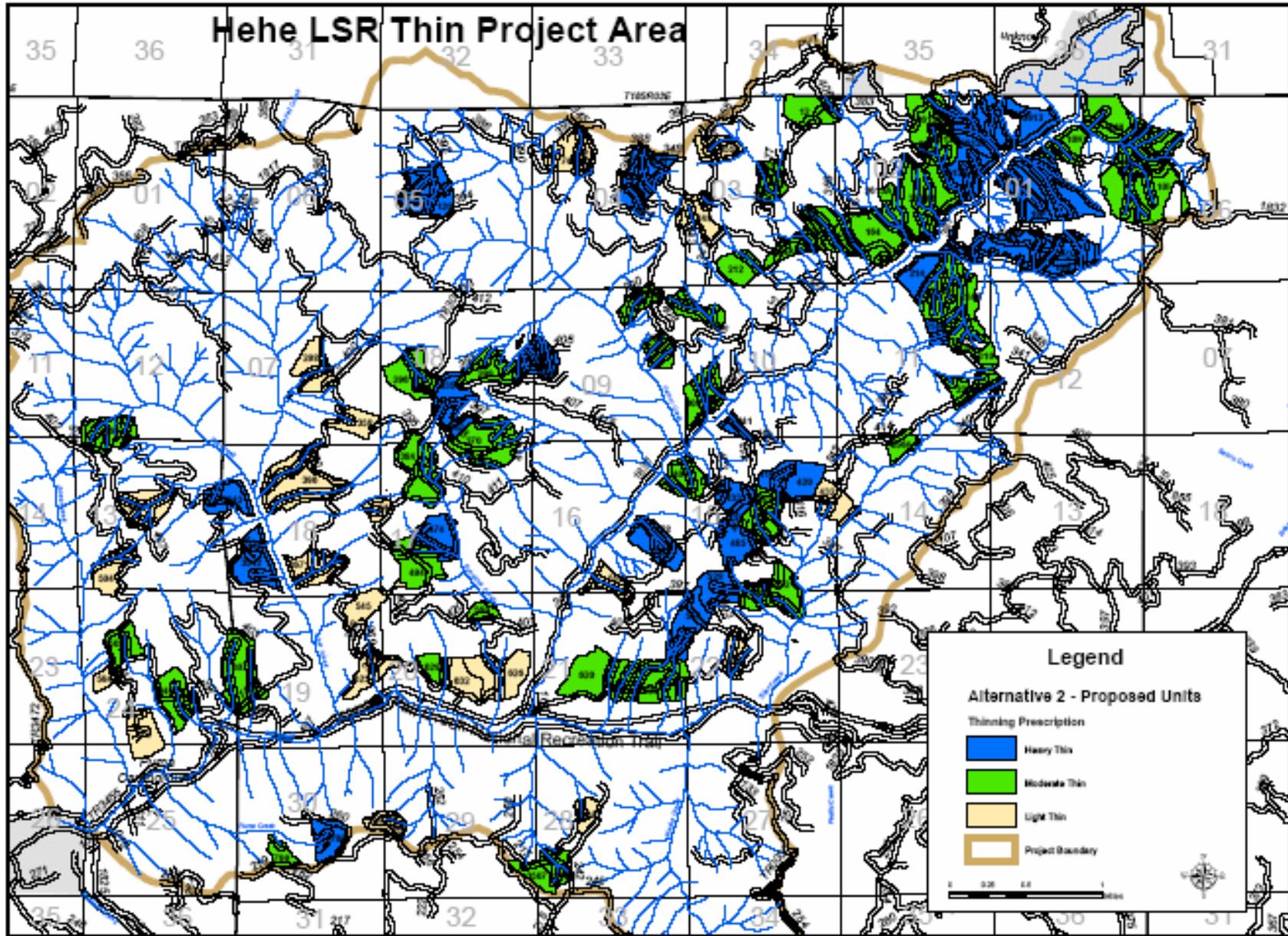


Figure 2 - Map of Alternative 2

Alternative 3 – Proposed Action

Alternative 3 is designed to maintain access for fire protection, recreation, and administrative use while implementing the proposed road closures in the Middle Fork District Supplemental Road Analysis. Road closures would employ a mixture of closure designs appropriate for given road conditions. This alternative would thin a moderate amount of acres of second growth plantations. Thinning acres were chosen based on stand densities without regard of open road access. The alternative includes a protection strategy designed in consultation with USFWS for the spotted owl sites. Post-thinning fine fuel treatments were designed to meet Forest Plan guidelines on about 74% percent of the treatment areas.

This alternative would commercially thin about 3,762 acres of 35-60 year old stands. The stands would be thinned to a variety of densities ranging from about 50-100 trees per acre. Approximately 842 acres would receive a light thinning, about 1,846 acres moderate thinning, and 1,074 acre a heavy thinning. Various prescription elements of variable density thinning would be employed such as leaving un-thinned patches, maintaining no thin buffers and protection for riparian areas and special habitats, creating small openings clearing round and releasing dominant trees and from landings areas, and varying the tree spacing among the units. The thinning has the silviculture objective of accelerating development of late-successional forest conditions in the LSR.

This alternative would yard about 2,576 acres with skyline and 1,186 acres with helicopters.

The proposed yarding systems would require the new construction of about 3.8 miles of temporary roads to access the thinning areas, and the maintenance and reconstruction of about 115.3 miles of haul route roads. This alternative would replace numerous culverts on perennial and non-perennial streams and ditch relief drainages throughout the project area. One large fish bearing stream culvert at Pernot Creek on Road #1831 would also be replaced. This alternative would close about 38 miles of road to passenger vehicles after thinning operations. These roads would be rehabilitated and stored in a hydrologically stable condition using low level closure (see pages 54-55 for description) techniques on 20.3 miles of road and moderate levels closure techniques on 17.7 miles. About 6.2 miles of roads would be decommissioned including the last 3.4 miles of Road #1831.

The alternative would mitigate the post-thinning fuels by yarding tops and machine piling at landings on about 3,660 acres. The alternative would also machine pile and burn about 130 acres within 40 feet of open roads and landings in or adjacent to thinning areas. This alternative also includes 281 acres of prescribed underburning.

Alternative 3 would thin 1,387 acres of Riparian Reserves with the no thin (no-cut) portion of the Riparian Reserves being established at approximately 170 feet away for the listed fish streams of Hehe and Alder Creeks (See Table 1)

This alternative would protect established spotted owl sites with less than 40 percent of their 1.2 mile radius home range in suitable habitat by not thinning within 0.5 miles of the sites, light to moderate thinning from 0.5 to 0.7 miles. All three thinning intensities, light, moderate, or heavy would be allowed beyond the 0.7 miles. If the owl sites are established and have greater than 40 percent suitable habitat conditions within 1.2 mile home range, light to moderate thinning is allowed within 0.25 to 0.5 miles of owl sites and the three thinning intensities would be allowed beyond 0.5 miles. If the owl sites are resident single owls and suitable habitat conditions are less than 40 percent within 1.2 mile radius home range, light to moderate thinning is still allowed within 0.25 to 0.5 miles of owl sites and the three thinning intensities beyond 0.5 miles.

The alternative includes the creation of snags and down woody debris in the thinned stands, invasive plant surveys and control measures along roads and landing areas, decommissioning of roads, instream habitat enhancements on the portions of Hehe, Alder, Tiller, and Fall Creeks, disassemble the Hehe Creek log collection rack, and firewood administration.

A listing and summary of the unit prescriptions for Alternative 3 can be found in Appendix C –

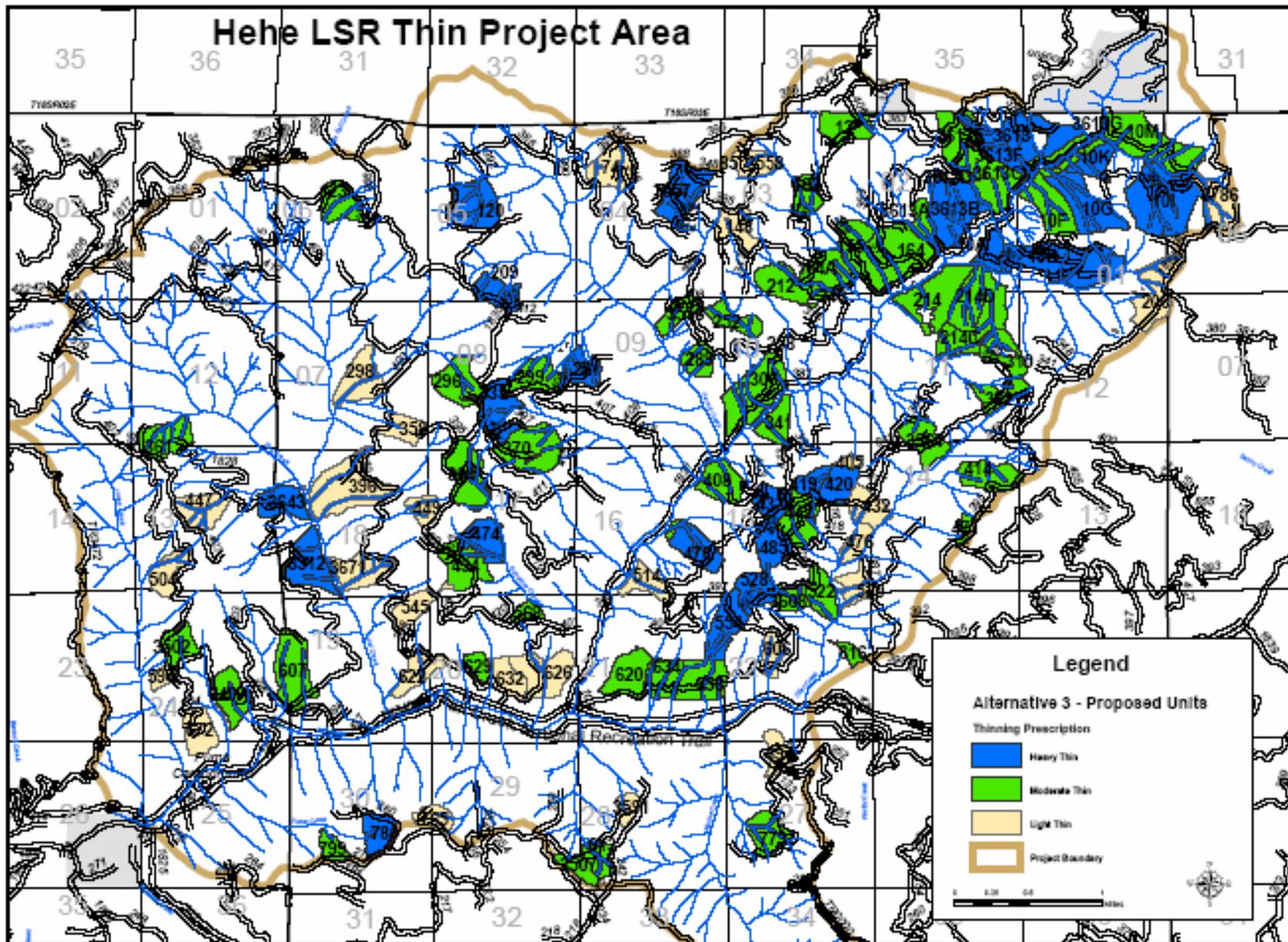


Figure 3 - Map of Alternative 3 (Proposed Action)

Alternative 4

Alternative 4 is designed to implement the proposed road closures from the Middle Fork District Supplemental Road Analysis. Road closures would be designed for the long-term. This alternative would thin the highest number of acres of second growth plantations. Thinning acres were chosen based on stand ages and seral conditions. The alternative includes the minimum amount of protection for the spotted owl sites among the action alternatives. Post-thinning fine fuel treatments were designed to meet Forest Plan guidelines on 98 percent of the treatment areas.

This alternative would commercially thin about 4,179 acres of 35-60 year old stands. The stands would be thinned to a variety of densities ranging from about 50-100 trees per acres.

Approximately 990 acres would receive a light thinning, about 1,676 acres moderate thinning, and 1,513 acre a heavy thinning. Various prescription elements of variable density thinning would be employed such as leaving un-thinned patches, maintaining no-thin buffers to protect riparian areas and special habitats, creating small openings by clearing around and releasing dominant trees and from landings areas, and varying the tree spacing among the units. The thinning has the silvicultural objective of accelerating development of late-successional forest conditions in the LSR.

This alternative would yard about 2,926 acres with skyline and 1,253 acres with helicopters.

The proposed yarding systems would require the new construction of about 4.8 miles of temporary roads to access the thinning areas, and the maintenance and reconstruction of about 127.5 miles of haul route roads. This alternative would replace numerous culverts on perennial and non-perennial streams and ditch relief drainages throughout the project area. One large fish bearing stream culvert at Pernot Creek on Road #1831 would also be replaced. This alternative would close about 38.1 miles of road to passenger vehicles after thinning operations. These roads would be rehabilitated and stored in a hydrologically stable condition using low level closure techniques on 7.2 miles of road and moderate-level closure techniques on 29.2 miles (includes 1.7 miles of decommission road). A total of 12.6 miles of road would be decommissioned. This alternative includes the reconstruction of the end of Road #1831 to access helicopter landing sites and subsequent decommissioning of the road after thinning operations.

The alternative would mitigate the post-thinning fuels by yarding tops and machine piling at landings on about 4,101 acres. The alternative would also machine pile and burn about 141 acres within 40 feet of open roads and landings in or adjacent to thinning areas. This alternative also includes about 362 acres of prescribed underburning and about 1,196 acres of supplemental hand piling and burning.

Alternative 4 would thin about 1,597 acres of Riparian Reserves. The no thin (no-cut) portion of the Riparian Reserves has been decreased to approximately 60 feet away for the Class II fish bearing and perennial streams, thinned to 50 % canopy closure 60-90 feet away from streams, and

then thinned to meet riparian objectives in the rest of the Riparian Reserves. On non-fish bearing intermittent stream, the no thin (no-cut) buffers were decreased to 25 feet on areas with stream side slopes less than 30 percent (See Table 1).

This alternative would protect established spotted owl sites with less than 40 percent of their 1.2 mile radius home range in suitable habitat by not thinning within 0.5 miles of the sites. All three thinning intensities, light, moderate, or heavy would be allowed beyond the 0.5 miles. If the owl sites are established and have greater than 40 percent suitable habitat conditions within 1.2 mile home range, light to moderate thinning is allowed within 0.25 to 0.5 miles of owl sites and any of the three thinning intensities beyond 0.5 miles. If the owl sites are resident single owls and suitable habitat conditions are less than 40 percent within 1.2 mile radius home range, light to moderate thinning is still allowed within 0.25 to 0.5 miles of owl sites and any of three thinning intensities beyond 0.5 miles.

The alternative includes the creation of snags and down woody debris in the thinned stands, invasive plant surveys and control measures along roads and landing areas, decommissioning of roads, instream habitat enhancements on the portions of Hehe, Alder, Tiller, and Fall Creeks, disassemble the Hehe Creek log collection rack, and firewood administration.

A listing and summary of the unit prescriptions for Alternative 4 can be found in Appendix C.

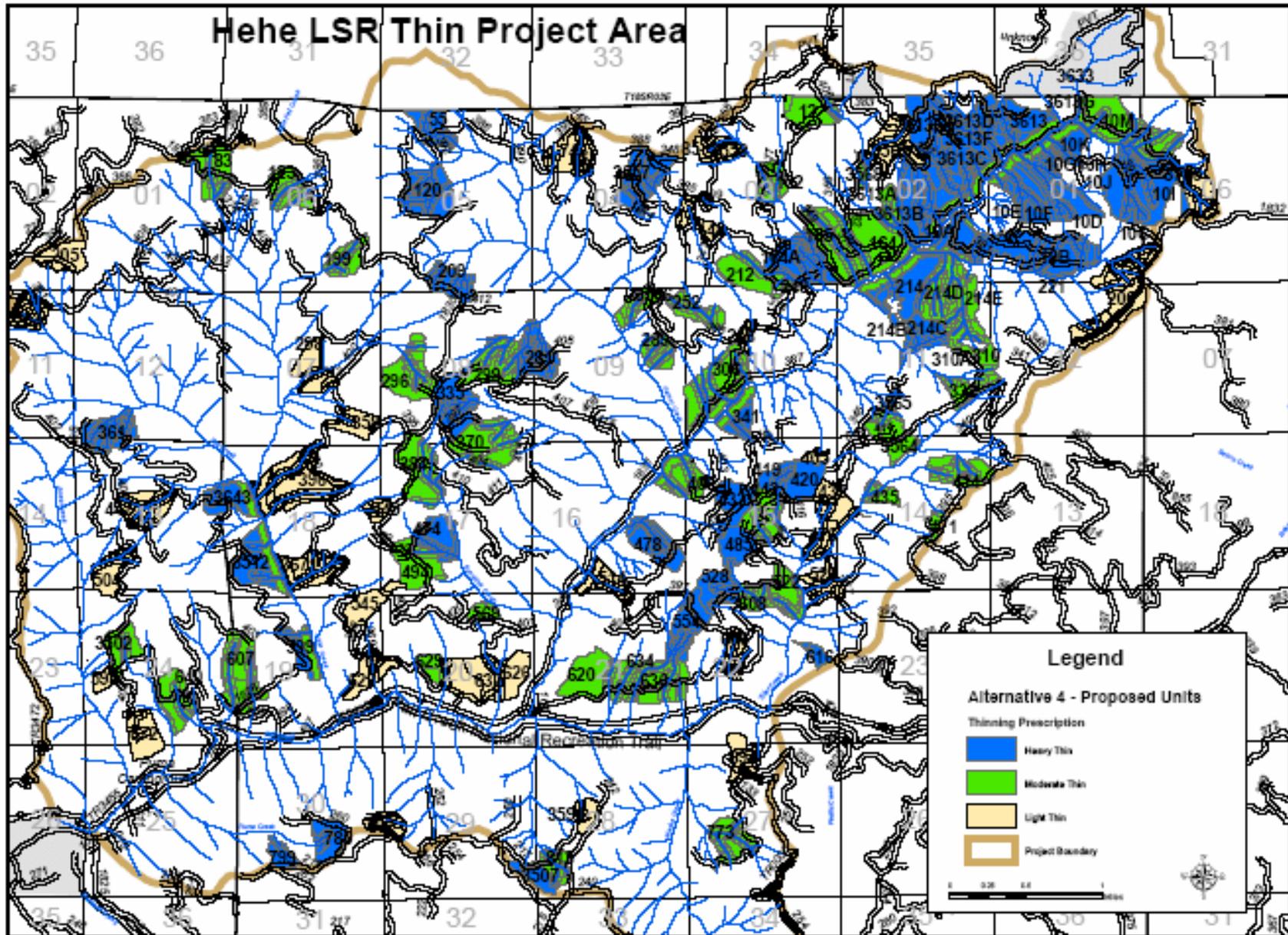


Figure 4 - Map of Alternative 4

Alternative Considered But Eliminated from Detailed Analysis

Thinning without Timber Removal – An alternative was considered that would not remove the timber from the thinning. Leaving such a large quantity of cut trees on the ground would pose an unacceptable risk of wildfire and Douglas–fir bark beetle infestation and thus would be ineffective at protecting late-successional and old-growth ecosystems, and fostering development of late-successional characteristics in young stands. Applying such a prescription across the landscape without timber removal would result in young stands in the very high risk fuel models for more than 40 years.

Mitigation Common to All Action Alternatives

In response to Forest Plan S&Gs, laws and regulations, and public comments on the proposal, mitigation measures were developed to ease some of the potential adverse impacts the various alternatives may cause. The mitigation measures applied to all of the action alternatives.

Timber harvest felling and yarding

Trees in riparian buffers that need to be cut to facilitate harvest operations should be dropped into the stream if possible and left to aid in wood recruitment.

Protect unstable areas identified by field visits in the early planning stages (units/partial units were dropped where necessary early in the planning process) as well as those identified during project implementation with adequate no-cut buffers.

Where cable yarding is planned, logging systems will be designed to generally yard away from stream channels to minimize soil disturbance in adjacent stream buffers.

No yarding corridors are anticipated to cross perennial stream channels in this project, but if any areas are identified during project implementation, full suspension will be achieved and yarding corridors will not exceed 15 feet wide.

Log suspension requirements and fuel reduction operations are prescribed to minimize soil disturbance within FW-081 and FW-084 (from Forest Plan) limits. In the case where mineral soil is exposed in specific locations beyond the level of maximum allowable disturbance, the site would be waterbarred, seeded, and fertilized immediately following harvest.

If the total oil or oil products storage at a worksite exceeds 1,320 gallons, or if a single container (i.e., fuel truck or trailer) exceeds a capacity of 660 gallons, the purchaser shall prepare and implement a Spill Prevention Control and Countermeasures (SPCC) Plan. The SPCC Plan will meet applicable EPA requirements (40 CFR 112), including certification by a registered professional engineer.

Helicopter yarding with Type I (i.e., heavy) helicopters is not allowed to operate within 0.25 miles of any activity centers of spotted owls during the entire breeding season (March 1 to September 30). If Type I helicopters are used it may trigger a Likely to Adversely Affect (LAA) determination, due to the terms associated with the Biological Opinion. If this were to occur it would require re-consulting with the US Fish and Wildlife Service

Type II-IV helicopters (as well as KMAX helicopters) are not allowed to operate within 120 yards of any activity center during the critical breeding season (March 1 to July 15). No restriction on Type II-IV (and KMAX) during the latter part of the breeding season (July 16 – September 30)

The project area has been surveyed to protocol, therefore seasonal restrictions do not apply to activities such as chainsaws use during falling, skyline yarding, and operation of other heavy equipment that are beyond 0.25 mile of known activity centers. Activities within the defined disruption distances of known spotted owls (see Table 2) are restricted during the critical breeding period (March 1 to July 15). The disruption distance for log truck hauling is 0 yards for all times of the year.

Table 2 - Disturbance and disruption distances for the northern spotted owl during the breeding period

Activity	Disturbance Distances	Disruption Distances	
		Critical Breeding Period (March 1 to July 15)	Latter Breeding Period (July 16 to Sept 30)
Aircraft –fixed wing	440 yards (0.25 mile)	120 yards	0 yards
Blasting	1,760 yards (1 mile)	1,760 yards (1 mile)	440 yards (0.25 mile)
Burning	440 yards (0.25 mile)	440 yards (0.25 mile)	0 yards
Chainsaw use	440 yards (0.25 mile)	65 yards	0 yards
Heavy Equipment	440 yards (0.25 mile)	35 yards	0 yards
Helicopter - Type I*	880 yards (0.5 miles)	440 yards (0.25 mile)	440 yards (0.25 mile)
Helicopter – Type II,III, or IV*	440 yards (0.25 mile)	120 yards	0 yards
Pile Driving	440 yards (0.25 mile)	60 yards	0 yards
Rock Crushing	440 yards (0.25 mile)	180 yards	0 yards
Hauling	440 yards (0.25 mile)	0 yards	0 yards

*Type 1 helicopters seat at least 16 people and have a minimum capacity of 5,000 lbs. Both a CH-47 (Chinook) and UH-60 (Blackhawk) are Type I helicopters

Type II helicopters seat at least 10 people and have a minimum capacity of 2,500 lbs. Both Bell UH1 and Bell 212 are Type II helicopters

KMAX helicopters are considered Type 1 helicopters for ICS definition, but are considered Type II for the purposes of disturbance

Type III helicopter seat at least 5 people and have a minimum capacity of 1,200 lbs. Both a Bell 206 and Hughes 500 are Type III helicopter

Type IV helicopter seat at least 3 people and have a minimum capacity of 600lbs.

Road Work

Best Management Practices (BMPs), including placement of sediment barriers, provision of flow bypass, and other applicable measures, will be included in project design as necessary to control off-site movement of sediment.

For any perennial stream crossing culvert replacement, a specific dewatering plan shall be included with the contract design provisions

Any in-stream activity such as culvert replacement or in-stream wood placement occurring within fish bearing and other perennial streams will comply with Oregon Department of Fish and Wildlife (ODFW) seasonal restrictions on in-stream work activities. For the main stem of Fall Creek, in-stream work must occur between July 1 and August 31, and for Fall Creek tributaries, in-stream work must occur from July 1 to October 15 unless otherwise approved by ODFW.

All road reopening, reconstruction and temporary road building will occur during the dry season between June 1 and October 31 to avoid potential surface erosion of exposed soil.

All temporary roads shall be winterized if not being used for extended periods of wet weather.

To prevent sedimentation to the greatest extent possible, apply rock surfacing on all native surfaced roads to be used in the wet season between November 1 and May 31.

Any road maintenance along haul routes, including placement of additional surface rock, blading, brushing, ditch relief culvert cleaning or addition of ditch relief culverts shall occur prior to project implementation.

At the completion of harvest activities, reopened roads and new temporary roads shall be water barred, seeded with approved forest mix design and closed to vehicle travel to reduce potential for surface erosion and sedimentation.

Wet weather haul will be monitored by the Timber Sale Administrator and the Hydrologist.

When necessary, haul may be suspended during heavy rainfall to prevent breakdown of road surface structure, pumping of fine sediment and potential mobilization of sediment to streams.

Haul will be prohibited on native-surfaced roads during the wet season between November 1 and May 31.

Winter haul will be allowed on roads 1800, 1824, 1825, 1825-217 (mp 0.00-3.17), 1825-218 (mp 0.00-0.64), 1825-219, 1825-240, 1825-242m 1828 (mp 0.00-0.47), 1828-402, 1828-407, 1830 (mp 0.00-4.34), 1832 (mp 0.00-5.38), 1832-396 and 1832-397 between November 1 and May 31. Haul will not cause damage to roads or National Forest resources.

Erosion control booms or straw mulch would be installed near road and stream crossings when sediment is generated from winter haul road.

Erosion prevention and control measure would implement during timber sale operation. Areas disturbed by harvest operations and road maintenance or reconstruction would be re-vegetated where needed and completed in a timely manner.

All temporary spur roads used on the project would be closed by berming, scarifying, waterbarring, seeding, and fertilizing.

Water-bars would be installed where needed to minimize water runoff on tractor skid trails, landings; the modified low level closed roads, and closed temporary roads.

Dry season operating restrictions would be applied to all native surface temporary spur roads. If the purchaser requests to operate outside the dry season period, then the purchaser would rock/gravel the spur upon approval of the FS official.

Fuels Treatment

Fuel treatments are prescribed to mitigate the fine fuel loadings created from the commercial thinning. Fuel treatments include yarding tops and branches and grapple piling and burning at landings, grapple piling within 40 feet of most roads left open, hand piling and burning, and underburning. The underburning would occur during spring-like conditions to minimize impacts to the soils, existing coarse woody debris, and mortality to green leaf trees.

Planned, deliberate ignition of under burning should be kept outside of the designated no-cut buffers.

Restoration Activities (In-stream wood placement, road closure, decommission, bridge abutment repair)

Any in-stream activity such as culvert replacement or in-stream wood placement occurring within fish bearing and other perennial streams will comply with Oregon Department of Fish and Wildlife (ODFW) seasonal restrictions on in-stream work activities. For the main stem of Fall Creek, in-stream work must occur between July 1 and August 31, and for Fall Creek tributaries, in-stream work must occur from July 1 to October 15 unless otherwise approved by ODFW.

Stream crossings removed as part of road decommissioning or closure shall lay back side slopes to 1½:1, and extent of fill removal should be done to match natural topography of hill slopes and floodplains above and below the fill removal.

Apply native grass seed to all bare mineral soil left after road decommission or road closure. On laid back side slopes of fill removals, apply coverage of native slash or weed free straw to prevent surface erosion from direct raindrop impact during the first storms after fill removal.

On segments of decommissioned roads in between fill removals, either build waterbars to divert surface drainage or de-compact the road surface to a depth of 30” to ensure infiltration of surface runoff.

Bridge Abutment Repair

Keep continuous stream flow around work site, i.e. no dewatering of the channel. All work must be isolated from any flowing water. Concrete will not be poured if any of the uncured concrete or contaminated wash water could enter the stream.

If proposed bridge work along Fall Creek, Hehe or Alder Creeks are carried forward 2-3 days prior to initiating work have bridges surveyed for bat maternity colonies, if colonies found await species determination (by Regional bat expert-P.Ormsbee) prior to proceeding with bridge work. If bats species are found at bridge sites, but no maternity colonies are present, no conflicts are expected (P.Ormsbee Pers. Comm, 2007).

Coarse Woody Debris

No yarding of existing coarse woody debris shall occur in these stands. Protecting the existing coarse woody debris ensures adequate nutrient cycling for maintenance of long-term site potential and provides valuable habitat structure for a diversity of species. The majority of the coarse woody debris is remnant debris from the previous harvest entry.

For most of the unit's stand conditions, there is an opportunity to begin creating large woody debris where it is deficit and meet minimum standards for diameters of pieces and linear feet established in the Northwest Forest Plan (Reference Appendix F for individual unit prescriptions).

When it is feasible to do so, consider "high stumping" trees or snags ≥ 24 " diameter during the falling of coarse woody debris. Creating stumps 3- 6 feet in height would mitigate the loss of some existing roosting habitat more quickly than the delayed snag creation for bats and some existing perch, foraging, and potentially nesting habitat for land birds/neo-tropical migrants.

Road closure

Up to about 38 miles of classified roads would be closed by blocking the entrance to the road to reduce the density of open road miles. These roads are blocked primarily to reduce disturbance to big game habitat, to rehabilitate them for long-term storage which minimizes sediment contribution to streams, and to reduce the cost of maintenance. The road block devices would be maintained over time to ensure the effectiveness of the closure. All temporary roads would be closed after harvest activities.

Deer and Elk

Openings associated with proposed activities such as landings, burn piles, and road closure would be seeded with approved forage seed mix and fertilized.

Invasive Weeds

Require cleaning of all timber harvest equipment, culvert replacement machinery, and road maintenance equipment prior to entering the work area, especially those that would be working off-road.

Use weed-free aggregate material for road restoration/reconstruction and helicopter landing construction.

Re-vegetate the project area with native species following disturbance. This could include California brome, California fescue and blue wild rye in openings such as landings and the forested understory; desired herbaceous species such as big deer vetch (*Lotus crassifolius*) in openings; blue wild rye in culvert replacements, and in closed road beds.

Clean up quarries, notably the Porcupine Rock Pit and helicopter landings prior to use. This could mean scalping the top six inches of soil and depositing it in an area where weed infestations can be monitored and treated or it could mean removal of weeds via manual or chemical methods.

Try to conduct work during the dry season when mud and seed would be less likely to be transported on vehicle undercarriages.

Monitor road systems and disturbed areas for new localized populations for three years following treatment.

Determine appropriate site(s) for vehicle cleaning site. Monitor any sites for invasive weed infestations for three years following treatment to ensure weeds are eradicated and do not spread from this site. This would also be a good site for removal of helicopter landing material if soil removal is the preferred option.

Although care should be taken to treat existing slender false brome sites prior to thinning, there remains a seed bank in the soil of unknown longevity. Roads infested with false brome should be re-surveyed prior to project implementation to document new false brome sites. Pre-treat all sites prior to project implementation and document in Project File.

Air Quality

Air quality would be maintained by adhering to the Oregon Smoke Management Plan and additional monitoring of low level winds to insure that burning occurs when the risk of smoke intrusions into designated areas and Class I airsheds is low. Various fuel treatments methods such as yarding tops, grapple piling along roads, and hand piling and burning, and underburning during spring-like conditions would be used. The slash piles would be covered and dry when burned which reduces the amount of smoke produced. Only units and fuel concentrations which exceed FW-212 and FW-252 guidelines would be piled and burned.

Cultural Resources

Proposed harvest units were surveyed for cultural resources and no sites were discovered in the project area. If any cultural sites are found during any proposed activity, the activity would be discontinued, and contract provisions would be invoked until the site is evaluated for significance and appropriate mitigation measures are performed.

Recreation

Safety concerns would be mitigated by advisory signing (Truck Traffic Ahead), and temporary road closures when falling or yarding activities adjacent to roads could create unsafe conditions, as would occur per standard timber sale contract clauses.

Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. Information in the table is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives. The table should be used in conjunction with the discussion of issues in Chapter 3 – Environmental Consequences in order to fully understand the implications and differences of the alternatives

Table 3 - Comparison of Alternative

	Alternative 1 (No Action)	Alternative 2	Alternative 3 (Proposed Action)	Alternative 4
Commercial Thinning Acres				
Heavy Thin	0	963 ac.	1,074 ac.	1,513 ac.
Moderate Thin	0	1,573 ac.	1,846 ac.	1,676 ac.
Light Thin	0	650 ac.	842 ac.	9,90 ac.
Totals	0	3,186 ac.	3,762 ac.	4,179 ac.
Road Management	Significant Issue			
Temp. Road Construction	0	3.9 mi	3.8 mi	4.8 mi
Road Maintenance & Reconstruction				
Low	0.0 mi	74.6 mi	94.7 mi	103.9 mi
Moderate	0.0 mi	27.2 mi	20.3 mi	22.5 mi
High	0.0 mi	0.3 mi	0.3 mi	1.1 mi
Totals	0 mi	102.1 mi	115.3 mi	127.5 mi
Wet Weather Haul	0 mi	42.3 mi	45.6 mi	45.6 mi
Culverts Replaced	0	78	100	100
New Road Closures				
Low	0 mi	4.0 mi	20.3 mi	7.2 mi
Moderate	0 mi	0.4 mi	17.7 mi	29.2 mi
High (Decommission)	0 mi	0 mi	0	1.7 mi
Totals	0 mi	4.4 mi	38.0 mi	38.1 mi
Existing Closed to be Decommissioned	0 mi	0.5 mi	6.2 mi	12.6 mi
Road Density miles/sq mile	2.5	2.4	1.2	1.0
Road Work Costs	0	\$2,687,370	\$3,323,795	\$3,764,060
Interior Habitat	Significant Issue			
Linear feet of thinning edge adjacent to Interior habitat	0	36,115	42,014	61,509

	Alternative 1 (No Action)	Alternative 2	Alternative 3 (Proposed Action)	Alternative 4
Spotted Owls	Significant Issue			
Acres of thinning within home range of activity centers	0	2,960 ac	3,514 ac	3,854 ac
Fuel Management	Significant Issue			
Treatment Types				
Yard tops and Limbs	0 ac	1,996 ac	3,660 ac	4,171 ac
Underburn	0 ac	0 ac	281 ac	362 ac
Hand Piling	0 ac	0 ac	0 ac	1,196 ac
Roadside Piling	0 ac	190 ac	130 ac	141 ac
Treatment Costs	0	\$999,820	\$2,400,8470	\$4,168,670
Post Thin fine fuel loadings tons/acre	7			
Heavy Thin	0	12-16	12-16	12-16
Moderate Thin	0	9-12	9-12	9-12
Light Thin	0	7-9	7-9	7-9
Priority Acres	0	370 ac	553 ac	1,832 ac
Vegetation				
Stand age to develop 5 DF TPA >32"DBH				
Heavy Thin	> 150 years	122 years.	122 years.	122 years.
Moderate Thin	> 150 years	131 years	131 years	131 years
Light Thin	> 150 years	143 years.	143 years.	143 years.
Stand age to develop 16 Shade Tolerant TPA >16"DBH				
Heavy Thin	> 150 years	122 years	122 years	122 years
Moderate Thin	53 years	107 years	107 years	107 years
Light Thin	> 150 years	143 years	143 years	143 years
Acres of additional LS forest in 150 years	0	3,186 ac.	3,762 ac.	4,179 ac.
Water Quality				
See Road Management criteria above				
Acres of Riparian Thinning	0 ac	1,138 ac	1,387 ac	1,597 ac

	Alternative 1 (No Action)	Alternative 2	Alternative 3 (Proposed Action)	Alternative 4
Aggregate Recovery Percentages				
Upper Hehe	95.8	90.3	89.4	88.3
Sunshine-Pernot	91.9	88.6	87.9	87.6
Alder	93.7	92.8	92.5	91.7
East Hehe	93.3	92.1	90.8	90.6
Tiller	89.3	87.1	85.9	85.7
Jones	88.9	87.7	87.7	87.7
Puma	95.9	94.9	94.9	94.9
Pacific Marine	91.4	91.3	90.8	90.8
Hehe Sixth Field Subwatershed	91.4	91.3	90.9	90.4
Fisheries				
Change in survival of salmon eggs	Decrease and continual from road failure	Smallest decrease of action alternatives	More decrease than Alt 2 but less than Alt 4	Greatest decrease of all action alternatives
Linear feet of fish-bearing streams affected	0	2,820 feet	3,820 feet	3,820 feet
Soil Erosion and Detrimental Soil Conditions				
Acres of new detrimental soils	0 ac	45.0 ac (1%)	51.7 ac (1%)	59.2 ac (1%)
Big Game Habitat				
Habitat Effectives Index				
Alder BGEA	0.43	0.44	0.46	0.46
Platt BGEA	0.42	0.43	0.45	0.45
Sunshine-Pernot BGEA	0.41	0.46	0.48	0.48
Logan BGEA	0.45	0.47	0.48	0.48
Threatened, Endangered, and Sensitive Species				
Wildlife Species				
Northern Spotted Owl				
Habitat Mod.	NI	MA, NLAA	MA, NLAA	MA, NLAA
Disturbance	NI	MA, NLAA	MA, NLAA	MA, NLAA
Northern Bald Eagle	NI	NI	NI	NI
Harlequin Duck	NI	NI	NI	NI

	Alternative 1 (No Action)	Alternative 2	Alternative 3 (Proposed Action)	Alternative 4
American Peregrine Falcon	NI	NI	NI	NI
Baird's Shrew	NI	MIH	MIH	MIH
Pacific Shrew	NI	MIH	MIH	MIH
Fisher	NI	NI	NI	NI
Pacific Fringe-tailed Bat	NI	MIH	MIH	MIH
Oregon Slender Salamander	NI	MIH	MIH	MIH
Cascade Torrent Salamander	NI	MIH	MIH	MIH
Crater Lake Tightcoil	NI	NI	NI	NI
Fish Species				
Spring Chinook Salmon	NI	MA, LAA	MA, LAA	MA, LAA
Survey and Manage Species				
Plant Species				
<i>Botrychium manganense</i>	NI	NI	NI	NI
<i>Botrychium montanum</i>	NI	NI	NI	NI
<i>Bridgeoporus nobillissimus</i>	NI	NI	NI	NI
<i>Carex livida</i>	NI	NI	NI	NI
<i>Cimicifuga elata</i>	NI	NI	NI	NI
<i>Corydalis aqua-gelidae</i>	NI	NI	NI	NI
<i>Dermatocarpon luridum</i>	NI	NI	NI	NI
<i>Eucephalis(Aster) vialis</i>	NI	NI	NI	NI
<i>Iliamna latibracteata</i>	NI	NI	NI	NI
<i>Hypogymnia duplicata</i>	NI	NI	NI	NI
<i>Leptogium burnetiae</i> var. <i>hirsutum</i>	NI	NI	NI	NI
<i>Leptogium cyanescens</i>	NI	NI	NI	NI
<i>Lycopodium complanatum</i>	NI	NI	NI	NI
<i>Montia howellii</i>	NI	NI	NI	NI
<i>Mycorrhizal Fungi</i>	NI	MIH	MIH	MIH
<i>Nephroma occultum</i>	NI	NI	NI	NI
<i>Pannaria rubiginosa</i>	NI	NI	NI	NI
<i>Peltigera neckeri</i>	NI	NI	NI	NI
<i>Peltigera pacifica</i>	NI	NI	NI	NI
<i>Pseudocyphellaria rainierensis</i>	NI	NI	NI	NI
<i>Ramalina polinaria</i>	NI	NI	NI	NI

	Alternative 1 (No Action)	Alternative 2	Alternative 3 (Proposed Action)	Alternative 4
Saprophytic on Litter fungi	NI	NI	NI	NI
<i>Romanzoffia thompsonii</i>	NI	NI	NI	NI
Saprophytic on wood	NI	MIIH	MIIH	MIIH
<i>Scouleria marginata</i>	NI	MIIH	MIIH	MIIH
<i>Tetraphis geniculata</i>	NI	NI	NI	NI
Wildlife Species				
Great Gray Owl	NI	NI	NI	NI
Red Tree Vole	NI	NI	NI	NI
Economics				
Present Net Value	(\$200,286)	\$9,516,807	\$10,891,190	\$11,376,434
Revenue Cost Ratio	0	1.46	1.44	1.41
Invasive Weeds				
Acres of Potential Soil Disturbance	0 ac	3,383 ac	4,181 ac	5,888 ac
Air Quality				
PM 25 & 10 Emissions	0	82	306	599
Post-Sale Area Improvement Projects				
Riparian Tree Falling	No	Yes	Yes	Yes
Instream Habitat Improvements	No	Yes	Yes	Yes
Disassemble Log Collection Rack	No	Yes	Yes	Yes
Firewood Admin	No	Yes	Yes	Yes
Logging Ac.				
Skyline	0 ac	1,996 ac	2,576 ac	2,926 ac
Helicopter	0 ac	1,189 ac	1,186 ac	1,253 ac
Timber Volume				
Wood products	0	48 mmbf	56 mmbf	63 mmbf

DF= Douglas Fir, TPA=Trees per acre, DBH= Diameter Breast Height, LS=Late-Successional, PM=Particular Matter, CWD=Coarse Woody Debris

NI=No Impact, MIIH=May Impact Individuals or Habitat, but will not likely contribute to a trend toward federal listing or loss of viability for the population or species, MA, NLAA=May Affect, Not Likely to Adversely Affect, MA, LAA=May Affect, Likely to Adversely Affect

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