

**USDA FOREST SERVICE  
IDAHO PANHANDLE NATIONAL FORESTS  
COEUR D'ALENE RIVER RANGER DISTRICT  
Kootenai and Shoshone Counties, Idaho**

**2502 East Sherman Avenue  
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(208) 664-2318**

**DECISION MEMO  
2001 Thinning Project**

**OVERVIEW**

The Forest Service has examined a proposal for precommercial tree thinning in overstocked stands on approximately 2,510 acres in 56 timber stands across the Coeur d'Alene River Ranger District. Crowded trees will eventually compete with each other for light, soil moisture, and soil nutrients, resulting in slow growth or even death. Because of their weakened condition, slow-growing trees also become vulnerable to insects and disease. To avoid overcrowding and competition, trees can be thinned to increase the growing space available to each tree. There are four primary objectives to the proposed thinning activities:

1. *Minimize excess, damaged and diseased trees.*
2. *Maintain or improve stand and tree vigor to reduce insect and disease vulnerability and increase tree species diversity.*
3. *Maintain stocking levels in even-aged stands.*
4. *Increase growth of remaining trees to provide a commercially valuable wood product earlier.*

**THE DECISION**

It is my decision to proceed with the proposed thinning activities identified in Table 1 and as described below. (Please refer to the project files for maps displaying stands where the activities will occur.) The duration of thinning activities will be short, occurring during the summer and fall of 2001. Late summer and fall are the best times to carry out thinning operations, because trees grow in the spring and early summer. Cut trees can attract insects that have the potential to kill the remaining trees, so it is better to work near the end of the growth season.

**Table 1. Activities to be implemented under this decision.**

<b>Activity</b>	<b>Estimated Amount</b>
Acres of precommercial thinning	1,660
Acres of pruning and thinning	850
Miles where barriers are removed	1
Miles of roads brushed open	1

Thinning will occur using manual (hand) methods on a total of approximately 2,510 acres in overstocked naturally or artificially regenerated stands. The age class of trees to be thinned is approximately 12 to 25 years. The maximum diameter of thinned trees will be 5 to 7 inches, with minimum cut heights of 24 inches. A field review will be conducted to evaluate fuelbreak options in

the larger stands. Directional felling will be used to reduce fuel depths. Trees that cannot be directionally felled will be bucked in lengths not to exceed 6 feet. Slash will be pulled back a minimum of four feet away from all system roads, cut banks, fill slopes and from defined stream channels and seeps.

All slash resulting from project activities will be removed from riparian zones. Class I fisheries streams will be protected by a 50-foot buffer. A fisheries biologist and a botanist will conduct field reviews to evaluate the need for (7 by 7-foot) thinning within the buffer. A 50-foot no-activity buffer will be maintained along Class II streams, in compliance with the State's Best Management Practices (BMPs). A 50-foot no-activity buffer will be maintained along all wetted defined channels, springs and seeps within thinning units to protect Sensitive plant habitat.

Snags and dead trees will not be cut. Cull trees that exceed the 5-7 inch diameter limit will be girdled in lieu of felling to provide additional cavity-nesting habitat. In addition, a minimum of three of the largest trees per acre will be reserved in accordance with Forest Plan snag retention standards.

Stands to be thinned are scattered over a wide area, including portions of 56 stands. There are large undisturbed areas adjacent to most of the stands to be thinned, which will continue to provide security for wildlife. There are no active timber sales or other resource management activities ongoing or reasonably foreseeable adjacent to the thinning areas.

Some of the roads providing access to the activity areas are currently closed due to brush or road closures. Roads opened to provide access to thinning areas will be closed following completion of the thinning. Any earthen barriers removed to allow access for project activities will be replaced upon completion of the project. To obtain access on roads that have naturally closed through revegetation, field reviews will be conducted by the Timber Stand Improvement (TSI) culturist to evaluate options and make recommendations regarding opening the road. No new road construction will occur in association with this project.

Adequate cover will still be provided within activity areas. Game trails along ridges and into or through riparian zones will be kept open. In designated elk security areas, activities will be conducted behind closed gates between June 15 and September 30, depending on the site-specific conditions. These areas are closed to vehicle access during big-game hunting season, so working behind closed gates will help to minimize vehicle disturbance. Designated elk wallows will be protected by maintaining one sight distance of vegetation around them. Displacement resulting from thinning activities will last no more than two years.

None of the thinning activities will occur in lynx analysis units (LAU's). Several proposed thinning sites were dropped from consideration because they were within LAU's (Stands 148-106, 146-107, 148-130, 136-306, 136-501, and 161-103). Eleven thinning units (a total of 578 acres) are within areas classified as lynx travel corridors; all are classified as lynx forage areas. Travel corridors were designated to connect the various lynx analysis units, but do not meet the criteria for lynx habitat (personal communication with Brian Holt, Idaho Fish and Game). No large openings will be created in these travel corridors. The features of the thinning activities meet the conservation criteria addressed in the "Canada Lynx Conservation Agreement and Strategy. This project will have no effect upon the Canadian lynx or its survival. (For additional information, please refer to the Biological Assessment in the Project Files.)

Standards and Guidelines of the Inland Native Fish Strategy were followed in the development of this proposal, and will be followed during project implementation. Standard Best Management Practices will be included in the project work contract and enforced during administration of the contract.

Direct, indirect and cumulative effects to area resources have been considered as documented in this Decision Memo and in the project files. Based on the activities to be implemented and anticipated effects, I have determined that no mitigation measures are necessary.

## CATEGORICAL EXCLUSION

Specific categories of actions are excluded from documentation in an environmental impact statement or environmental assessment (Forest Service Handbook 1909.15. These projects are termed Categorical Exclusions. This proposal meets the criteria to be categorically excluded under FSH 1909.15; 31.1b, part 6 (timber stand and/or wildlife habitat improvement activities which do not include the use of herbicide or do not require more than one mile of low standard road construction). It has been determined that no extraordinary circumstances exist, and that no conditions exist which might cause the action to have significant effects on the human environment:

- a. *There are no steep slopes or highly erosive soils where the activities will occur. Please refer to the soils information in the Project File.*
- b. *This project will have no effect on Threatened or Endangered species or their habitat. It will have no impact, or may impact individuals or habitat, but not contribute to a trend toward federal listing or cause a loss of viability to populations of Sensitive species. Biological Assessments and Evaluations have been completed and are part of the Project File.*
- c. *The project activities will not occur in municipal watersheds, wetlands or floodplains.*
- d. *The area where the project activities will occur is not part of any designated or proposed wilderness, wilderness study area, or National Recreation Area.*
- e. *The area where the project activities will occur is not part of any inventoried roadless area.*
- f. *The area where the project activities will occur is not part of any Research Natural Area.*
- g. *The area has been previously surveyed; there are no Native American religious or cultural sites, archaeological sites, or historic properties or areas in the vicinity of where project activities will occur.*

## FINDINGS REQUIRED BY OTHER LAWS

**Forest Plan Consistency:** The timber stands where thinning will occur have been identified by the Forest Plan as Management Areas 1, 4, 6, 9, and 10. Briefly:

- *The emphasis of Management Area 1 lands is on timber production.*
- *The emphasis of Management Area 4 lands is on management of big-game winter range to provide sufficient forage to support projected big-game habitat needs, through scheduled timber harvest and permanent forage areas.*
- *The emphasis of Management Area 6 lands is on providing both high quality elk summer habitat and wood products through road management and scheduling of harvest activities.*

- *The emphasis of Management Area 9 lands is on maintaining and protecting existing improvements and resource productive potential with minimum investments.*
- *The emphasis of Management Area 10 lands is on providing semi-primitive recreation.*

The project activities are consistent with standards, goals and objectives of these Management Area allocations as well as all other Forest Plan standards, as discussed in this decision memo. Project activities are consistent with Inland Native Fish Strategy standards and guidelines. For additional discussion of the Management Area allocations, please refer to the Forest Plan, Chapter III.

**Vegetation Manipulation:** All proposals that involve vegetation manipulation of tree cover for any purpose must comply with the seven requirements found in 36 CFR 219.27(b).

- 1. Be best suited to the goals stated in the Forest Plan.** Vegetation manipulation is the most effective method of regenerating to seral species and to provide forage for big game, in order to meet Forest Plan objective for these harvest areas. The precommercial thinning treatment is consistent with the goals and objectives for Management Areas 1, 4, 6 and 16.
- 2. Assure that technology and knowledge exists to adequately restock lands within five years after final harvest.** Technology and professional knowledge were applied and assure that adequate restocking will occur within five years after final harvest. Monitoring has determined that 82% of trees planted on the Coeur d'Alene River Ranger District survive.
- 3. Not be chosen primarily because they will give the greatest dollar return or the greatest output of timber (although these factors shall be considered).** Management practices are governed by ecosystem sustainability needs, not strictly economics. Economic feasibility and practicality was considered when determining the most efficient means of accomplishing vegetative restoration treatments. The Selected Alternative was not chosen primarily for the greatest dollar return or greatest output of timber.
- 4. Be chosen after considering potential effects on residual trees and adjacent stands.** Potential effects on residual trees and adjacent stands were a key consideration in determining the extent and appropriate method of treatment.
- 5. Be selected to avoid permanent impairment of site productivity and to ensure conservation of soil and water resources.** Implementation of the activities as described in this Decision Memo (please refer to the description of activities on pages 1 and 2) will ensure that soil, water, and watershed resources are protected.
- 6. Be selected to provide the desired effects on water quality and quantity, wildlife and fish habitat, regeneration of desired tree species, forage, production, recreation uses, aesthetic values, and other resource yields.** Compliance with Forest Plan standards and implementation of activities as described in this Decision Memo will provide for the desired effects (please refer to the description of activities on pages 1 and 2).
- 7. Be practical in terms of transportation and harvesting requirements and total costs of preparation, logging, and administration.** The transportation and logging systems are efficient for the topography, landtypes, and timber characteristics of the area. Total cost of sale preparation, harvest, and administration are well within average costs experienced in similar sales.

**Transportation Facilities:** Existing roads will be used. No new road construction will take place.

**Monitoring :** Activities will comply with specific monitoring requirements identified by the Forest Plan (Forest Plan, Chapter IV).

## PUBLIC INVOLVEMENT

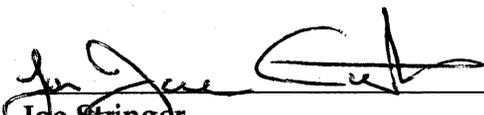
The public was first notified of this proposal through the Forest's Quarterly Schedule of Proposed Actions, dated January 2001, and in all subsequent Quarterly Reports. A legal ad was published in area newspapers to initiate the 30-day public scoping period, which began on February 28, 2001, and ended on March 30, 2001. The Ecology Center indicated interest in the proposal. No **scoping** comments were received. One letter was postmarked and received after the close of the scoping period (on April 2, 2001), from Lauren Buckley, on behalf of the Ecology Center and Alliance for the Wild Rockies. Their letter, substantive comments, and our response to their comments are provided in Attachment A.

## DOCUMENTS AND PROJECT FILES

This Decision **Memo** summarizes the analyses that led to this decision. More reports **and** analyses documentation have been referenced or developed during the course of this project and are part of the Project Files. All project files are available for review upon request. Please contact the NEPA Coordinator at the Fernan Office of the Coeur d'Alene River Ranger District (208-664-2318) to review the files.

## APPEAL RIGHTS AND IMPLEMENTATION

This decision is not subject to appeal pursuant to 36 CFR 215(4). Implementation of the project activities will begin in approximately 15 working days. For more information, or if there are any concerns related to this project, please contact Project Team Leaders Henry Nipp at the Silverton Office of the Coeur d'Alene River Ranger District, (208) 556-5154, or Joyce Stock at the Fernan Office, (208) 664-2318. I have been delegated the authority and am the Responsible Official for this decision.

  
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**Joe Stringer**  
District Ranger  
Coeur d'Alene River Ranger District  
Idaho Panhandle National Forests  
(208) 664-2318

6/19/01  
\_\_\_\_\_  
Date

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**ATTACHMENT A  
PUBLIC COMMENTS**

One letter was postmarked and received after the close of the scoping period (on April 2, 2001), from the Lauren Buckley on behalf of the Ecology Center and Alliance for the Wild Rockies. Response to their substantive comments is provided below, followed by a copy of their letter.

- 1. We do not feel a categorical exclusion is appropriate under NEPA. We request a thorough review of the correspondence of the intent to categorically exclude the project with the recent litigation addressing categorical exclusions, Heartwood, Inc. v. U.S. Forest Service, Civ. No. 99-4255 (S.D. Ill. Sept. 15, 2000).**

On February 6, 2001, District Court Judge Foreman (S.D. Ill.) vacated the September 15, 2000 Heartwood, Inc. v. U.S. Forest Service ruling. The effect of the February 6 order is to reinstate the *status quo* prior to October 24, 2000. Thus, if a project or activity is categorically excluded from documentation in an environmental assessment or environmental impact statement, it is not subject to notice and comment pursuant to 36 CFR 215.4(b) nor subject to appeal pursuant to 36 CFR 215.8(a)(4).

This proposal meets the criteria to be categorically excluded under FSH 1909.15; 31.1b, part 6 (timber stand and/or wildlife habitat improvement activities which do not include the use of herbicide or do not require more than one mile of low standard road construction). It has been determined that no extraordinary circumstances exist, and that no conditions exist which might cause the action to have significant effects on the human environment.

- 2. The environmental analysis should consider the use of prescribed fire rather than more invasive mechanical treatments.**

Precommercial thinning would be more appropriate than prescribed burning in these stands at this time, based on stand conditions and project objectives.

- 3. The environmental analysis should consider the natural fluctuation of insect populations over time in response to a spectrum of forest conditions and the essential role that insects play in forest nutrient cycling and renewal.**

The stands in which thinning will occur are overstocked stands. The objectives of the thinning focus on improving stand and tree vigor, and are not intended to reduce insect populations or salvage timber damaged by insects.

- 4. The district should be aware that thinning does not serve to decrease the potential incidence and intensity of wildfire, and [may] actually increase the incidence and intensity. The environmental analysis must address the potential of the project to augment fire risk.**

There are several features identified in this Decision Memo to address potential fuels. Directional felling will be used to reduce fuel depths. Trees that cannot be directionally felled will be bucked in lengths not to exceed 6 feet. Slash will be pulled back a minimum of four feet from all system roads, cut banks, fill slopes, and from defined stream channels and seeps. In addition, a field review will be conducted to evaluate fuelbreak options in the larger stands.

- 5. We request a thorough description of the size, species and distribution of trees that will be cut. The spacing of trees may substantially detriment the ecosystem integrity of the units through alteration of wildlife habitat, soil conditions, and microclimate. We are concerned that the proposal to increase the amount of sunlight will cause soil drying and allow for the propagation of introduced species**

As stated in the scoping letter (dated February 26, 2001) and in this Decision Memo, the trees to be thinned are 5 to 7 inches and 12 to 25 years in age. Species on site include western hemlock, grand fir, Douglas-fir, white pine, western larch, ponderosa pine, alpine fir, mountain hemlock and cedar. Distribution will be based on 10-foot by 10-foot spacing at 303 trees per acre, and 12-foot by 12 foot at 430 trees per acre. The spacing won't open the canopy to the extent that soils would dry out or allow for propagation of introduced species.

- 6. We request an explanation of whether any of the trees will be removed from the analysis area, and if so, how they will be yarded.**

As stated in the scoping letter and Decision Memo, this is a precommercial thinning project; no commercial harvest will occur. All material will be left on site.

- 7. The environmental analysis must disclose whether any vehicles will be used to access the stands off road.**

Existing roads will access all units. The thinning will be done by hand. No vehicles or ATV's will be allowed in the units or off the main road.

- 8. We request explanation of the rationale for the prescribed silvicultural treatments, including any methodology used to estimate historic range of variability.**

The only method to be used for the precommercial thinning is manual (hand) thinning, based on site conditions, soil conditions, and desired spacing.

- 9. The presence of old growth stands in the project area should be discussed and mapped.**

There is no old growth in the stands where the precommercial thinning will occur.

- 10. Snag retention should be addressed.**

As stated in the scoping letter and this Decision Memo, snags and dead trees will not be cut. Cull trees that exceed the 5 to 7-inch diameter limit will be girdled in lieu of felling to provide additional cavity-nesting habitat. In a addition, a minimum of three of the largest trees per acre will be reserved in accordance with Forest Plan snag-retention standards.

- 11. The potential for soil and vegetation disturbance associated with the project to augment infestations of noxious weeds should be thoroughly considered.**

Treatment of noxious weeds will be consistent with the direction provided by the Noxious Weed Environmental Impact Statement and Record of Decision for the Coeur d'Alene River Ranger District (USDA Forest Service, 2000).

**12. Project impacts to structural complexity and downed woody debris must be considered.**

This is not an issue, as material left on site will be gone within three to four years.

**13. The machines and methods used to implement thinning should be thoroughly described. The potential for the project to compact or destabilize soils or decrease soil productivity must be analyzed.**

Effects to soils have been considered. Access to units will be from existing roads, with no new road construction and no reconstruction. Only manual (hand) thinning will occur. There will be no impacts to soil compaction. Productivity will increase as a result of additional material being left on the ground.

**14. We request that studies address the related issues of population viability and distribution throughout its geographic range in regards to all species of concern, in order to comply with USDA Regulation 9500-4 and 36 CFR 219.19. We are requesting the Forest Service analyze the status of wildlife corridors for all MIS and TES species, and effects of each of the alternatives on the linkages. The impacts of the potential project on populations of Threatened, Endangered, Proposed and Sensitive species and their habitat should be thoroughly considered.**

A Biological Assessment of effects to Threatened, Endangered and proposed species has been completed, as well as a Biological Evaluation of effects to Sensitive species. Based on habitat requirements, existing habitat, and anticipated scoping and timing of the thinning activities, this project will have no effect to Threatened, Endangered or proposed wildlife species or their habitat. The project may impact individuals or habitat, but not contribute to a trend toward federal listing or cause a loss of viability to populations of Sensitive species. Copies of the Biological Assessment and Evaluation are attached to the Decision Memo.

**15. The watershed impacts of the proposed projects and the impacts to aquatic species should be thoroughly evaluated. Potential for the project to augment sedimentation and water yield should be thoroughly considered. The erosion currently being caused by roads in the analysis area should be considered and roads should be considered for obliteration. We are concerned with the intent to thin in riparian areas.**

Effects to water and fisheries resources have been considered. Implementation of the activities as described in this Decision Memo (please refer to the description of activities on pages 1 and 2) will ensure that soil, water, and watershed resources are protected. Effects to fisheries are disclosed in the Biological Assessment and Evaluation (Project Files).

**16. Cumulative effects should be extensively addressed.**

The analysis considered direct, indirect and cumulative effects of project activities. The analysis is commensurate with the scope of the proposal.

**17. We request a thorough economic analysis of the project.**

Economic feasibility and practicality was considered when developing the criteria for implementing the thinning activities. There is no commercial value associated with the trees that will be removed.

04 APR 2001

**The Ecology Center, Inc.**

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April 2, 2001

Jose Castro, Acting District Ranger  
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Fernan Office  
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Re: Precommercial Thinning Project

Dear Mr. Castro;

I appreciate the opportunity to comment on the Precommercial Thinning Project scoping document on behalf of the Ecology Center and the Alliance for the Wild Rockies. Given the large size of the proposed project (2400 acres) and its potential to impact wildlife populations and habitat, water quality, and soil productivity, we do not feel that a categorical exclusion is appropriate under NEPA. We request a thorough review of the correspondence of the intent to categorically exclude the project with the recent litigation addressing categorical exclusions, Heartwood, Inc. v. U.S. Forest Service, Civ. No. 99-4255 (S.D. III. Sept. 15, 2000). As we understand the interim rule, the FS may not categorically exclude the following class of projects:

Projects in which the cutting of trees for thinning or wildlife purposes occurs over an area greater than 5 contiguous acres.

As 2400 acres is in excess of 5 acres, we do not believe that a categorical exclusion is appropriate.

The environmental analysis should consider the use of prescribed fire rather than more invasive mechanical treatments. However, the impacts of prescribed fire should be carefully evaluated. While fire is a natural and essential process in ecosystems, human induced fire can often differ drastically from natural fire.

An objective of the proposed project is presented as being to minimize "excess, damaged and diseased trees". The environmental analysis should consider the natural fluctuation of insect populations over time in response to a spectrum of forest conditions and the essential role that insects play in forest nutrient cycling and renewal. Emphasizing individual tree health subverts the goal of ecosystem management integrity and long-term sustainability of forests and their myriad biotic components. In the Northern Rocky Mountains, tree decay, native insects, and fire are integral components of a healthy forest. Decaying and dead trees are essential components of a healthy forest. (McClelland and McClelland 1999). Further:

Pathogens help decompose and release elements sequestered within trees, facilitate succession, and maintain genetic, species and age diversity. Intensive control measures, such as thinning, salvage, selective logging, and buffer clearcuts around affected trees remove crucial structural features. Such activities also remove commercially valuable, disease-resistant trees, thereby contributing to reduced genetic vigor of populations (Castello et al. 1995).

The district should also be aware that thinning does not serve to decrease the potential incidence and intensity of wildfire, and many actually increase the incidence and intensity. The environmental analysis must address the potential of the project to augment fire risk. Huff, et. al (1995) stated:

(I)ntensive forest management annually produces high fuel loadings associated with logging residues. As a by-product of clearcutting, thinning, and other tree-removal activities, activity fuels create both short- and long-term fire hazards to ecosystems. The potential rate of spread and intensity of fires associated with recently cut logging residues is high (see for example, Anderson 1982, Maxwell and Ward 1976), especially the first year or two as the material decays. High fire-behavior hazards associated with the residues can extend, however, for many years depending on the tree species (Olson and Fahnestock 1955). Even though these hazards diminish, their influence on fire behavior can linger for up to 30 years in the dry forest ecosystems of eastern Washington and Oregon. Disposal of logging residue using prescribed fires, the most common approach, also has an associated high risk of an escaped wildfire (Deeming 1990). The link between slash fires and escaped wildfires has a history of large conflagrations for Washington and Oregon (Agee 1989, Deeming 1990).

Other scientists have doubts about the efficacy of intensive fuels reductions as fire-proofing methods. DellaSala, et al. (1995) state:

Scientific evidence does not support the hypothesis that intensive salvage, thinning, and other logging activities reduce the risk of catastrophic fires if applied at landscape scales.

We request a thorough description of the size, species, and distribution of trees that will be cut. We request an explanation of whether any of the trees will be removed from the analysis area. If any trees will be removed, we request an explanation of how they will be yarded. The environmental analysis must disclose whether any vehicles will be used to access the stands off road. The spacing of trees may substantially detriment the ecosystem integrity of the units through alteration of wildlife habitat, soil conditions, and microclimate. We are concerned that the proposal to increase the amount of sunlight will cause soil drying and allow for the propagation of introduced species.

We request explanation of the rationale for the prescribed silvicultural treatments, including any methodology used to estimate historic range of variability. Although historic stand conditions may have involved more open forests than currently exist, natural processes and the trees that result from such processes differ greatly from mechanical manipulation.

The presence of old growth stands in the project area should be discussed and mapped. Snag retention should be addressed. The potential for soil and vegetation disturbance associated with the project to augment infestations of noxious weeds should be thoroughly considered. Project impacts to structural complexity and downed woody debris must be considered.

The machines and methods used to implement thinning should be thoroughly described. The potential for the project to compact or destabilize soils or decrease soil productivity must be analyzed.

We request that studies address the related issues of "population viability" and "distribution throughout its geographic range" in regards to all species of concern, in order to comply with USDA Regulation 9500-4 and 36 CFR 219.19. To adequately analyze population viability, you must explicitly consider population dynamics. Population dynamics refers to persistence of a population over time—which is key to making predictions about population viability. The District should fully analyze population growth rate, population size, linkages to other populations, and the dynamics of other populations in examining population dynamics.

The impacts of the potential project on populations of threatened, endangered, proposed, and sensitive species and their habitat should be thoroughly considered. NEPA requires the Forest Service to consider

biological corridors. The standard for such a review is the same "hard look" NEPA requires of other environmental effects. We are requesting the Forest Service analyze the current status of wildlife corridors for all MIS and TES species, and effects of each of the alternatives on the linkages. That means that corridors within the analysis area, and linkages with areas adjacent to the analysis area need be examined, plus the value of the entire analysis area as part of a larger corridor within or between ecosystems. Fragmentation and the presence of large tracts of core area should be addressed.

The watershed impacts of the proposed projects and the impacts to aquatic species should be thoroughly evaluated. Potential for the project to augment sedimentation and water yield should be thoroughly considered. The erosion currently being caused by roads in the analysis area should be considered and roads should be considered for obliteration. We are concerned with the intent to thin in riparian areas.

Cumulative effects should be extensively addressed. We request a thorough economic analysis of the project.

Thank you for considering our comments.

Sincerely,

  
Lauren Buckley  
Ecosystem Defense  
The Ecology Center

Ryan Shaffer  
Alliance for the Wild Rockies  
Box 8731  
Missoula, MT 59807

**Literature Cited:**

Castello, J.D., D.J. Leopold, and P.J. Smallidge. 1995. Pathogens, patterns, and processes in forest ecosystems.

DellaSala DA, Olson DM, Barth SE, Crane SL, and Primm SA. 1995. Forest health: moving beyond rhetoric to restore healthy landscapes in the inland Northwest. Wildlife Society Bulletin 1995, 23(3): 346-356.

Fahnestock GR. 1968. Fire hazard from pre- commercially thinning ponderosa pine. U.S. Forest Service

Huff MH, Ottmar RD, Alvarado E, Vihnanek RE, Lehmkuhl JF, Hessburg PF, and Everett RL. 1995. Historical and Current Forest Landscapes in Eastern Oregon and Washington. Part II: Linking Vegetation Characteristics to Potential Fire Behavior and Related Smoke Production. General Technical Report (PNW-GTR-355).

McClelland B. Riley and McClelland Patricia T. 1999. Pileated woodpecker nest and roost trees in Montana: links with old growth and forest "health". Wildl. Soc Bull. 27(3):846-857