Appendix D Response to Comments on the South Deep Management Project Environmental Assessment

On March 29, 2006, the *South Deep Vegetation Management Project Environment Assessment* was available for review on the Colville National Forest web site. On that same date, hardcopies and digital CD copies of the Environmental Assessment were mailed to interested stakeholders and the Colville Statesman Examiner newspaper published a notice of opportunity to comment. This notice initiated the required 30 day comment period for the environmental assessment. The comment period ended Friday, April, 28, 2006.

Public review generated five comment letters. From these, 78 comments were extracted. Comments are grouped into twelve categories, which correspond with the sections of this appendix:

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The following guidance was used to identify comments:

Comments on an environmental assessment or on a proposed action shall be as specific as possible and may address either the adequacy of the assessment or the merits of the alternatives discussed or both (Council for Environmental Quality Regulations for Implementing the National Environmental Protection Act, Section 1503.3a).

D.1 Botany

1) Respondents are concerned about the possible negative effects on 16 populations of sensitive plants. Extensive monitoring and specific recommendations from the Forest Service botanist is encouraged. (Letter 1, Comment 20)

Response

The effects of the project are described in the Biological Evaluation and in Chapter 4 of the environmental assessment, Section 4.2.2, pages 193-196. Although negative impacts to these species and their habitat are possible, they may be minimized with the implementation of recommended mitigation measures. See mitigation measures for Threatened, Endangered, and Sensitive Species in Chapter 2 of the EA, Section 2.4.7, pages 46-47.

2) The project will bring a large number of off road vehicles to what had been inaccessible areas. The respondent is fearful of the damage they will bring to sensitive plant and fungal life. (Letter 2, Comment 12)

Response

Control of vehicles that illegally drive off designated roads is a law enforcement issue that the district handles on a daily basis. It is not anticipated that there will be a large increase in this activity due to the South Deep Management Project because this is heavily forested, mountainous country. Nearly all off road vehicle use will be confined to designated roads and trails and the Forest Service will close, block, or obliterate all newly created roads and skid trails.

D.2 Economics

1) Can the Forest Service afford to use helicopter logging in the more inaccessible areas? The Forest Service has a history of lost revenue on timber sales. In 1997, the Colville National Forest lost over $342,000 on commercial timber sales—a figure that increases to $1,348,000 when administrative overhead and state/county payments are figured in (Appellants v. Forest Supervisor, 2003). (Letter 1, Comment 8)

Response

The Interdisciplinary Team was also concerned with the expenses incurred with helicopter yarding when they designed alternatives. To keep these costs down, helicopter units were limited to areas not more than ½ mile from existing roads. In Alternative E, several proposed helicopter units within the wildland urban interface (WUI) were dropped due to the high costs of treatments. In Alternative G, a road to provide long term access and management of these units within the WUI is proposed.

If helicopter logging is considered alone, it is not cost effective. However, when all harvesting systems are considered the timber sale cost-revenue analysis reveals a present net value of $4,865, 530 for Alternative E and $8,958, 598 for Alternative G. See Table 4-34 in Chapter 4, page 259.

2) Is helicopter logging necessary to cover the purpose and need of this project? (Letter 1, Comments 9)

Response

The purposes of the South Deep Project are to reduce the risk of stand replacement and uncharacteristically large wildfires, improve landscape forest health, and provide wood fiber for local mills and the American public. The associated needs are to reduce hazardous fuels, remove diseased trees and reduce stand density, and produce sawlogs and other wood products to help sustain local sawmills and communities. Helicopter logging contributes to all these purposes and needs by helicopter logging in areas not accessible to roads. Economically, Alternative E would provide a volume of 29.8 million board feet, and Alternative G would provide a volume of 47.1 million board feet. If helicopter logging was dropped from the alternatives, there would be a potential reduction of 127 jobs under Alternative E and 147 jobs under Alternative G.

3) It is in the best interest of the Forest Service economically to abandon this project; road building and restoration is expensive and loss of water could be a disaster. The scope of this project as outlined is far too large for this watershed. The respondent believes this US Forest land offers our citizens greater value as a habitat a watershed and a recreational respite than it does as a tree farm for the local mills. (Letter 2, Comment 19)

Response

Thank you for your comment.

D.3 Fire

1) Is there a distinction between areas within the wildland urban interface (WUI) that would maintain an artificial fire regime to accommodate the needs of the community versus areas within the WUI where the natural fire regime would be encouraged to exist? (Letter 1, Comment 5)

Response

The Forest Service is not intentionally creating an artificial fire regime. Currently most areas within the WUI are not within their historic fire regime. WUI treatments are designed to reduce hazardous fuels that will accommodate the community's needs for fire protection. Another objective within the WUI is to mimic, or return the stands to the natural fire regimes with commercial harvest, pre-commercial thinning, and prescribed fire.

2) Areas with high fuels levels can often be treated with prescribed burning alone and do not need to be mechanically thinned first. Larger level spatial and temporal issues need to be considered (Hessburg and Lemkuhl 1999). (Letter 1, Comment 6)

Hessburg PF and Lehmkuhl JF. 1999. Results of a blind scientific peer review of the Wenatchee National Forest's Dry Forest Strategy and a case study of its implementation in the Sand Creek Ecosystem Restoration Project. USDA Forest Service, Pacific Northwest Research Station.

Response

This is true. Areas have been identified where prescribed burning (underburning) will be used by itself to reduce fuels. These are areas where crown bulk density is low, surface fuels are light to moderate, and ladder fuels are light to moderate.

Prescribed fire is effective at surface fuel reduction, and it can also increase canopy base height by scorching the lower crown of the stand. It is generally less effective at reducing canopy bulk density, as fires intense enough to kill larger trees often exceed the desired severity threshold (Agee and Skinner 2005).

Agee, J.K., Skinner, C. N., 2005. Basic principles of forest fuels reduction treatments. Article in press.

3) The project will bring a large number of off highway vehicles (OHVs) to what had been inaccessible areas. As far as fire danger, the greater number of humans in OHV's scares me most of all. I have had to stamp out campfires left behind too many times near my land. (Letter 2, Comment 11)

Response

It is possible that the potential for human caused ignitions will increase because of additional access. The additional access will also allow for faster response time by wildfire suppression crews into these areas for the control of lightning and human caused fires.

4) The respondent proposes that no action be taken. With the summers being even warmer and dryer than usual no hazardous fuel reduction should be conducted. The threat of severe wildfires may be increased by this action. (Letter 4, Comment 1)

Response

In the short term the risk of severe wildfire will be increased by additional surface fuels created by commercial harvesting and pre-commercial thinning. However, in the long term the risk of uncontrolled wildfire will be greatly reduced after post harvest treatments of grapple piling, handpiling, and jackpot burning are completed. The canopy bulk density will also be reduced making it difficult for damaging crown fire to initiate. There are many stands in the South Deep Management Project that are currently in the high category for risk of crown fire. With the proposed treatments these stands would fall into the low category for this risk

D.4 General

1) This area is an extremely valuable resource providing wildlife habitat, recreation, and scenery. The respondents encourage the Forest Service to consider new technologies, alternative methods of treatments and including more restoration elements into the project purpose and need. (Letter 1, Comment 25)

Response

Thank you for your comment.

2) The respondent wrote an extensive summary outlining concerns as both a public citizen and landowner during a previous comment period and urges the Forest Service to review comments of January 31, 2002 which addressed these issues in greater detail. (Letter 2, Comment 1)

Response

The Forest Service has reviewed the respondent's previous letters. Two previous letters were written on proposals that have been dramatically altered as a result of input from the public. The specific comments in the old letters refer to actions that have changed. The Forest Service believes the major issues identified in those letters have been discussed in the environmental assessment based on the new alternatives.

3) I support the No Action Alternative. In its current state, this watershed is making an important contribution to our region as an important wildlife habitat, a space for year round human recreation, a place to escape from the city with beautiful scenery and solitude and most importantly a critical watershed. (I depend on the water table for my farm as do others in the area.) You speak of all this human intervention somehow enhancing this ecosystem, but the vast human intervention that you are proposing could destroy the very ecosystem we have now. The South Fork of the Deep Creek is a whole system that in its current natural state is clearly not broken. This is evidenced by its capability to support extremely diverse populations of plants and wildlife. I believe this Forest Service land offers our citizens greater value as a habitat, a watershed, and a recreational respite than it does as a tree farm for the local mills. While I commend you for making a few concessions in the revised plan, such as no logging in old growth forest, the plan seems short sighted and does little to enhance the existing forests. (Letter 2, Comment 2)

Response

Thank you for your comment. This area has had extensive roadwork and timber harvest in the past, but it still retains the values that are mentioned in the above comment. The present project proposal has many features to protect water, wildlife, recreation, and visual quality that were not applied to timber management projects 20-30 years ago. Yet those past projects did not "destroy" the ecosystem. This project will have some adverse effects, but many of the effects will be highly beneficial, especially when viewed over the long term.

4) In 2002, one of your staff members came to my house and spoke of an option to close the Gillette Mountain trail and make this a type of "wilderness area". What about setting this aside as a non-motorized recreation area with no development? What happened to that option? Are there any other large tracks that could be saved in their natural state, before all these "treatments" are applied? I would like to have this further explored. (Letter 2, Comment 14)

Response

This comment is beyond the scope of this document. Wilderness designation requires an act of Congress. Inventoried roadless areas (IRAs) are identified in the *Forest Plan* and the South Deep watershed does not contain roadless areas sufficiently large to qualify as IRAs.

5) An environmental group that previously provided comments on the South Deep Project has not been provided a copy of the environmental assessment. With only two days remaining in the comment period, the 30-day comment period should be extended. (Telephone conversation, Comment 2)

Response

This environmental group was mailed a compact disc copy of the South Deep Project Environmental Assessment at the address that appears on their website. The U. S. Postal Service has not returned the disc and this group has not requested additional copies. The environmental assessment is also available on the Internet. Forest Service regulations at 36 CFR 215.6 (a)(1)(iv) do not allow extension of the 30-day comment period on environmental assessments.

6) Respondents have heard concerns over the lack of effort to contact landowners in the area that live out of state. They ask that extra efforts are made to contact these landowners to insure their involvement in this public process. (Letter 1, Comment 36)

Response

At the beginning of the South Deep Management Project, the Forest Service obtained landowners addresses from the Stevens County Assessor. Letters inviting participation in the process were mailed to these addresses. Individuals that responded by mail, fax, email, or in person were kept apprised of the progress of the project. The Forest Service held public meetings and field trips, sent letters, and placed legal ads in the local newspaper. All guidelines for involving members of the public were followed. Please see Chapter 1 of the EA, Section 1.7, pages 18-20 for details of Public Involvement.

7) Everyone does not agree with the Northeast Forestry Coalition's position on the South Deep Project. Sixty to seventy percent of the private landowners in the area have not voiced their concerns. Everyone does not agree that there are no roadless areas in the South Deep watershed. (Telephone conversation, Comment 3)

Response

The Forest Service understands that stakeholders concerns are diverse. The Interdisciplinary Team used all the comments since the project was initiated to develop the alternatives. The Northeast Forestry Coalition has not formally collaborated on the South Deep Management Project, although a couple members of the coalition offered nonbinding advice on issues that were of concern to their constituency. The Forest Service is aware that there are many groups that are not represented by the Coalition and may disagree with the Coalition's views.

See response to Comment 6 in this section regarding landowner involvement in the process.

8) The South Deep Management Project is an area with diverse and valuable ecosystems. The respondent is interested in protecting these values and not building new roads. There has been extensive timber management in the watershed and the respondent supports the No Action Alternative. (Telephone conversation, Comment 8)

Response

Thank you for your comment.

9) The respondent believes this area should be left alone all together since there has already been significant logging in the surrounding areas. I believe there should be No Action. (Letter 3, Comment 1)

Response

Thank you for your comment.

10) Human Interface Zones-It seems preposterous to me that it is necessary to take more land (for example, the trees, the forest floor with all its diverse vegetation). We (humans) don't need the protection but the forest floor certainly does! At what point does the forest stop being a forest…? I suppose it's when we (humans) have destroyed or "so called" manage it to death. (Letter 3, Comment 6)

Response

Thank you for your comment.

11) Does the Forest Service really need to do anything now? Much has happened in this valley and the human activity accelerates daily. Currently a viable habitat exists that serves us well. But, there is only so much change a system can take before it spins into rapid decline. The Forest Service plan does not take into account the effects of current and future human activity on state and private land. This cannot be taken lightly. The interrelationships are far too complex. (Letter 2, Comment 18)

Response

See the purpose and need for the project in Chapter 1 of the environmental assessment, Section 1.4, pages 14-17. In addition, see Chapter 4 for discussion of the potential cumulative effects of no action on all resources.

D.5 Hydrology

1) There is concern regarding the BLM, State and private lands within the analysis area. Many of these areas have experienced timber harvest in the past. Although these are governed by different regulations, it is unclear as to what type of monitoring has been done and how cumulative effects can be accounted for without this data collection and analysis. The environmental assessment states that the water yield cumulative effects analysis for the South Deep project will consider actions that have occurred within the analysis area during the last 30 years since hydrologic recovery on the Colville National Forest is assumed to be complete after that time period. We are not clear on what this assumption is, and would like further clarification on this decision. (Letter 1, Comment 33)

Response

"Hydrologic recovery is defined as the period of time it takes for the hydrologic condition of a third order watershed to return to a predisturbance condition. The primary processes that influence hydrologic recovery are: evapotranspiration, interception of precipitation, and redistribution of snow accumulation. It is expected that a <25% dispersion of created openings within a watershed will not cause significant adverse cumulative effects and will meet water quality goals for the forest (CNF LRMP FEIS p. IV-17). As the vegetation in these areas becomes reestablished, the watershed begins to recover hydrologically. Hydrologic recovery in the Equivalent Clearcut Area model is considered complete when a fully stocked stand of new trees reaches a height of 35 feet (assumed to occur 30 years after treatment) and have a canopy closure of 70%. The hydrologic recovery curve used by the Colville National Forest has been modified to reflect tree growth as modeled in the Forest Plan." (Hydrology Affected Environment Report, p.8)

U.S. Department of Agriculture, Forest Service, 1988. *Final Environmental Impact Statement for the Colville National Forest Land and Resource Management Plan.* Colville, Washington.

2) The South Deep Project Environmental Assessment also states that assumptions were made regarding future harvest levels for state and private lands within the watershed since forest practices applications with the state are only valid for two years from the time of application. (Letter 1, Comment 34)

Response

The assumption was that timber harvest on state and private lands within the analysis area will continue at or near the same level as those that have occurred in the previous 5 years. These past harvest levels were used to project future harvest levels in the Equivalent Clearcut Area model over the next 15 years (2006-2021) because they include the increased rate of logging that has occurred in the analysis area referred to in Comment 4 in this section.

3) The South Deep Environmental Assessment also states that an average annual non-federal harvest level was used in the Equivalent Clearcut Area calculation for each subwatershed based on the previous five years of forest practices applications. It is not known how closely the forest practice applications correspond to accrual harvest levels, nor is it known if these current harvest levels are sustainable in the future. With a project area fragmented by different regulations, history, and absence of information, we would suggest using prescriptions and actions that mitigate adverse affects to this watershed. (Letter 1, Comment 35)

Response

"Based on the Equivalent Clearcut Area model, South Deep riparian surveys, and field observations of watersheds displaying similar Equivalent Clearcut Area values, any increase in the average duration of near bankfull flows is not likely to result in detrimental channel conditions. Streambanks are well vegetated and stable in most areas of the watershed and channels are capable of handling increased flows. The channels in this watershed are probably capable of carrying higher flows than those currently occurring in the watershed due to the current dense stocking levels and increased evapotranspiration rates." (Hydrology Affected Environment Report, p.24) In other words we do not anticipate any adverse cumulative effects to surface flows from the proposed actions within these watersheds.

4) The Forest Service plan currently calls for heavy commercial logging on land adjacent to the respondent's wells. The economic hardship of losing a well because of logging activity would devastate the respondent's farm. During periods of heavy logging in the past several landowners in this valley had water shortages and even DRY wells. The Forest Service proposes logging on a steep hillside with great elevation gain, above a well site. What measures have been taken to control run off? (Letter 2, Comment 3)

Response

The disappearance of springs following the removal of trees by logging is frequently expressed as a concern. It is clear that the removal of forest vegetation on deep soils reduces evapotranspiration, and nearly every recent study has shown that base flows are thus increased. This would seem to indicate that the removal of forests should increase the quantity of groundwater available to springs rather than cause them to dry up. It is possible that land management activities may result in a reduction in infiltration rates through the process of soil compaction or where a new road diverts subsurface water away from its natural course toward a downhill spring. Thus, two factors may operate simultaneously in opposite directions—a decrease in transpiration resulting in an increase in soil moisture and subsequent subsurface flows, and a possible reduction in the amount of water entering the soil (infiltration). If evapotranspiration is reduced to a greater degree than infiltration, the effect of forest clearing will be to increase spring flow. But if infiltration is reduced more than evapotranspiration, spring flows may decline. Therefore, it is not the forest clearing that causes springs to dry up, but rather the reduction of infiltration due to harvest operations or road construction. There is no reason to expect that timber harvests will cause springs to dry up as long as favorable conditions for infiltration are maintained. The Forest Service will work closely with individual landowners to alleviate concerns about impacts on their property. (Satterlund and Adams 1992) (Hydrology Affected Environment Report, p. 26) See also South Deep EA, Appendix C, Best Management Practices, for mitigations to control runoff.

Satterlund, D.R. and P.W. Adams, 1992. *Wildland Watershed Management, Second Edition.* John Wiley & Sons, Inc.

5) Is there a plan to hire a hydrologist to evaluate the impact on this project on local water sources? (Letter 2, Comment 4)

Response

A hydrologist is on staff at the Three Rivers Ranger District and has analyzed the effects of the alternatives on hydrology. See Response to Comment 4 in this section and the signature block at the bottom of the hydrology report.

6) Some of the seasonal streams have already dried up even in a wet season due to the Phillips logging on my south boundary. Is the Forest Service prepared to compensate me for loss of water? (Letter 2, Comment 5)

Response

See Response to Comment 4 in this section.

7) There are reports of wells going dry for extended periods. As this situation would not correspond to high fuel loads, we are curious as to the effects of extensive logging in the area on the local water supply. (Letter 1, Comment 31)

Response

See Response to Comment 4 in this section.

8) Any discharge of sediment-laden runoff or other pollutants to waters of the state is in violation of Chapter 90.48, Water Pollution Control, and Wac 173-201A, Water Quality Standards for Surface Waters of the State of Washington, and is subject to enforcement action. (Letter 5, Comment 1)

Response

See *Inland Native Fish Strategy Forest Plan Amendment* for additional means of avoiding sedimentation of streams. See South Deep Management Project Environmental Assessment, Appendix C--Best Management Practices.

Best Management Practices (BMPs) are defined as "methods, measures, or practices selected by an agency to meet its nonpoint source control needs. BMPs include, but are not limited to, structural and nonstructural controls, operations, and maintenance procedures. BMPs can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters." (40 CFR 130.2, EPA Water Quality Standards Regulation) The selection and design of BMPs are an integral part of the Colville National Forest's Land and Resource Management Plan Standards and Guidelines for Soil, Water, and Air (Forest Plan, pg. 4-50 to 4-54). The BMP process, including monitoring, is described in the *Forest Plan*, page 4-51 item 3; and the *Forest Plan Appendix G*. Appropriate BMPs are selected for each project by an interdisciplinary team. BMP selection and design are dictated by site-specific water quality objectives, soils, topography, geology, vegetation, climate, economics, institutional constraints, etc. (Best Management Practices for the South Deep Project, p.1)

9) Proper disposal of construction debris must be on land in such a manner that debris cannot enter the natural stormwater drainage system or cause water quality degradation of state waters. (Letter 5, Comment 2)

Response

See Best Management Practices PR-15.

10) Proper erosion and sediment control practices must be used on the construction site and adjacent areas to prevent upland sediments from entering the stream channel. All areas disturbed or newly created by construction activities must be revegetated; use bioengineering techniques, use clean durable riprap, or some other equivalent type of protection against erosion when other measures are not practical. (Letter 5, Comment 3)

Response

See Best Management Practices PT-13, PT-14, PT-16, PT-18, PT-19, PT-23, PR-2, PR-9, PR-12, PR-16, and PR-22.

11) Any work in or adjacent to waterways that will adversely affect water quality must receive specific prior authorization from the Department of Ecology pursuant to WAC 173-201A-110. Short-term water quality standards modifications may be issued if the proponent agrees to a number of specific construction practices and techniques designed to minimize water quality impacts. The construction schedule will be tied to the schedule on the Hydraulic Project Approval. (Letter 5, Comment 4)

Response

See the Memorandum of Understanding between Washington Department of Fish and Wildlife and the USDA Forest Service regarding Hydraulic Project Approvals on routine projects conducted by the Forest Service, January 2003. The Army Corps of Engineers has also issued a Region 6 programmatic permit for culvert removal and replacement projects intended to restore fish passage. The Colville National Forest will coordinate with the Department of Ecology on any project activities not covered under these agreements.

12) Routine inspection and maintenance of all sediment and erosion control devices is recommended both during and after development of the site. (Letter 5, Comment 5)

Response

See Best Management Practices PT-18, PT-19, and PR-2.

13) During construction all releases of oils, hydraulic fluids, fuels, other petroleum products, paints, solvents, and other deleterious materials must be contained and removed in a manner that will prevent their discharge to waters and soils of the state. The cleanup of spills should take precedence over work on the site. (Letter 5, Comment 6)

Response

See Best Management Practices PT-21.

14) There is mention of all haul roads getting pre-treated with herbicides. Although we acknowledge and appreciate the mitigation of noxious weeds, we are concerned how extensive herbicide application would affect the water quality of streams and the watershed. (Letter 1, Comment 14)

Response

Contamination of streams and lakes by herbicides and pesticides is unlikely except in the case of accidental spills. Water quality monitoring by the Colville National Forest to date has not detected the presence of herbicides or pesticides in forest waters.

15) Dumpsters and refuse collection containers must be leak free with close fitting covers. The drainage for refuse containers and dumpsters areas adjacent to or over the water must be connected to the sanity sewer or otherwise designed to prevent leachate from being discharged to surface waters. (Letter 5, Comment 7)

Response

We do not plan to use dumpsters or refuse containers on this project.

16) In the past three years, the rising price of timber has accelerated logging on commercial and private lands in this valley to levels greater than that seen in the last 30 years. If this project goes forward the respondent will have logging on all four sides of her land. Has the Forest Service taken into account the cumulative effects of logging on state, private, and federal lands in this area? (Letter 2, Comment 7)

Response

Yes, the cumulative effects of logging on other lands have been factored in when analyzing the effects of the alternatives on the natural resources within the South Deep watershed. "The Equivalent Clearcut Area (ECA) Model is used by the Colville National Forest to analyze cumulative effects. (Schultz. 1992, Forest Direction Letter) The ECA model calculates the area of a watershed in a 'clearcut' condition at a specific point in time. Past vegetation manipulation treatments and natural disturbance events that have the potential to affect the water yield of a watershed are converted to an equivalent clearcut area, added to alternative proposed treatments, and expressed as a percent of the total watershed area. The result can be compared to other alternative treatments and to the threshold of concern indicated in the Land and Resource Management Plan, Colville National Forest, FEIS. The concept is adapted from "A Water Yield and Channel Stability Analysis Procedure: by Cliff Benoit and Dr. Alan Galbraith (1974). The ECA calculation can be used as an index of potential water yield changes due to management activities. If the ECA values exceed the established Forest threshold of concern, additional professional analysis of the potential for significant channel response or water quality changes is warranted. (Wasson 1992.)" (Hydrology Effects Analysis Report, p.7-8) The ECA model used in this analysis considers past harvest activities on all ownerships within the watershed.

Wasson, B., 1992. Equivalent Clearcut Acre (ECA) Calculation for Cumulative Effects analysis, Colville National Forest.

17) There are also concerns regarding the fish bearing streams. Alternative E will have between 15-20 crossings on Class II streams. Large brook trout up to 8 inches have been reported by recreationists in the South Fork of Deep Creek, and members of the public are very concerned about the potential degradation of this habitat. (Letter 1, Comment 32)

Response

A total of 18 existing crossings on Class II streams will be used for log haul in Alternative E. Five of these will be upgraded through reconstruction. The reconstruction of these existing crossings will improve fish passage and reduce long-term road-related sediment delivery to streams through the implementation of mitigation measures such as aggregate surfacing and slash filter windrows.

Most of the stream crossing activities under both action alternatives will consist of light and moderate reconstruction. Alternative E will not construct any new stream crossings. Alternative G will construct 2 new crossings; both in the South Deep Tributaries. Both new crossings are on Class IV (intermittent) streams. Alternative E will include heavy reconstruction of 2 existing crossings, both in the headwaters of Rocky Creek. Alternative G will include heavy reconstruction on four crossings. Two of these will be in the headwaters of Rocky Creek, one in the headwaters of Scott Creek, and one in the headwaters of the South Fork of Rogers Creek. (Hydrology Effects Analysis Report, p.14)

One of the crossings scheduled for heavy reconstruction in Rocky Creek (FR #7018.000) under both alternatives has been a chronic problem in the past. This culvert has plugged and the road has washed out several times at this location. No feasible options have been found to relocate the road at this crossing due to topographic restrictions. See the Fisheries section of this appendix for further response regarding effects of stream crossings on fish.

18) Elevated peak flows contribute to downstream flooding and increase the magnitude and extent of flood damage. Elevation of downstream flows also increases downstream channel erosion and sediment transport. Even relatively slight increases in downstream flooding greatly increase downstream erosion and sediment transport because they are exponentially related to streamflow (King 1989). Six hundred and seventy tons of estimated sediment increase is expected in Alternative E, which is detrimental to water quality and fish habitat. (Letter 1, Comment 30)

King, J.G., 1989. Streamflow Responses to Road Building and Harvesting: A Comparison With the Equivalent Clearcut Area Procedure. USFS Res. Paper INT-401, Ogden, UT.

Response

"Potential increases in high magnitude peak flows due to rapid snowmelt caused by snowpack exposure to rain or warm winds are somewhat more likely to occur under both alternatives since a reduction of stand densities will result in increased snow depths and increased solar radiation. Most of the activities proposed in both alternatives, however, are located in the snow-dominated zone of these watersheds. The risk of increased rain-on-snow events in these alternatives is small due to the limited area of proposed harvest within the rain-on-snow zone." (Hydrology Effects Analysis Report, p.24)

"... no increased channel-forming flows from federal lands are expected to cumulatively degrade channel conditions along the mainstem of the South Fork [as a result of proposed harvest activities]." (Hydrology Effects Analysis Report, p.24)

"Sediment delivery outputs will be modeled to compare alternatives. A direct correlation between the results of this model and sediment delivery in the field has not been established. Consequently, the results of this model are for trends and comparisons only and should not be used to quantify sediment production." (Hydrology Affected Environment Report, p.4)

19) Water-As well you know, there are so many things that logging, construction of new roads, and burning affect. Not only is the water table affected but also the ability of streams to remain healthy. When you have private land owners, the wildlife, recreational land users and logging all competing or trying to share the land, every aspect of how any action of any one group or person needs to be taken into account. (Letter 3, Comment 7)

Response

Thank you for your comment.

D.6 Noxious Weeds

1) It seems the areas that are most disturbed by humans through current logging practices are not only an eyesore, but simply a haven for invasive species of plants. The respondent is battling three types of knapweed that was brought in via roads. Reopened roads will increase the impact of non indigenous invasive species. What non-indigenous plants will invade these zones once logging begins? (Letter 2, Comment 10)

Response

Roads do serve as vectors for noxious weeds, but not to the extent that they once did. Adaptive management over the past 10-20 years has produced noxious weed prevention strategies that are very effective. The mitigation measures included with the project (Chapter 2 of EA, pg. 46) are the result of observing what works and what doesn't work on the ground. They are designed to aggressively prevent the establishment of noxious weeds along new roads and elsewhere. Subsequent mitigation will adapt, as conditions change and prevention strategies evolve. Please see Chapter 4, pages 197-200 for estimates of noxious weed species and extent of expansion due to the effects of road construction and reconstruction and logging.

D.7 Road Management/Transportation

1) Respondents greatly appreciate the information provided regarding the extent of roads in the environmental assessment, which shows 194 miles of classified roads, with National Forest System roads comprising 84%. Forty six percent of these Forest Service roads are closed to travel, although 17 miles of unclassified roads were identified during the South Deep analysis process. The respondents support the Forest Service proposal to decommission 6.6 miles of roads. (Letter 1, Comment 11)

Response

Thank you for your comment.

2) Respondents are concerned about the extent of road reconstruction on the south end of the project area, especially those areas outside the wildland urban interface (WUI). Road 7018290 is proposed for a heavy road reconstruction on 0.4 miles, which would access units just outside the WUI. At a cost of $25,000 a mile, further clarification on this proposal is desired. (Letter 1, Comment 12)

Response

Much of Forest Road 7018290 is currently (as of late 2005) in poor condition. The first portion of the road has adequate road surface drainage. Although it has a few spots that tend to hold moisture, it is in relatively good shape. The second half of the road is in very poor shape. It has severe erosion gullying on the steeper grades and ponding on the flat areas. The road parallels, and then crosses an intermittent stream. At higher flows, the stream flows down the road. Heavy reconstruction would repair and realign the road through this segment. Approximately 500 feet of the road would be moved out of the riparian area. The crossing would be aligned to be perpendicular to the stream (the least amount of impact to the stream), but at the same location as the old grade. So no new crossing would be created.

Like most of the proposed road reconstruction, the objective here is to protect the water resource, meet Inland Native Fish Strategy and Clean Water Act requirements, while providing for a safe and efficient haul route.

The label of "Light", "Medium" or "Heavy" reconstruction is used to help describe the degree of initial disturbance; it does not describe an increase in traffic volume or upgrade to a higher traffic standard.

3) The respondents are pleased that this proposal (only Alternative E) does not include any new road construction, but are concerned with the construction of 2.5 miles of temporary roads, the amount of light reconstruction on 39.6 miles of roads, the amount of medium reconstruction of 34.2 miles of roads, and the heavy reconstruction on 0.5 miles of roads. There is some concern that the amount of decommissioning does not rectify the amount of road reconstruction. The Forest Service is encouraged to find additional areas (especially adjacent to already unroaded areas) that could also be obliterated, and taken out of the Forest Service Road System Atlas. (Letter 1, Comment 13)

Response

As stated above, roads are reconstructed to the degree necessary to protect the water resource, meet Inland Native Fish Strategy and Clean Water Act requirements, while providing for a safe and efficient haul route. Light, medium, and heavy reconstruction descriptions are detailed below:

Light – The work includes construction of drainage structures such as drain dips and outslope drains, and associated blading and brushing on roads used for commercial haul. These drainage structures assist in the reduction of long-term sedimentation by causing water to be moved off of the road surface. Rocking of drain dips and riparian habitat conservation areas and their contributing areas, and rocking of roadbed for sediment control and subgrade strength is also included.

Medium – Medium reconstruction includes "Light reconstruction" plus occasional clearing of vegetation, including trees 6 inches and greater; excavation of the cut bank and roadbed for width, as well as placement of material; culvert replacement and installation. The roads identified as needing Medium Reconstruction are listed in the tables of the South Deep Transportation Report.

Heavy – Heavy reconstruction includes road re-alignment (especially for correcting curves that have a radius of less than 50 feet), major excavation, and clearing. This type of reconstruction would have initial disturbance similar to new construction but it is usually only planned in specific work locations for specific corrective/restorative actions.

D.8 Soils

1) The respondents are concerned that project activities will accelerate soil erosion, increase soil compaction, and degrade soil productivity. Prescribed fires and mechanical treatments may adversely affect soil productivity. The National Forest Management Act (NFMA) requires the Forest Service to "not allow significant or permanent impairment of the productivity of the land." [36 C.F.R. § 219.27(a)(1).] NFMA requires the Forest Service to "ensure that timber will be harvested from National Forest System lands only where soil, slope, or other watershed conditions will not be irreversibly damaged." [16 U.S.C. 1604 (g)(3)(E)] (Letter 1, Comment 21)

Response

The project will accelerate soil erosion, increase compaction, and impact soil productivity. This is disclosed in the environmental assessment. The Forest Service developed standards for detrimental soil conditions

in order to address whether impairment is 'significant'. If less than 20% of an activity area (including roads and landings) is not impaired, the impact is not 'significant' (*Forest Plan* pg. IV-145).

2) The respondents are concerned with the detriment of soil productivity, as there are areas of Kegel loam that is found on relatively active floodplains that become flooded during spring melt. This is found in Units DBD and DCH. (Letter 1, Comment 22)

Response

The project includes the practice of avoiding wet areas during logging and other activities using ground equipment (like machine piling). These areas were identified and will be avoided during layout. Unit DCH has a very small area of Kegel outside the unit boundary.

3) The respondents are concerned with the detriment of soil productivity, as the soils found in harvest areas include Newbell-silt loam and Aits loam. The compaction potential for these soils is high, and they may remain compacted for a long time. The Forest Service is encouraged to conduct activities on these types of soils during the winter months, when soil compaction and erosion can be mitigated. The proposed treatments will dramatically expose surface soils, which in this area have a gravelly or stony silt–loam texture that is susceptible to raindrop impacts, surface sealing, and increased runoff. (Letter 1, Comment 23)

Response

Snowfall and frozen conditions are only required for selected units where the existing detrimental soil conditions are high. At these elevations adequate snowfall and frozen soil conditions are not assured, therefore winter logging was not required widely. In stands with low levels of existing detrimental soil conditions, compaction is best mitigated by limiting the extent of skid trails.

The potential for erosion is described in the environmental assessment. The likelihood of exposed soils is discussed. The soil section, Chapter 4, Section 4.1.1, pages 146-160, discusses erosion as a site productivity issue. Sedimentation is discussed in the hydrology section, Chapter 4, Section 4.1.2, pages 160-177.

4) There are concerns regarding the possible increase in cattle access into the wetlands below the dam at Big Meadow Lake. Timber harvest units DCI, ECJ, and DCH will open up these stands, and will most likely increase cattle use. Monitoring for this detrimental affect on soils is very important, and we encourage any precautions to avoid this issue. (Letter 1, Comment 24)

Response

The project includes mitigation for this concern. The wetlands will be monitored, and the area may be fenced. Please see Chapter 2, Section 2.4.1, page 42 for details on mitigation for soils.

5) Looking at the effects of Alternative E, the South Deep Management Project Environmental Assessment states there will be negative effects on soil productivity on 58.5 acres due to landings and road construction/reconstruction. Three hundred twenty three acres will have negative effects due to logging, and 9-10% is estimated for detrimentally disturbed soil due to timber harvest. (Letter 1, Comment 25)

Response

These numbers are disclosed in the environmental assessment. They are an estimate of the detrimental impacts of the alternative on soil productivity. Under Alternative E, soil productivity will be severely reduced on about 58.5 acres (roads and landings) and detrimental soil conditions will occur on an additional 345

acres (timber harvest and prescribed fire). This is about 1.3% of the National Forest System lands within the planning area.

6) The meaning of "soil productivity" in the terminology of National Forest Management Act (NFMA) is largely ignored. In Forest Service Manual 2500-99-1 the Forest Service claims "Soil quality is maintained when erosion, compaction, displacement, rutting, burning, and loss of organic matter are maintained within defined soil quality standards." But even if the soil conditions of land outside proposed activity areas could reasonably be ignored, the Forest Service still cannot assume that there has been no "significant or permanent impairment of the productivity of the land" as NFMA requires. (Letter 1, Comment 26)

Response

This comment is outside the scope of this analysis. The environmental assessment discloses the effects of the proposal on soil productivity, and estimates the acres that would be adversely impacted.

7) It is reasonable to expect that in order for the Forest Service to assure that soil productivity is not or has not been significantly impaired, to assure that the forest is producing a sustained yield of timber. For example, tree growth must not be significantly reduced by soil-disturbing management activities. Grier et al. (1989), in a Forest Service General Technical Report, adopted as a measure of soil productivity: "the total amount of plant material produced by a forest per unit area per year." (P. 1.) And they cite a study finding "a 43-percent reduction in seedling height growth in the Pacific Northwest on primary skid trails relative to uncompacted areas" for example. And in another Forest Service report, Adams and Froehlich (1981) state:

Measurements of reduced tree and seedling growth on compacted soils show that significant impacts can and do occur. Seedling height growth has been most often studied, with reported growth reductions on compacted soils from throughout the U.S. ranging from about 5 to 50 per cent. (Letter 1, Comment 27)

Adams, P.W and H.A. Froelich, 1981. Compaction of forest soils. Extension Publication PNW 217. 13 pp.

Grier, C. C., K. M. Lee, N. M. Nadkami, G. O. Klock, & P. J. Edgerton, 1989. Productivity of Forests of the United States and Its Relation to Soil and Site Factors and Management Practices: A Literature Review. USDA Forest Service General Technical Report PNW-GTR-222, March 1989.

Response

The extent to which compaction decreases site productivity for conifers has been debated. In California, Helms (1983) estimated a decrease in conifer productivity of 21% in the most compacted soils he studied. In north Idaho, Roche (1997) found a 20% decrease in tree height for trees grown on main skid trails. Froelich (1979) found a 6-12% decrease in growth in residual ponderosa pine along skid trails. Miller, Scott and Hazard (1996) found little difference in tree growth on compacted skid trails for Douglas-fir, Sitka spruce, and western hemlock. This variation in growth due to compaction is believed to be because trees growing on skid trails may experience less competition, and because compacted soils do not always reach a growth-limiting bulk density. This concern has been addressed by *Forest Plan* standards and guidelines; this project meets those guidelines by restricting skidding and yarding operations (See mitigation measures Chapter 2, Section 2.4.1, pages 42-43, and BMPs in Appendix C of the South Deep Management Project Environmental Assessment.) Re-examining the appropriateness of *Forest Plan* standards and guidelines is outside the scope of this environmental assessment.

Froelich, H. A., 1979. Soil compaction from logging equipment: effects on growth of young ponderosa pine. Journ. Soil Water Con. Nov-Dec 1979: 276-278.

Helms J. A., 1983. Soil compaction and stand growth. Final report to USDA Forest Service, Master Agreement 21-395. University of California, Berkeley, CA. 97 pages

Roche, D. M., 1997. Effects of ground-based harvesting and site preparation on the height growth of Douglas-fir: a second look. Masters Thesis, University of Idaho, Moscow, ID. 74 pages.

Miller, R. E., W. Scott, J. W. Hazard 1996. Soil compaction and conifer growth after tractor yarding at three coastal Washington locations. Can. J. For. Res. 26:225-236.

8) Thinning and prescribed burns have made the land more prone to slides in some places. (Letter 3, Comment 4)

Response

Thinning and light prescribed burning do not make land more prone to slides in the South Deep Creek area. Thinning, by leaving a large number of deep-rooted trees, continues to provide support and de-water the site. Light prescribed burns have not been associated with increased landslides in these ecosystems.

D.9 Timber/Logging/Silviculture

1) Is the South Deep Management Project Environmental Assessment a salvage timber sale? (Telephone conversation, Comment 1)

Response

The South Deep Management Project is not a timber salvage environmental assessment. The purpose of the project is to reduce hazardous fuels, improve forest health, and provide wood fiber. See Chapter 1, Section 1.4, pages 14-17.

2) Respondents are supportive of various thinning and prescribed burning for fuels reduction purposes particularly in the wildland urban interface. (Letter 1, Comment 1)

Response

Thank you for your comment. Section 1.4, Chapter 1, pages 14-17 of the South Deep Management Project Environmental Assessment discusses the purpose and need for this project. The purpose and need guides the proposed actions on National Forest System lands and are interdisciplinary in approach. Section 1.5 outlines the scope of the decision to be made from this environmental assessment.

While the wildland urban interface is an intrinsic component of the project planning area, the South Deep Management Project Environmental Assessment does not isolate this area. Instead, it strives to develop a mix of forest stand conditions that are consistent with fire adapted landscapes across the National Forest System lands within the project planning area, regardless of proximity to urban areas. The project recognizes the National Fire Plan and shares objectives where they coincide with the South Deep purpose and need.

3) Respondents do not support even-aged stage management or extensive removal which would be seen in the various combinations of shelterwood, sanitation, and clear-cut treatment prescriptions. They say that other projects on the Colville National Forest have treated densely stocked stands without even-aged regeneration treatment. They want all shelterwood, clearcuts, and sanitation harvest treatments removed from Alternative E (or modify the treatments to decrease the intensity of treatments). (Letter 1, Comment 1)

Response

Section 1.8.1, Chapter 1, pages 20 to 27 of the South Deep Management Project Environmental Assessment discusses key issues. Key issues were addressed through the development of alternatives. Key Issue #2, "Clearcutting and Large Forest Openings", on pages 21 and 22 of the South Deep Management Project Environmental Assessment discusses how concerns were addressed.

Many of the fire-originated stands in the project area regenerated naturally to lodgepole pine and its associates and have now developed into densely stocked small diameter stands where tree growth and differentiation of stand structure is very slow. Almost 7,900 acres of the project area are vegetated with these types of stands. Most trees are less than eight inches in diameter at breast height or DBH; the largest trees are 4 to 7 inches DBH and have dense understories. The lowest canopy layers are characterized by hundreds (and often thousands) of seedlings, saplings and small pole-sized trees per acre, spaced 2 to 8 feet apart with crowns of 10 to 20 percent. Based on tree sizes and species and volumes per acre, there is a range of small diameter stand types. In 1994, a study identified four types of densely stocked small diameter stands (CROP). In stands where the average tree diameter is larger than 7 inches DBH, these stands may be thinnable. This is the type of stand that has been thinned in the past on the Colville National Forest and is proposed for thinning in this environmental assessment. Many of the past commercially thinned stands have group openings or are regeneration treatments. Based on local merchantability standards, a stand is thinnable only if one third of its volume is greater than 3.5 million board feet per acre. Advances in harvest technologies and utilization standards have made it possible to treat a number of small diameter stands types that were not possible in the past. The small diameter stands recommended for regeneration harvest in this environmental assessment have an overstory 2 to 6 inches DBH, 40 to 60 feet in height, and are spaced 4 to 6 feet apart. If the Forest Service attempted to thin these stands, the leave trees with 10 to 20 percent crown lengths and poor height to diameter ratios would bend over and/or blow down or become root sprung. Fuel loads would increase as fall down occurred. The goal of moving the stand toward late structure would be delayed. Regeneration treatment would provide a way to break up fuels continuity, decrease risk of crown fire initiating and being sustained, decrease risk of insect attacks, improve stand growth, move the stand toward late stand structure (project area is deficit in late structure), and provide habitat for a more diverse suite of wildlife species.

Figure 1 below shows an 80 year old densely stocked small diameter stand type in South Deep that is proposed for regeneration harvest. More than 400 trees per acre are between 2 -7 inches DBH. Contrast this to Figure 2, where in the foreground the average crop trees are larger than 7 inches DBH. This portion of the stand would be thinnable if the western larch trees have crown lengths of 25 to 30 percent. Thinnings are planned where the potential exists for the residual stand to meet the desired objectives. Regeneration harvest will help to create the desired mosaic of stand conditions to meet the multi-resource objective of the project area.

Figure 1

Figure 2

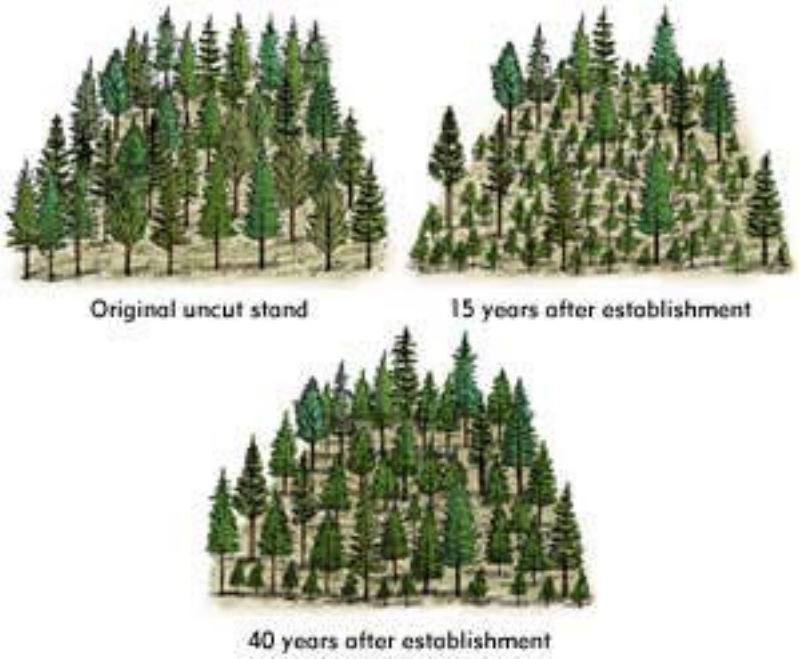
4) Respondents would like to see before and after tables for the irregular shelterwood units. They need information on stand density, composition, and distribution of size classes across the landscape. (Letter 1, Comment 3)

Response

Section 2.2.1 to 2.2.5 on pages 31 to 36 of the environmental assessment discusses vegetation management treatments. Sections 3.1.3 and 3.2.1 on pages 75 to 103 of the environmental assessment provides a detailed description of vegetation conditions including: biophysical environments and vegetation structure, insect and diseases, timber harvest, livestock grazing, fire exclusion, climatic change, and old growth. Appendix B of the environmental assessment displays the proposed management activities by unit.

Section 3.2.1 on pages 90 and 91 of the environmental assessment discusses and displays vegetation structural stages. A map of "Current Vegetation Structural Stages" at the end of Chapter 2 between pages 57 and 58. A map of the Biophysical Environment (at the end of "Response to Comments") displays the distribution of size classes. Alternative maps of proposed vegetation treatments that locate and label all units are also presented at the end of this "Response to Comments" appendix.

Irregular shelterwoods are not defined by spatial arrangement. The key characteristic of irregular shelterwood is that, although prompt regeneration is an objective, residual trees are left for long periods beyond the regeneration phase (e.g., from 20% of the rotation to several rotations). Residual trees initiate new age classes of regeneration, accumulate wood volume increment and, if desired, achieve non-timber stand objectives. Due to the protracted retention of leave-trees, the resulting stand is broadly aged and therefore intermediate between an even-aged and an uneven-aged stand. The reserved trees can be left for a defined or indefinite period after the regeneration phase. Both group and uniform patterns of leave-tree retention can be formed. Irregular shelterwood is used to promote structural diversity while maintaining the simplicity of managing less than three age classes (Uneven-age management has three or more age classes.) The resulting stand would have a mosaic of stand conditions. The picture below provides snapshots of what portions of the stand would look like over time.



5) Is there a difference in treatments for cool moist forest types and dry forest types? (Letter 1, Comment 4)

Response

Section 1.4, Chapter 1, pages 14-17 of the South Deep Management Project Environmental Assessment discusses the purpose and need for this project which guide the proposed treatments. Treatment activities are described in Section 2.2, Chapter 2 of the South Deep Management Project. Treatment activities are designed to improve ecosystem integrity by moving vegetation toward the historic range of variation. While the objective for each habitat type is to maintain or enhance the large diameter tree component in the stand there are differences in treatments between cool-moist and dry forest types.

On warm dry Douglas-fir habitat types the treatment usually includes prescribed fire which would address the need to re-establish fire as an ecosystem process, promote seral species, and move the stands toward a single-stratum late structural stage. Natural and harvest activity-generated fuels would be treated along with small patches of encroaching small trees that create ladder fuels. Excess natural regeneration or shade tolerant species would be killed. Ponderosa pine and Douglas-fir tree species would be selected to move toward late stand structure. The resulting stand would have 40 to 600 trees per acre. Resulting basal areas[1] would range from 40 square feet to 120 square feet. In some clumps with larger diameter trees the basal area would range from 120 square feet to 220 square feet.

On cool mesic habitat types, the emphasis is weighted toward maintenance and enhancement of multi-stratum late structure. The resulting stand would have 60 to 600 trees per acre. The resulting basal areas would range from 80 square feet to 160 square feet. In some clumps of larger diameter trees the basal areas would range from 180 square feet to 260 square feet. Douglas-fir, western larch, western white pine, and western redcedar would be the species favored for development of large tree diameters.

[1] the cross section area of a tree stem in square feet commonly measured at breast height (4.5' above ground) and inclusive of bark

6) Fifteen-acre openings are much too large in size. Respondents want more detailed information on the 1,867 acres of uneven-aged regeneration treatments in Alternative E. There may be instances where 50% tree removal is too excessive, and a less aggressive treatment would benefit the landscape. (Letter 1, Comment 7)

Response

Please see response to comments 2 and 3 in this section.

Section 1.8.1, Chapter 1 pages 20 to 27 of the environmental assessment discusses the key issues (section 1.8.1 and other concerns (section 1.8.2). Key issues were addressed through the development of alternatives. Key Issue #2 "Clear-cutting and Large Forest Openings" on pages 21 and 22 of the environmental assessment discusses how concerns were addressed.

Chapter 3, Section 3.2.1 on pages 85 to 103 and maps in this appendix provide a detailed description of vegetation conditions. Appendix B provides detailed information by unit. Information includes: acres, yarding system, prescription, management area, and additional treatments.

Thinnings are planned where the potential exists to carry a residual stand to meet desired objectives. In areas, where stand conditions (e.g. high potential of blowdown in residual stands that would increase fuel loading in the wildland urban interface) preclude thinning, forest openings would be created. The size, shape, and distribution of the openings will vary based on the existing stand condition. A mosaic of stand conditions will result. The project will maintain essential structural elements (live or dead trees or clumps of trees, woody debris, etc) that exist in stands (as" legacies") for integration into post-treated stands. No live trees greater than 21.0 inches diameter at breast height will be cut. To meet snag retention levels, when created openings are greater than 3 acres, at least one group of green replacement trees per 10 acres will be marked to insure a stand average of 8 green replacement trees per acre.

Many areas within South Deep were severely burned during wildfires in 1926 and 1929 and have regenerated into dense, small-diameter stands. In many areas thinning is not practical, and stand regeneration is the only feasible option to remove this vegetation to allow new, more structurally diverse stands to eventually develop on these sites. These treatments are proposed to help meet the distributions of late stand structure. Where created openings are 5 acres or more, planting to re-establish fire tolerant western white pine, western larch and ponderosa pine is prescribed. Western white pine blister rust has caused widespread mortality in all age classes of western white pine throughout the analysis area. Current estimates are that western white pine occupies about 1/2 to 2/3 less area than it has historically occupied (DeSpain, pers. comm., 1996). The loss of western white pine has led to an increase in Douglas-fir, which in turn led to significant armillaria root disease problems (Flanagan 1997).

Based on findings by Jain et al. (2004), western white pine requires a greater than 23% canopy opening to occupy a site. To gain a competitive advantage, the canopy opening must be greater than 50% and to achieve free-to-grow status, the canopy opening must be greater than 92%. These findings show growth of western white pine will be sacrificed in openings less than 10 to 12 acres, but the species can persist in smaller openings (Jain et al. 2004).

Despain, T., 1996. Colville National Forest Geneticist. Conversation with Michelle Satterfield.

Flanagan, P., 1997. *Insect and Disease Conditions Slate/Salmo and LeClerc Areas*. USDA Forest Service. Eastern Washington Forest Health Office. Wenatchee National Forest. Wenatchee, Wa. Personal correspondence.

Jain, T.B, Graham R.T., Morgan, P., 16 November 2004. NRC Research Press Web Site at http://cjfr.nrc.ca. Western white pine growth relative to forest openings.

7) Respondents would like to see a before and after table describing the amount and size of trees removed in the structural stage 6 stand (portion of commercial harvest unit NBE). Clarify what currently exists within this unit, and to what extent the area will be thinned within the understory. (Letter 1, Comment 10)

Response

Please see the response to comment 4 in this section.

8) The Forest Service seems to assume that all insect "pests" and diseases are "invasive" and bad for the ecosystem. Please analyze the effects of insects and disease from an ecosystem management approach that recognizes that fungal and insect organisms are capable of operating in a self-regulatory manner and often exist as beneficial organisms within the project area. (Letter 1, Comment 28)

Response

The characterization of the analysis area is based on Forest direction that was jointly developed by a team of ecologists, fire management staffs, and silviculturists form the Colville and Okanogan National Forests to describe target landscape patterns for the Okanogan, Columbia, and Pend Oreille basins. Historically insects and pathogens played a role in forested ecosystems by contributing to the development of wildlife habitat, nutrient recycling, as well as stand and landscape level structural diversity. Pages 85 to 97 of the environmental assessment discuss vegetation, forest fuels, and the natural role of fire, insects and pathogens, and potential patterns of forest stand development. Page 149 of the environmental assessment recognizes the effects of burning on many kinds of bacteria, fungi and arthropods. Harvey, et al 1994 is also referenced and recommends preserving soil carbon to maintain the biologic activity. Page 21 of the environmental assessment describes silvicultural prescriptions in the project that will maintain essential structural elements (live or dead trees or clumps of trees, woody debris, etc). The project will maintain essential structural elements (live or dead trees or clumps of trees, woody debris, etc) that exist in stands (as" legacies") for integration into post-treated stands. The focus is on what is retained rather than removed. One of the main purposes of the retention is to maintain "refugia" of existing fungi and other organisms to maintain ecosystem diversity.

Harvey, A.E., J.M. Geist, G.I. McDonald, M.F. Jurgensen, P.H. Cochran, D. Zabowski, and R.T. Meurisse, 1994. Biotic and Abiotic Processes in Eastside Ecosystems: The Effects of Management on Soil Properties, Processes, and Productivity. GTR-323 93-204 (1994)

9) The Forest Service has no empirical evidence to indicate that logging treatments for forest health purposes decrease rather than increase the incidence of insects and disease in the forest. Please consider the large body of evidence that indicates that logging, roads, and human caused disturbance promote the spread of tree diseases and insect infestation. (Letter 1, Comment 29)

Response

Your comment is noted. Providing empirical evidence to indicate that logging treatments for forest health purposes decrease rather than increase the incidence of insects and disease in the forest is beyond the scope of this document.

The mission of the Forest Service is to sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations. The Forest Service applies an ecological approach to the multiple-use management of the National Forests and Grasslands. Specialists use the best scientific knowledge available in making decisions and selecting the most appropriate technologies in the management of resources. The Forest Service conducted an Ecosystem Analysis at the

Watershed Scale and a Fire Study for the South Fork of Deep Creek Watershed to help characterize the watershed, identify issues, and compare reference and current conditions.

The findings expressed in these publications are considered in the design of proposed treatment activities. A variety of factors influence which vegetation management activity or combination of activities are used, including: the condition of the vegetation, inherent disturbance regime, the management area prescriptions (Chapter 4 of the Forest Plan); and prescription feasibility. Adaptive management has produced prevention strategies that are effective. Management practices and mitigation measures included with the project (pages 42 to 54) are designed to reduce negative effects on area resources.

10) Research is currently showing that logging and its associated road building actually promote the spread of disease. I see no evidence of this research in your plan. Stressed out trees in logged areas will bring disease to my stands. Blow down from the logging at my borders is already occurring. My 70 acres has not been logged since the 20's fires. I do not take out diseased trees and do not have many diseased trees. Lodge pole areas are beginning to thin out, not mechanically but on nature's time and regenerate vital clearings for new trees with greater variety. (Letter 2, Comment 9)

Response

See response to Comment 9 in this section.

11) In the past three years, the rising price of timber has accelerated logging on commercial and private lands in this valley to levels greater than that seen in the last 30 years. If this project goes forward I will have logging on all four sides of my land. Has the Forest Service taken into account the cumulative effects of logging on state, private, and federal lands in this area? (Letter 2, Comment 7)

Response

This recent activity is captured in the Equivalent Clearcut Area (ECA) calculations, and by the design of the alternatives.

As stated in the South Deep Management Project Environmental Assessment, Washington State Forest Practices Applications were used to calculate ECA, and to predict future actions on private land.

12) The plan relies heavily on traditional commercial logging practices. There are many new alternatives that could be researched and tested. Paul Staments, the leading US authority on mycology, has developed a method used by the BLM to broadcast mushroom spores in the wood chips to accelerate decomposition. Horse logging or helicopter logging could be used instead of tractor and cable logging systems. There are many new out of the box methods. Has the Forest Service considered new methods of harvesting timber? (Letter 2, Comment 17)

Response

Your comments are noted. The Forest Service is interested in considering new technologies and working with researchers.

Horse logging was considered by the Interdisciplinary Team during alternative development but not brought forward. Helicopter logging is planned on 734 acres in Alternative E and 888 acres in Alternative G. The Interdisciplinary Team was also concerned with the expenses incurred with helicopter yarding when they designed alternatives. To keep these costs down, especially with the additional wildland urban interface treatments, the Interdisciplinary Team limited helicopter units to not more than ½ mile from existing roads.

13) Thinning and prescribed burns can cause blow downs in surrounding areas. (Letter 3, Comment 2)

Response

Your comment is noted. Blow downs are a possibility after thinning and prescribed burns. Wind-firmness and the potential effects of treatments to the surrounding areas is a consideration in the treatment prescriptions and every effort to minimize blow down within the stand and in the surrounding area is taken. .

Identifying distribution patterns of windfalls in the watershed can help characterize and assess its role in shaping the landscape patterns of plant communities. During the winter of 1996/1997, a large-scale storm event (snow, ice, and wind) occurred across the northeastern portions of Washington and parts of Idaho. In the spring 1997, an aerial reconnaissance flight was made to evaluate the storm damage. Existing stand exam data (1992; which include natural fuels photo series, primarily PNW_15, INT-96 and INT-98) and field reconnaissance were also used to evaluate the situation. Damage from this storm event occurred in several areas throughout the watershed with the highest concentrations in densely stocked lodgepole pine stands. Some blow down was noted along a riparian area. Damage included down trees, snapped off treetops and root sprung trees.

14) The process of tree regeneration seems to take longer after thinning and prescribed burns. (Letter 3, Comment 5)

Response

Your comment is noted. Fuels reduction, forest regeneration, and forest health are included in the purpose and need of the project discussed on pages 14 to 16 of the environmental assessment.

Post harvest tree regeneration depends on the site, whether the site will be naturally regenerated or artificially planted, and the objective of the treatment. In areas of proposed commercial harvest, jackpot burning, and planting, tree regeneration will be much faster. In areas where natural regeneration will be encouraged, jackpot burning will be used to reduce surface fuels to create areas for seeds to grow. In other areas, such as the wildland urban interface (WUI), regeneration is not desirable because of ladder fuel issues. Jackpot burning will be used to kill some of the existing regeneration in the WUI.

Artificial planting is planned on 1,617 acres in Alternative G and 507 acres in Alternative E. The purpose of the plantings is to re-establish fire tolerant western larch, ponderosa pine, and white pine. The type of site preparation for seedling establishment and amount of sunlight (canopy opening size) varies by the species of tree that will have the competitive advantage. For example, western larch prefers exposed mineral soil to become established and a considerable amount of light to be able to grow. As mention in response to Comment 6 in this section, western white pine requires a greater than 23% canopy opening to occupy a site and a greater than 50% canopy opening to gain a competitive advantage. If the canopy is too dense, such as after some thinnings, shade tolerant species (e.g. grand fir, western redcedar) will occupy the site.

D.10 Visuals

1) The respondent is concerned about the visual affects of treatments surrounding her property. As the Colville and Spokane populations increase how will the Forest Service manage for visual resources for view sheds or will it all be logged over including public forest lands? (Letter 2, Comment 8)

Response

Mitigation measures, such as retaining vegetation in an irregular, feathered pattern along transmission line corridors, roadways, and private land boundaries, are discussed under Scenery in Chapter 2 (Section 2.4.10, page 50). In addition, the Forest Service will work with individual landowners to minimize the impacts on neighboring parcels of land. Thinning overstocked stands is designed to move towards a sustainable landscape character that will be visually appealing in addition to being less at risk for stand-replacing wildfire. That landscape character will be more open with less understory where treatments are visible, but most of the treatments will be hardly noticeable.

2) The respondent recognizes the risk of wildfire and has taken action to insure defensible space on her property. Concern was expressed that the Forest Service would create an undesirable "tree farm" along the boundary. The landowner would like to be involved in determining the specific treatments that occur along shared boundaries. (Telephone conversation, Comment 7)

Response

See response to Comment 1 in this section.

D.11 Wildlife

1) With the increase in population growth and the subsequent increase in existing structures in or near forested areas, limited habitat becomes increasingly fragmented, reduced in size, and functioning capacity. Wildlife habitat selection is almost entirely based upon existing conditions rather than the disturbance history of an area. Forest Service data on how Threatened and Endangered Species and Management Indicator Species select habitat is extremely limited. So cumulative effects are difficult if not impossible to understand. We hope that treatments are chosen that mitigate damage to these sensitive and limited ecosystems, and are followed by comprehensive monitoring and adaptive management. (Letter 1, Comment 15)

Response

Although Forest Service information on wildlife habitat selection is limited, we draw on a large body of mainly published material (best available science) to understand the habitat requirements of a variety of wildlife species. For each species, the elements used to analyze current conditions and effects are listed in the Biological Evaluation and Effects to Management Indicator Species documents. Treatments were chosen that would affect, but not adversely affect, habitats of all the species of concern.

2) State-of-the-art conservation biology and the principles that underlie the agency's policy of "ecosystem management" dictate an increasing focus on the landscape-scale concept and design of large biological reserves accompanied by buffer zones and habitat connectors as the most effective (and perhaps only) way to preserve wildlife diversity and viability (Noss 1993). (Letter 1, Comment 16)

Noss, Reed F., 1993. The Wildlands Project Land Conservation Strategy. Wild Earth Journal, Special Issue: 10-26

Response

When analyzing the effects of a project on each species, the wildlife biologists examine effects at several scales: the stand, the project and the landscape. These different levels are reflected in the wildlife

documents written for the project (Biological Evaluation and Effects to Management Indicator Species). For each species, effects at the stand and project levels are reported in the "Environmental Consequences" section and effects at the landscape scale are reported in the "Cumulative Effects" section. For large species such as lynx, wolf, wolverine and grizzly bear, we also include the important concepts of corridors (landscape connectors). See Chapter 4, Section 4.2.4, pages 200-240.

3) The Forest Service has stated: "Well distributed habitat is the amount and location of required habitat which assures that individuals from demes, distributed throughout the population's existing range, can interact. Habitat should be located so that genetic exchange among all demes is possible." (Mealey 1983.) (Letter 1, Comment 17)

Mealey, Stephen P., 1983. Wildlife Resource Planning Assistance to the Payette and Boise National Forests. April 1, 1983. U.S. Forest Service, Land Management Planning Systems, 3825 E. Mulberry, Fort Collins, Colorado 80524.

Response

For species of concern or special interest, the wildlife biologists conduct analyses that examine the amount, distribution and condition of habitats important to that species. The results can be found in the *Biological Evaluation* and *Effects to Management Indicator Species* documents. Connectivity of habitat is examined for several species, and the *Forest Plan*, as amended, dictates that corridors be mapped to ensure that habitat remains to connect Management Requirement Areas (MRs).

4) The Forest Service should firmly establish that the species that exist, or historically are believed to have been present in the analysis area are still part of viable populations. Since *Forest Plan* monitoring efforts have failed in this regard, it must be a priority for project analyses. Identification of viable populations is something that must be done at a specific geographic scale. The analysis must cover a large enough area to include a cumulative effects analysis area that would include truly viable populations. Analysis must identify viable populations of MIS, TES, at-risk, focal, and demand species of which the individuals in the analysis area are members in order to sustain viable populations. (Letter 1, Comment 18)

Response

For species of concern or special interest, the wildlife biologists conduct analyses that examine the amount, distribution and condition of habitats important to that species. This analysis examines effects from the project level, which are listed in the "Environmental Consequences" section, and at the landscape level, which are included in the "Cumulative Effects" section. The analysis of cumulative effects identifies the amount, quality and distribution of habitat over a large area and serves as a proxy for viability analysis. The results can be found in the *Biological Evaluation* and *Effects to Management Indicator Species* documents.

5) According to official Forest Service policy, the Forest Service "must develop conservation strategies for those sensitive species whose continued existence may be negatively affected by the *Forest Plan* or a proposed project." (Forest Service Manual 2670.45) Distributions of common wildlife species as well as species at risk encompass much larger areas than typical project areas (often referred to as "landscape scales"). The Forest Service has unsuccessfully tiered the viability analyses for sensitive species that would be impacted by the South Deep project to a landscape analysis of sensitive species viability that would allow for some assurances to the public that species viability is currently being insured in spite of continued habitat destruction and/or alteration. (Letter 1, Comment 19)

Response

The *Forest Plan* outlines a conservation strategy for several species on the Forest. The wildlife biologists use the best available science to determine effects of projects to species of concern, including threatened, endangered and sensitive species. Effects to sensitive species at the landscape scale can be found in the "Cumulative Effects" section of the *Biological Evaluation.*

6) A sensitive area on the back side of Rogers Mountain is an important wildlife habitat yet it is getting heavy commercial treatment. I have seen bear, moose, and even the old group of elk coming back and forth from this direction for decades. It is a corridor. Granted there are old existing roads, but left alone, undisturbed they will eventually fade. (Letter 2, Comment 13)

Response

Part of Rogers Mountain will receive treatment in Alternative G but not Alternative E. Black bear, moose and elk are fairly common in the planning area, and effects to moose and elk can be found in the *Effects to Management Indicator Species* document. Corridors were examined for a variety of wildlife species and effects to such habitat are listed in the *Biological Evaluation* and *Effects to Management Indicator Species* documents.

7) There do not appear to be any wildlife corridors in the South Deep Management Project. (Telephone conversation, Comment 6)

Response

Wildlife corridors that allow movement of animals among old structure stands, pine marten MRs and MA1 areas have been mapped for the South Deep area. Most lie outside harvest units, although partial or selective harvest can occur as long as sufficient cover remains. Additionally, the wildlife biologist conducts a subjective permeability examination of the landscape to determine whether or not an animal can move through the landscape without encountering large, human-created openings that would block movement. Discussion of this analysis is in the *Biological Evaluation* under grizzly bears.

8) What provisions are being made for threatened and sensitive species? How will greater logging and greater human penetration threaten their lives? The respondent would like to see management for specific species, for example bird populations such as the owl. (Letter 2, Comment 15)

Response

Each threatened, endangered, and sensitive species receives a thorough analysis by the project's wildlife biologists. The findings are available in the *Biological Evaluation* for this project. Additionally, the US Fish and Wildlife Service reviewed the findings for threatened and endangered species and concurred that the conclusions in the *Biological Evaluation* are valid.

9) Thinning and prescribed burning in some places cause the loss of specific kinds of wildlife. (Letter 3, Comment 3)

Response

This is true: when managing to promote habitat for some species habitat is reduced for other species.
A discussion of effects to management indicator species, and threatened, endangered, and sensitive

species can be found in the "Environmental Consequences" section of the *Biological Evaluation* and *Effects to Management Indicator Species* documents.

D.12 Fisheries

1) The South Fork of the Deep Creek travels through my property as well as a few lesser seasonal creeks. I have concerns about how activities and treatments will affect the brook trout in this area. I am not sure of the variety, but some are as large as 8-9". The water flow cannot fluctuate as the fish are in deep pools that are only created over time. What provisions have been made to minimize stream fluctuations? What about stream bank degradation and waters too muddy for the fish to breathe. Much of the commercial logging is on steep hillsides in this area. I cannot believe it will not negatively affect the South Fork of the Deep. (Letter 2, Comment 6)

Response

Eastern brook trout have persevered in the South Deep watershed for many years during which substantial portions of the watershed have been harvested and many miles of road have been constructed as part of these operations. Water levels naturally fluctuate during each year and from year to year primarily in response to weather and hydrology. Deep pools are usually created through the scouring action of water over either large instream wood and/or rock structure. This scouring occurs regardless of flow, although greater flows can create deeper pools in some circumstances.

No specific provisions have been made to minimize stream fluctuations but the level of proposed openings in either action alternative considered the amount of land area with openings in the canopy in each subwatershed (ie Rocky Creek) to try to ensure that these openings did not constitute more than 25% of the total canopy in each subwatershed. Under both action alternatives, the proposed levels of new openings in the existing forest canopy and increase in new roads as new drainage patterns (Alt G only) are not considered extensive enough to noticeably change the flow regime of the smaller subwatersheds on the National Forest. Therefore, the action alternatives are not expected to significantly alter flows in the larger South Deep watershed.

The proposed timber sales would not conduct timber harvest within the Riparian Habitat Conservation Area of any stream in the project area. A small number of new or reconstructed stream crossings are proposed which would remove a minor amount of riparian vegetation and, in the case of new crossings, rock the streambank on either side of the road corridor to stabilize the area and reduce streambank erosion. Most potential overland soil movement from proposed timber harvest on steep hillsides would be filtered out by the existing riparian vegetation between these units and the streams.

An increase in overall sediment introduction is expected under either action alternative and some of this will end up in the South Deep Creek. Project design, Best Management Practices, compliance with *Forest Plan* standards and guidelines and mitigation measures would substantially reduce any contribution.

In conjunction with some increase in sediment introduction, affected waters within the analysis area may temporarily become more turbid. The limited numbers of turbidity ratings that have been taken on several streams on the forest have not reached the level where scientific research indicates that damage has occurred to the fish from the abrasive action of soil particles on the gills.

2) There are concerns regarding fish bearing streams. Alternative E will have 15-20 crossings on Class II streams. Large brook trout up to 8 inches have been reported by recreationists in the South Fork of Deep Creek, and members of the public are very concerned about the potential degradation of this habitat. (Letter 1, Comment 32)

Response

The proposed activities, under Alternative E, do not include any new stream crossings. Regarding the effects to brook trout and its habitat, see answer to comment 1 in this section.

3) A landowner stated that there are bull trout in a stream on her property. Does this possibility change any of the actions in the South Deep Project EA? (Telephone conversation, Comment 6)

Response

The Forest Service is not aware of any bull trout in the Deep Creek watershed historically or presently. However, the presence of bull trout would not precipitate any change in the action alternatives. Regardless of fish species, the Best Management Practices, mitigation measures, and compliance with the Washington Department of Fish and Wildlife hydrologic permit approval and the *Forest Plan* standards and guidelines, as amended by Inland Native Fish Strategy, should limit any detrimental effect to fish and fish habitat.