United States Department of Agriculture

Grizzly Fire Salvage & Restoration

Environmental Assessment

Forest Service Idaho Panhandle National Forests Coeur d'Alene River Ranger District June 2016

For More Information Contact:

Project Leaders Kerry Arneson (karneson@fs.fed.us) and Will Young (wtyoung@fs.fed.us)

District Ranger Dan Scaife (dscaife@fs.fed.us)

Coeur d'Alene River Ranger District
2502 East Sherman Avenue
Coeur d'Alene, ID 83814

Telephone: (208) 664-2318
Fax: (208) 769-3062

Cover photo: *Road 6521A/Trail 807 as it passes through North Grizzly Unit 19. Forest Service photo taken May 13, 2016.*

In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at http://www.ascr.usda.gov/complaint_filing_cust.html and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442; or (3) email: program.intake@usda.gov.

USDA is an equal opportunity provider, employer and lender.

Contents

Contents ..... **i**
Introduction **1**
Overview of the Project Area and Background **1**
Project Location 1
Management Areas 2
Fire Severity 2
Purpose and Need for Action **6**
Project Planning Process **8**
Emergency Situation Determination 8
Public Involvement 8
Determining Proposed Salvage Units 14
Proposed Action and Alternatives **22**
Alternatives Considered but Eliminated from Detailed Study 22
Alternatives Considered in Detail 23
Alternative 1 - No Action 24
Alternative 2 - Proposed Action 24
Alternative 3 – Reduced Action 28
Range of Alternatives 29
Design Features 29
Mitigation Measures 30
Monitoring Activities 30
Research Opportunities 31
Framework for Cumulative Effects Analysis 32
Environmental Consequences **34**
Introduction 34
Issues 34
Human Safety 35
Forest Vegetation 37
Economics 47
Hydrology 52
Fisheries 64
Soils 69
Botany 76
Wildlife 81
Recreation 85
Scenic Quality 92
Other Issues Addressed But Not in Detail 108
References **111**

List of Appendices

Appendix A - Public Involvement **1**
Introduction 1
Changes Resulting From Public Comments 1
Key Public Concerns 2
Persons Consulted on the Proposal and Planning 9
Appendix B - Past, Ongoing and Reasonably Foreseeable Activities **1**
Introduction 1
Past Activities 1
Ongoing/Reasonably Foreseeable Activities 5
Appendix C - Design Features and Specific Activities **1**
Design Features 1
Specific Activity Information 11
Appendix D - Consistency with Legal Requirements **1**
Introduction 1
Federal Pollution Control Act (Clean Water Act) and Idaho State Water Quality Standards . 1
Executive Order 11988 (Protection of Floodplains) 2
Executive Order 11990 (Protection of Wetlands) 2
Endangered Species Act 2
Executive Order 12898(Environmental Justice) 2
Executive Order 13112 (Invasive Species) 3
2005 Travel Rule 3
National Forest Management Act 3
IPNF Land Management Plan 4

List of Tables

Table 1. Synopsis of comments received from agencies and organizations..... 11
Table 2. Summary of proposed activities, by alternative. 23
Table 3. Synopsis of past, ongoing and reasonably foreseeable activities. 33
Table 4. Key issues..... 35
Table 5. Resource indicators and measures for assessing effects to human safety. 35
Table 6. Summary comparison of effects to human safety. 36
Table 7. Resource indicators and measures for summarizing effects to forest vegetation..... 37
Table 8. Summary comparison of effects to tree species composition and the resistance and resilience of forest vegetation to disturbances and stressors. 43
Table 9. Summary comparison of effects to pre-fire old growth. 46
Table 10. Resource indicators and measures for assessing economic effects. 48
Table 11. Summary comparison of effects to economics..... 50
Table 12. Project feasibility and financial efficiency summary (2015 dollars)..... 51
Table 13. Resource indicators and measures for assessing effects to hydrology. 52
Table 14. Summary comparison of effects to sediment yield. 59
Table 15. Salvage as percent of watershed..... 60
Table 16. Summary comparison of effects to water temperature..... 63
Table 17. Resource indicators and measures for assessing effects to fisheries. 65
Table 18. Summary comparison of effects to riparian habitat..... 66
Table 19. Summary comparison of effects to Westslope cutthroat trout. 68
Table 20. Resource indicators and measures for assessing effects to soil productivity and stability. 70
Table 21. Summary comparison of effects to soil resources..... 74
Table 22. Resource indicators and measures for assessing effects to black-backed woodpeckers. 81
Table 23. Summary of rationale for wildlife species not analyzed in detail. 82
Table 24. Wildlife species analyzed in detail..... 82
Table 25. Summary comparison of effects to black-backed woodpeckers. 84
Table 26. Resource indicators and measures for assessing effects to recreation..... 86
Table 27. Summary comparison of effects to recreation..... 88
Table 28. Resource indicators and measures for assessing effects to scenery. 99
Table 29. Summary comparison of effects to scenery..... 105
Table A-1. List of agencies, tribes, organizations and businesses contacted/involved during project development, planning and analyses. 9
Table A-2. List of individuals contacted/involved during project development, planning and analyses. 13
Table B-1. Summary of past activities/events in and adjacent to the project area. 1
Table C-1. Design feature descriptions and implementation information applicable to the project. 2
Table C-2. Alternative 2 unit information..... 11
Table C-3. Alternative 3 unit information..... 13
Table D-1. Consistency with Forest Plan Goals..... 5
Table D-2. Consistency with Forest Plan Desired Conditions..... 5
Table D-3. Consistency with Forest Plan Objectives..... 7
Table D-4. Consistency with Forest Plan Guidelines..... 8
Table D-5. Consistency with Forest Plan Standards. 9
Table D-6. Consistency with the Inland Native Fish Strategy. 9
Table D-7. Consistency with the Management Area-2b designation..... 10
Table D-8. Consistency with the Management Area 6 designation. 11

List of Figures

Figure 1. Vicinity map of the Grizzly Fire Salvage and Restoration Project Area. 3
Figure 2. Background shows mixed severity burn in a portion of the Lower Flat Fire (proposed Unit LF10). Foreground (bottom of photo) shows a burnt sapling-size plantation. US Forest Service photo, September 10, 2015. 4
Figure 3. The overstory of this stand (proposed for salvage) is dead due to a severe surface fire. Char heights on the stems are very high, lower crowns are thoroughly scorched and the ground is already covered with needle cast. US Forest Service photo, September 10, 2015. 4
Figure 4. The overstory of this stand (proposed for salvage) is dead due to a moderate surface fire. Char heights on the stems are from 2-6 feet, lower crowns are thoroughly scorched and the ground is already covered with needle cast. US Forest Service photo, September 10, 2015. 5
Figure 5. The overstory of this stand (proposed for salvage) is dead due to a low intensity surface fire that consumed the organic layer of the forest floor. Char heights on the stems are up to 3 feet, lower crowns are moderately scorched, and the roots are exposed on the hemlock trees in the foreground. US Forest Service photo, September 10, 2015. 5
Figure 6. Overlooking a portion of the area burned within the project area. 10
Figure 7. Within a unit proposed for salvage and planting. 10
Figure 8. Unit 19 was dropped because field surveys found it was in a stand of surviving old growth. 19
Figure 9. A stand that no longer meets minimum old growth criteria and is proposed for salvage (Lower Flat Unit 24). 20
Figure 10. Flat Creek Forest Road 400 was burned over at multiple locations. Fire-killed trees are expected to fall over during the next few years, impeding public safety and access on roads and trails. 25
Figure 11. Broad area in the Flat Creek floodplain showing a low severity burn area. 53
Figure 12. Side tributary to Flat Creek that had a high severity burn. 54
Figure 13. Project map highlighting the relevant watersheds to be used as the spatial bounds for analysis. 58
Figure 14. Surface fuels consumed in the fire and mineral soil exposed. 71
Figure 15. Road 208 follows the course of the North Fork Coeur d'Alene River..... 93
Figure 16. A foreground view of an area that experienced intense fire activity..... 95
Figure 17. A foreground view of an area that experienced spotty ground fire..... 96
Figure 18. A middleground view of an area that experienced swaths of fire activity. 97
Figure 19. A middleground view of live and dead tree crowns..... 98
Figure 20. Foreground, middleground, and background views in the project area. 99
Figure 21. Scenic integrity objectives and sensitive viewpoints/travel corridors in the project area. 104

Introduction

In 2015, nearly 300 wildfires impacted tens of thousands acres on National Forest System lands in northern Idaho. Approximately 47,500 acres burned on the Idaho Panhandle National Forests (IPNF) and over 25,000 of that was in the Grizzly Complex itself; of those 25,000 acres approximately 14,500 make up the project area and within the project area, salvage operations would harvest trees over approximately 1,700 acres within these burned areas.

The Grizzly Fire Salvage and Restoration Environmental Assessment (EA) documents a site-specific effects analysis of activities proposed in a portion of the area that burned in the 2015 Grizzly Complex Fire on the Coeur d'Alene River Ranger District of the IPNF. A project interdisciplinary team developed alternatives to the proposed action based on existing condition data, best available science, professional judgment, public comments and concerns and legal requirements. The project has been designed to avoid or minimize potential impacts to resources to the extent possible, and activities would comply with all applicable laws, regulation, and direction, including the 2015 Land Management Plan (Forest Plan) for the IPNF. The team conducted an in-depth analysis to determine whether effects of the proposed activities were significant, which would warrant preparation of an environmental impact statement (EIS). Preparation of this EA fulfills agency policy and direction to comply with the National Environmental Policy Action (NEPA) and other relevant Federal and State laws and regulations, as no significant issues were identified or were mitigated for during the analysis.

Supporting resource reports and biological assessments are incorporated by reference into this document. Throughout this EA, specific documents are cited by their assigned project file document (PF Doc.) number. These documents are part of the project record and available upon request.

Overview of the Project Area and Background

Project Location

The project area (see Figure 1, Vicinity Map) is located north of Enaville and west of Prichard, Idaho, in the North Fork Coeur d'Alene River drainage, and consists of National Forest System (NFS) lands within the perimeter of the Grizzly Complex Fire, Shoshone County, Idaho (portions of T50N-R2E; T50N-R3E; T51N-R2E; T51N-R3E; T52N-R2E; T52N-R3E; Boise Meridian). A large-scale map and other documents are available on the project website: http://www.fs.usda.gov/project/?project=48585.

The project area is located entirely within areas burned by the 25,127-acre Grizzly Complex Fire, which consisted of several lightning-caused fires that started during storms on August 10 and August 22, 2015, and burned until late October 2015. These fires ultimately accounted for nearly 90 percent of the total acres burned on the Coeur d'Alene River Ranger District in 2015. This assessment is not intended to analyze the effects of the fire, only the effects of the proposed activities under the action alternatives as measured against the current condition. In that respect, it is important to have a basic understanding of how the fires burned, the resource conditions in the aftermath of the fires, and post-fire actions already taken.

The Grizzly Complex Fire consisted of six individual fires managed as one incident. All but 116 acres (private lands within the perimeter of the Lower Flat Fire) burned on National Forest System (NFS) lands. Activities are proposed in three of the fire perimeters: Grassy (860 acres), Lower Flat (8,295 acres), and North Grizzly (5,325 acres), as displayed in Figure 1.

Management Areas

The majority (nearly 90 percent) of the project area falls in Management Area (MA) 6, General Forest. The IPNF Land and Resource Management Plan (Forest Plan) describes this management area as "relatively large areas with roads, trails, and structures, as well as signs of past and ongoing activities designed to actively manage the forest vegetation." The Forest Plan also states, "Many of the acres within this MA are suitable for the production of timber on a regulated basis, providing wood fiber in response to regional and national demand." In much of this MA, vegetation management activities have a dominant role in affecting the composition, structure, and pattern of vegetation. These management activities trend the vegetation towards the desired conditions. Although natural ecological processes and disturbances are still present, they are influenced more by human activity in this MA than in others (page 71).

Small amounts of the project area are within Management Areas 2b and 5. Management Area (MA) 2b applies to river segments that have been classified as eligible for "Recreation" designation under the Wild and Scenic Rivers System described in the Forest Plan. A total of 214 acres of activities are proposed in MA2b, including approximately 150 acres of roadside danger tree removal and 64 acres of salvage, nearly all within two Lower Flat units, LF07 (35 acres) and LF26 (25 acres). The proposed salvage would occur along the outside edge of the MA2b corridor, on a relatively flat bench immediate above and west of the paved road; therefore, the units would be very difficult to see from the main travel corridor or from the river in general. The Forest Plan (page 61) states that "Timber harvest is allowed to maintain or restore the values for which the recreation river was identified…" (MA2B-GDL-TBR-02). The objective and design of the salvage and subsequent tree planting are to reduce the amount of standing dead trees while maintaining large snags and live trees, to maintain structural diversity and minimize potential visual effects. The tree planting would include cedar, larch and rust-resistant white pine to enhance species diversity, visual appeal, and the quality of the wildlife habitat of the new, developing stands while providing valuable seed sources for each of these species in defense against future disturbances.

MA 5 is considered "backcountry," which generally has no roads and provides a variety of motorized and non-motorized recreation opportunities (Forest Plan, page 69). Although present within the project area boundary, no activities are proposed in MA 5.

Fire Severity

Fires in the Grizzly Complex burned with varying severity, leaving a mosaic of burn patterns that ranged from unburned islands to areas where tree crowns were completely consumed. Much of the area was burned by moderate to severe surface fires which consumed all or most of the organic material on the forest floor (Figure 2 through Figure 5).

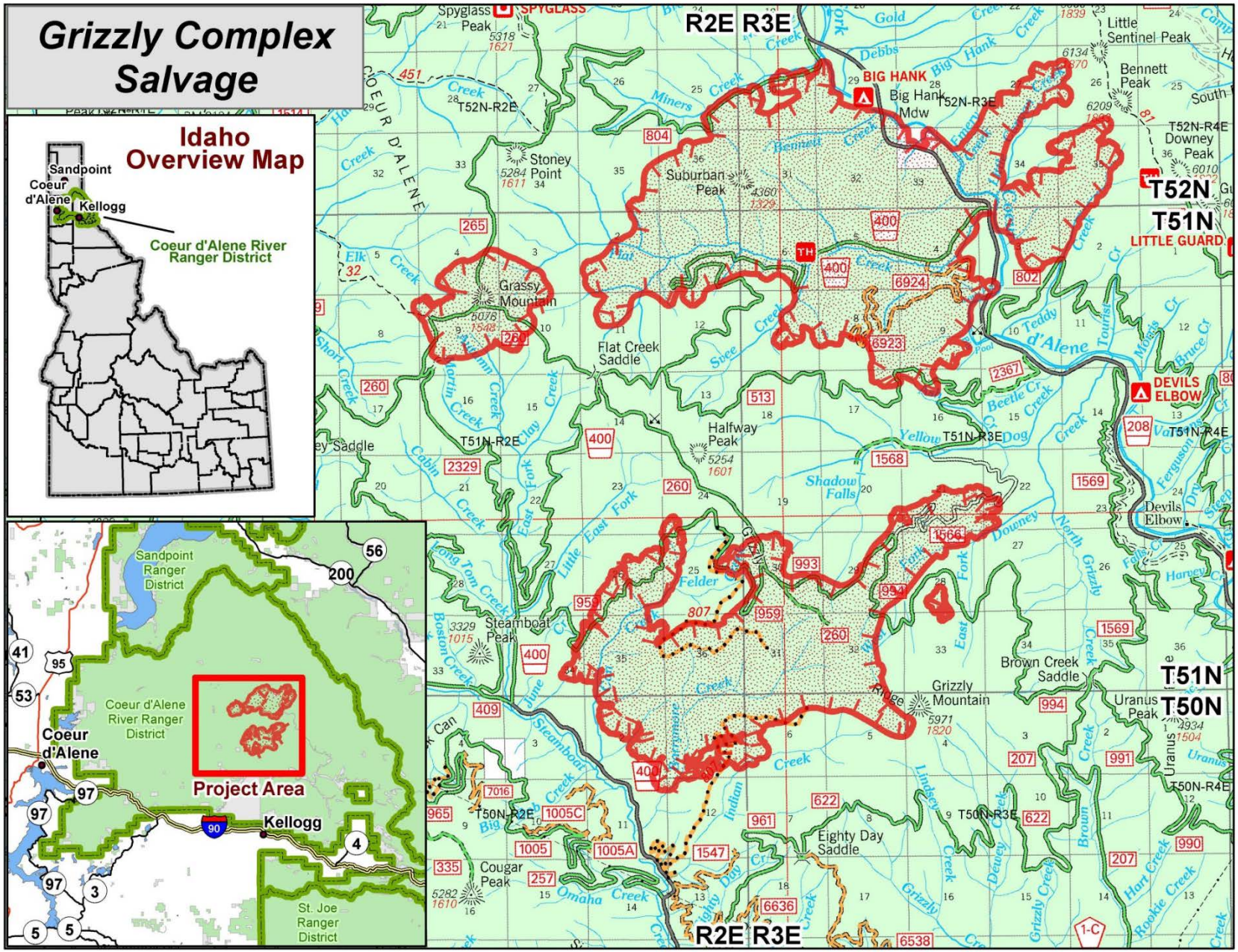

Figure 1. Vicinity map of the Grizzly Fire Salvage and Restoration Project Area.

Figure 2. Background shows mixed severity burn in a portion of the Lower Flat Fire (proposed Unit LF10). Foreground (bottom of photo) shows a burnt sapling-size plantation. US Forest Service photo, September 10, 2015.

Figure 3. The overstory of this stand (proposed for salvage) is dead due to a severe surface fire. Char heights on the stems are very high, lower crowns are thoroughly scorched and the ground is already covered with needle cast. US Forest Service photo, September 10, 2015.

Figure 4. The overstory of this stand (proposed for salvage) is dead due to a <u>moderate</u> surface fire. Char heights on the stems are from 2-6 feet, lower crowns are thoroughly scorched and the ground is already covered with needle cast. US Forest Service photo, September 10, 2015.

Figure 5. The overstory of this stand (proposed for salvage) is dead due to a <u>low intensity</u> surface fire that consumed the organic layer of the forest floor. Char heights on the stems are up to 3 feet, lower crowns are moderately scorched, and the roots are exposed on the hemlock trees in the foreground. US Forest Service photo, September 10, 2015.

Most stands within the project area are dominated by relatively fire intolerant western hemlock and grand fir; occasionally, on colder sites above 4,000 feet elevation, stocking is comprised of mountain hemlock, subalpine fir, spruce and lodgepole. Since each of these tree species are easily damaged and/or killed by low to moderate intensity fires due to thin bark and shallow roots, low rates of survival are expected. Virtually all trees within the very high severity areas are dead or expected to die; a substantial portion of trees in the moderate and high burn severity areas have been killed by the fire. Viewed from a distance, some forest stands may still appear green because the tree crowns were not burned. Even in many of those stands, the trees are dead because their thin bark did not protect them from the intense heat generated by the wildfire as it burned through the uncharacteristically dry fuels on the forest floor and within the upper layers of the soil.

Post-fire Actions

During fire suppression, the majority of ground-disturbing suppression effort focused on using existing road prisms; a few fire lines were constructed using heavy equipment and hand crews. Danger trees felled during fire suppression and fire line construction were decked along roads; five of these log decks were sold in the fall of 2015, totaling approximately a half of a million board feet.

When no longer needed for fire suppression, all fire lines were deconstructed by scarifying compacted soil, scattering brush and timber over disturbed soil, and seeding. Monitoring of the fire showed some erosion of the forest floor in small isolated areas of high severity fire, and little erosion of road surfaces. All roads used during suppression efforts received or will receive maintenance to return the road to pre-fire condition. Maintenance included blading, brushing and, where needed, establishing or re-establishing drainage features to reduce risk of road surface erosion. These actions, combined with a heavy post-burn needle cast, reduced the risk of erosion.

An evaluation of values at risk, considering imminent threats to human life and property did not warrant a Burned Area Emergency Response funding request and the agency continued to monitor those risks.

Given the short window of opportunity for treatments in 2015, as the fires burned late into the year and a season ending event shut down all operations, only a portion of the treatments needed to address danger trees and road work was accomplished through these post-fire activities.

Purpose and Need for Action

The purpose of the Grizzly Fire Salvage and Restoration Project is to protect the health and safety of the public, recover some forest product economic value and benefit, and accelerate restoration in portions of the landscape burned by the Grizzly Complex fires. Removal of the burned trees would also prepare the area for safe and timely reforestation with desired early seral tree species. Reforestation would expedite the re-establishment of a forested landscape with appropriate early seral tree species; i.e. western white pine and western larch.

These actions are needed because the existing conditions in the burned area deviate from the desired future condition as described by the 2015 Idaho Panhandle National Forests Management Plan (Forest Plan). The differences exist in a variety of resource areas, but are most pronounced in the areas of public safety, forest resiliency, and contribution to local economies from forest products.

Desired conditions for the area are as follows:

- Provide a safe and dependable transportation system free of unstable fire-affected trees or other hazards in areas of public and administrative use. Currently, roads within the fire perimeters have a heightened risk of danger trees falling, blocking access and threatening public and employee safety. The Forest Plan desires a transportation system that provides safe and efficient public and administrative access to the Forest (FW-DC-AR-07). Over time, additional danger trees would continue to fall because of increased defect, death, weathering agents, heavy snow, and other environmental factors. With existing and predicted risk, there is a need to remove danger trees along specific routes to improve safety for forest users.

- Re-establish and restore forested conditions to trend the project area toward Forest Plan desired conditions; in particular, increase the representation of early seral conifer species. The current composition of the forest, both at stand and landscape levels, deviates from desired conditions identified in the Forest Plan. Instead of having more of the forest dominated by western white pine, ponderosa pine, and western larch (FW-DC-VEG-01) that are more resistant to drought, fire and insects, current forest composition in the project area is dominated by less resilient western hemlock, grand fir and Douglas-fir trees. Planting native tree species (e.g. blister rust-resistant white pine and western larch) in the salvage units and the roadside danger tree removal areas after harvest and site preparation activities are completed would hasten and enhance the overall recovery process, meet restoration objectives, and trend the vegetation component toward desired future conditions.

- Recover the economic value of forest products in a timely manner to contribute to employment and income in local communities. As described by Forest Plan (FW-DC-TBR-01), it is desired that salvage of dead and dying trees capture as much of the economic value of the wood as possible while retaining the amount needed for wildlife habitat, soil productivity and ecosystem functions as described in the Proposed Action. The proposed salvage units occur in stands where it is estimated the dead and dying trees have enough merchantable timber to provide an economically viable timber sale that would capture the commodity value necessary to accomplish project objectives while contributing to employment and income in local communities. A time sensitive and viable sale is critical to ensure that project objectives can be accomplished.

A number of research studies have demonstrated that insects (primarily beetles), stain and decay fungi, and weather all act as deterioration agents in fire-killed timber. Deterioration of the fire-killed and damaged trees has a number of impacts. Lumber quality is reduced, merchantable volume of wood (and therefore, value) is reduced and most importantly, the deteriorating dead trees pose substantial safety hazards to the public and forest workers. Consequently, the ability of the Idaho Panhandle National Forests to accomplish the purpose and need for the project is strongly tied to the timing of the salvage harvest and danger tree removal.

Project Planning Process

Emergency Situation Determination

The Forest requested and, on May 13, 2016, was granted an emergency situation determination (ESD) for the Grizzly Fire Salvage and Restoration Project pursuant to Title 36, Code of Federal Regulations (CFR) Part 218.21. Authority to grant ESDs rests solely with the Chief and Associate Chief of the Forest Service. ESDs are only granted in situations where immediate implementation of a decision is necessary to achieve one or more objectives as defined in the regulation at 218.21(b). The ESD for the Grizzly project was granted based on a need to address safety concerns, to protect forest resources, and to avoid a loss of commodity value that would jeopardize the agency's ability to accomplish project objectives related to resource protection and restoration.

We have made every effort to complete the process as quickly as possible, while still accomplishing all of the necessary data collection and conducting a full and thorough analysis, and engaging and informing the public throughout the entire process. Field work, project design, and planning began even before the fire was declared contained in late October 2015; team members continued to access the area by snowmobile and snowshoes over the winter, and have been able to access more units as snow melts and roads stabilize this spring and early summer. The public scoping and comment periods, usually offered separately and lasting 30 days each, were offered as a single 30-day opportunity.

In addition to the comment period(s) offered during project development, the public involvement process normally provides a 30-day objection period after publication of an environmental assessment (EA) and *draft* decision notice (DN). Under 36 CFR 218.21(d), when an ESD is granted, the proposed project is not subject to the predecisional objection process and may be implemented immediately after providing the required notification of the decision (36 CFR 218, page 18490). "Immediate implementation" does not mean a project would be implemented immediately after the fire. It means the project would be implemented immediately after completion of environmental review work, when agency is prepared to issue a decision and prior to substantial timber deterioration. This puts the Forest in the best position to remove hazards safely, complete associated resource protection/restoration projects and capture enough commodity value to sell some of the trees.

Field observations in May 2016 found that burned stands have already begun deteriorating and are being further damaged by insects. Without the ESD and rapid implementation, value would quickly be lost, human safety would be at greater risk due to danger trees, and restoration of stands would be substantially delayed.

Public Involvement

Project development, public involvement, and the ongoing analysis process have followed the Council on Environmental Quality (CEQ) regulations for implementing NEPA (40 CFR Parts 1500 through 1508). We recognize that the public involvement associated with this project has been reduced by combining comment periods (scoping with notice and comment) and utilization of an ESD. In order to receive public input and keep the public informed, based on the compressed timeframe, we started public involvement early, provided as much preliminary analysis information as was available at the time, hosted a public meeting during the comment period, hosted a field trip to the project area, and promptly answered questions during telephone

calls and meetings with members of the public. We will to continue meeting with interested groups and members of the public throughout the process, including answering questions as they come in and providing additional field trips if requested.

Initial public involvement efforts were used to develop the proposed action. These included discussions with local state and county government, the Panhandle Forest Collaborative group, and industry representatives. The combined scoping and 30-day notice and comment period under 36 CFR 218.24(b)(3) was initiated with a letter dated January 28, 2016, which was sent to approximately 330 interested individuals and groups, including state and local government agencies, elected officials, tribal representatives, environmental advocacy groups, adjacent property owners, recreational groups, and the general public (a list is provided in Appendix A). A legal notice for the 30-day comment period was published in the *Coeur d'Alene Press* newspaper on January 29, 2016.

Information was shared and comments sought through the IPNF Quarterly Schedule of Proposed Actions (SOPA), with documents, maps and other materials posted to the IPNF webpage as they became available. To share as much information about the proposal as possible, we conducted an open-house meeting at the district's Silver Valley Office on February 17, 2016. The public was notified of this meeting in the comment letter, legal notice, and through social media. District Ranger Dan Scaife, Deputy District Ranger Ryan Foote, and several project team members were available to answer questions and share maps and other materials. A geospatial "Story Map" was used to display the proposed action map, as well as photos of each proposed unit and some roads in the area. Twenty-one people attended the open house, including representatives of Kootenai Environmental Alliance, Shoshone County Board of County Commissioners, Idaho Department of Fish and Game, Idaho Department of Lands, local timber purchasers/operators, Shoshone News Press newspaper, and other interested individuals.

A field trip to the area occurred on June 10, 2016. A total of eight members of the public participated, with five representatives from the Coeur d'Alene River Ranger District, including the District Ranger, Deputy District Ranger, silviculturist, fisheries biologist, and vegetation program staff officer. (There were other members of the public who were interested in the field trip but unable to attend on that date; additional field trips may occur to ensure these individuals have the opportunity to visit the area with project team members.) The group spent the day viewing the area, with stops made to observe the landscape from a distance, to look at stands that were excluded from treatment, and to view conditions in proposed salvage units (Figure 6 and Figure 7).

The views generated discussions of fire mortality (especially in thin-barked trees), pre-fire old growth (as well as existing old growth stands that were dropped from treatment), roadside danger tree removal, and reforestation opportunities.

Throughout the process, we responded to questions from individuals through telephone calls and emails, as well as having ongoing discussions with local state and county government, and industry representatives.

Figure 6. Overlooking a portion of the area burned within the project area.

Figure 7. Within a unit proposed for salvage and planting.

Overview of Public Responses

During the 30-day notice and comment period, we received a total of 79 letters from a variety of stakeholders with very differing viewpoints. Of the total, 31 were unique comment letters with individual comments, and 48 were based on an "Action Alert" posted on the American Forest Resource Council's "Healthy Forests, Healthy Communities" Action Center webpage. All of the letters are available for public viewing in the project's online reading room at http://www.fs.usda.gov/project/?project=48585; on the right-hand tool bar, click on the Public Comment/Objection Reading Room link.

All but 11 letters received were from individuals; those 11 letters came from representatives of state and county governments, environmental organizations, and the timber products industry (Table 1). A complete list of those who provided comments or were otherwise involved in project development is provided in Appendix A.

Table 1. Synopsis of comments received from agencies and organizations.

Name	Synopsis
Backcountry ATV/UTV Club *(Hayden, ID)*	Supports the proposed activities.
Idaho Parks & Recreation *(Jeff Cook - Boise, ID)*	Recommended specific trail protection and rehabilitation
Idaho Fish & Game (*Chip Corsi - Coeur d'Alene, ID)*	Recommendations for snag retention, stream buffers, front-end road obliteration
Idaho Forest Group *(Tim Dougherty - Moyie Springs, ID)*	Supports proposal based on economic value, forest rehabilitation, and expediency, with recommendations for timber sale contracts
Kootenai Environmental Alliance *(Mike Mihelich - Coeur d'Alene, ID)*	Concerned with need for high quality information, cumulative effects analysis, post-sale monitoring, rain-on-snow effects
Thompson River Lumber Company *(Shawn Morgan - Thompson Falls, MT)*	Supports proposal based on fire risks, need for reforestation, economic value, and expediency
American Forest Resource Council *(Tom Partin - Lake Oswego, OR)*	Supports proposal based on need for a safe transportation system, to re-establish early seral conifers, and to recover economic value for local employment; strongly supports ESD
The Lands Council *(Mike Peterson - Spokane, WA)*	Supports salvage but recommends a new alternative based primarily on excluding pre-fire old growth and dropping temporary road construction
Shoshone County Commissioners *(Wallace, ID)*	Supports proposal based on public safety, economic value, restoration, reforestation
Idaho Conservation League *(Brad Smith - Sandpoint, ID)*	Recommends a new alternative based primarily on excluding pre-fire old growth and dropping temporary road construction
Kootenai Environmental Alliance/ Alliance for the Wild Rockies *(Janet Torline - Harrison, ID; Adrienne Cronebaugh - Coeur d'Alene, ID; Michael Garrity - Helena, MT)*	Opposes proposal based primarily on process, effects to resources, and opposing science; requested project be dropped or an EIS be prepared

Of the total comment letters received, 69 indicated support for the project primarily because they agreed with the purpose and need and believe the project would protect public health and safety by removing hazardous trees, capture the economic value of the dead and dying timber and contribute to the local economy, and reforest burned areas with early seral tree species to improve forest resiliency. Additionally, some of these comments also believe that the project would reduce future fire risks.

Idaho Forest Group, employing over 900 people in five lumber mills in northern Idaho, urged the agency to expedite the process to provide for rapid salvage opportunities, recovery of resources, and rapid rehabilitation of affected areas. A letter was also received from the Shoshone County (Idaho) Board of Commissioners, stating they were very supportive of the Grizzly proposal, and believe it is imperative that the salvage project be undertaken to protect the health and safety of the public, recover the remaining forest product economic value and benefit, restore portions of the landscape burned by the Grizzly Complex Fire, and prepare the area for safe and timely reforestation.

These reasons correspond closely with the purpose and need for action in this area based a comparison of current conditions and the desired conditions, goals and objectives identified by the 2015 IPNF Land and Resource Management Plan (Forest Plan). The proposed removal of roadside danger trees, salvage of dead and dying trees, and associated tree planting would address these concerns. Several comments received during scoping also expressed concerns that economic values were not being fully considered, and suggested that salvage activities be expanded beyond the scope of the original Proposed Action.

Six of those who wrote (including representatives of Idaho Department of Fish and Game, Idaho Parks and Recreation, Kootenai Environmental Alliance and three individuals) did not indicate whether they supported or opposed the project; instead they offered specific concerns and questions regarding how the activities would be implemented or how certain issues would be addressed. Their comments were used to ensure that all relevant issues are addressed during the analysis, and that the implementation design is complete and well thought out. Two commenters suggested that an alternative be considered that would not salvage in pre-fire old growth stands and would not include the temporary road construction; as described below, these comments led to the development of Alternative 3.

The remaining four opposed the project. Letters from three individuals and one on behalf of two organizations (Kootenai Environmental Alliance/Alliance for the Wild Rockies) indicated concern with the process and/or effects of the proposed salvage and associated activities. Key concerns identified in the four letters opposing the project have been addressed through design features and/or resource analyses as follows.

Concern: There would be general detrimental effects associated with the proposed activities.

Field work and environmental effects analyses completed by the project team does not support this concern and have only validated the assumptions and predications made by the team last fall, as described to the public during the notice and comment period. As described later in this environmental assessment and in Appendix D (Consistency), there would be no significant impacts to any resources as a result of proposed activities, because of mitigation and project design features.

One individual specifically recommended that it would be better to leave healing to nature. Under Alternative 1, none of the proposed salvage operations or reforestation activities associated with the action alternatives would occur (to improve public safety, some roadside danger trees would be felled but not removed). This would address to some extent the desire that the area be left to heal on its own over time, and would demonstrate the effects of not implementing the full proposed action, but would not meet the purpose and need of the project to provide for restoration, public safety, and economic benefit.

Concern: The public was provided insufficient information and deprived of their EA review/objection process opportunities.

Of the 79 who provided written comments, only two commented that they did not receive enough information to be able to provide informed comments. As described earlier, we have answered questions and discussed post-fire conditions and the proposed salvage with individuals, industry representatives, and members of other organizations (for example, with collaborative group members) through meetings, telephone calls, and a public field trip. The two that voiced this concern did not request additional information or participate in the June 10, 2016 field trip.

Two people stated in their comments that the ESD would deprive the public of their opportunity to provide meaningful comment during a more formal EA review process and the opportunity to participate in the objection process.

The intent of the objection process is to encourage early and meaningful public involvement, allowing the Forest Service to resolve concerns prior to issuing a decision. As just described, the agency has made every effort throughout the process to inform and involve the public, and be responsive to public concerns.

Concern: Scientific Controversy over Salvage Logging

In the western United States, the topic of salvage logging is surrounded by a considerable amount of public controversy. The controversy centers on generalized ecological consequences and a fundamental premise that there are no ecological benefits to salvage logging (Hutto 2006, Noss et al., 2006). The four comment letters opposing the Grizzly Fire Salvage and Restoration project reflect the primary issues of concern in the debate. These include the importance of biological legacies, in particular large snags and large live trees; effects to wildlife species associated with recently burned forests, such as black-backed woodpeckers; effects to burned and exposed soils; and effects to riparian areas. There are however also valid socio-economic reasons for conducting post-disturbance logging, such as economic recovery of potential lost value, providing economic activity for rural communities, and mitigating public safety hazards posed by dead and damaged trees along transportation corridors and in high use areas.

National Forest System lands are managed for multiple uses, social values, ecological, economic, and others must be considered. The challenge for post-disturbance management is to determine, based on established management objectives, where and when salvage logging is appropriate, and how to avoid, minimize or mitigate the potential for undesirable ecological effects associated with proposed salvage activities.

Lindenmayer et al. (2008) present a wide-ranging summary of the documented ecological consequences associated with salvage logging after natural disturbances, and highlight the central components of the debate. They provide management recommendations for excluding areas from salvage, identifying situations where salvage may be appropriate, and planning salvage logging

operations. The points raised in opposition to the Grizzly project reflect the issues and supporting literature considered in Lindenmayer et al (2008).

The bulk of published literature about the ecological effects of salvage logging considers large-scale salvage that removes most, if not all, living and dead vegetation across large areas. There is a widely acknowledged shortage of research and monitoring data concerning smaller scale salvage projects, like the current project in this ecological setting, that are designed to minimize undesirable ecological effects while realizing other social or economic benefits.

There is also little empirical data about mortality associated with grand fir and western hemlock, species which occur with great frequency in all sizes throughout the IPNF and within the areas burned in the 2015 fires. During development of the Grizzly Fire Salvage and Restoration proposal, district Silviculturist Jason Jerman contacted Sharon Hood, a renowned research ecologist at the Rocky Mountain Research Station - Missoula Fire Sciences Laboratory (see http://www.firelab.org/profile/hood-sharon), to see if she had any further data related to published findings on grand fir and western hemlock. Their conversation brought the realization that the 2015 fires on the IPNF provide an excellent opportunity to further our understanding of the fire resiliency of these two species and others in moist habitats of the Inland Northwest. They also agreed it would be useful to monitor conifer establishment over time in the burned areas. Preliminary results confirm that these species are intolerant of low to moderate severity fire (personal communication with Jerman and Hood, 2016).

In order to assess the potential effects of salvage harvesting on overstory tree survival and regeneration establishment, it was determined that plots would be established in both unsalvaged and salvaged stands. This methodology is expected to provide baseline data which will be useful for validating the criteria we have proposed for assessing mortality/survival by conifer species. The data collected will also be useful for refining assessment of and prediction of long-term effects of mixed severity fires, with and without post-fire management activities, on regeneration given the contemporary forest conditions, which are significantly different than historic conditions.

Public Identification of New Issues and Alternatives

The public comments did not result in the analysis of any new issues; however, as a result of recommendations from The Lands Council and Idaho Conservation League, based on known issues an additional alternative (Alternative 3) was developed that would exclude from salvage any stands that met old growth criteria prior to the fires (i.e. pre-fire old growth), and would not include any temporary road construction. Alternative 3 is described in greater detail later in this document.

Determining Proposed Salvage Units

Background

The discussion on determining proposed salvage units provides a framework for considering the proposed units in light of public debate and current literature. This discussion reviews the management context of the planning area, and considers the design, content, and extent of the proposed activities relative to management recommendations presented in Lindenmayer et al (2008).

In the fall of 2015, field reconnaissance of the Grizzly Complex indicated high fire severity in terms of estimated overstory mortality, based on a combination of widespread moderate to high soil burn severity and high stocking levels of species with low resistance to fire damage at the root collar and roots. It also became apparent that while crown fire did occur in the burn areas, it was generally uncommon.

Because overstory mortality rates are estimated to be high but the crowns are still primarily intact due to a lack of crown consumption, it is expected that large quantities of seed will be deposited throughout the burned areas. The vast majority of the conifer seed that will contribute to the natural regeneration of these burned sites will be grand fir and western hemlock on warm/moist habitat types or grand fir and Douglas-fir on warm/dry habitat types because these three species were the most common species in the project area prior to the fires (Forest Vegetation Report). Western larch, western white pine and ponderosa pine occur in limited quantities across the project area and very few stands have enough reproductively mature individuals to ensure adequate regeneration of these three early seral species in the stand initiation stage. In a study of post-fire regeneration on dry mixed conifer sites in the Northern Rockies, Kemp et al. (2016) found that the composition of the post-fire regeneration reflected the composition of the pre-fire stand composition. It is reasonable to expect the same pattern to hold true on both warm/moist and warm/dry habitat types within the Grizzly Complex.

Forest plan desired conditions (Forest Plan, pages 11-12) indicate a need to decrease the proportion of Douglas-fir, grand fir and hemlock forest cover types across the forest and increase ponderosa pine, western larch, and western white pine. If left to natural recovery, the future forest composition of the vast majority of the stands burned in the Grizzly Complex is expected to deviate from desired conditions due to the presence of Douglas-fir, grand fir and western hemlock and the absence of white pine, ponderosa pine, and western larch seed sources in the burned areas. The disparity between desired forest composition and expected future conditions is the primary reason (purpose and need) for the proposed salvage activities.

The activities proposed for the Grizzly Fire Salvage and Restoration Project and analyzed in this environmental assessment were designed to address both the ecological and economic concerns presented by the post-fire conditions in the project area. The management context of the Forest Plan provides an opportunity to balance economic benefits with ecological considerations in both the short and long term.

A preliminary screening process evaluated sites that for initial consideration for post-fire salvage logging opportunities and sites that did not meet all criteria were excluded.

- Units should occur where site conditions such as soils and aspect are favorable for establishment and sustainability of western white pine.
- Units should occur on sites with enough merchantable saw log material that they are economically viable.
- Units should generally avoid sites burned with very high severity (crown fire areas) to avoid detrimental impacts to soils and leave standing dead to provide shade for future revegetation efforts.
- Units should occur on suitable timber lands in MA 6 (limited exceptions were made for logistical reasons on small portions of Management Area 2b)
- Stands that still met minimum old growth criteria (Green et al 1992) will be excluded from salvage.

- Inventoried roadless areas were excluded from consideration.
- Riparian Habitat Conservation Areas are excluded from harvest although trees can still be felled for public and operational safety reasons, but not removed.
- Units would not occur on sites with high mass failure potential.
- Units that would require new system road construction were excluded.
- Construction of temporary roads should remain short and preferably not cross water features.

Verification of Fire-caused Mortality

Mortality levels within the proposed salvage units were verified by experienced foresters during field reconnaissance. In the fall of 2015, crews visited 85 percent of stands identified as having salvage potential; the remainder of the units were visited in early 2016. Based on the preliminary screening described above, units were included in the proposed action if most of the trees were dead, in the process of dying, or expected to die in the near future due to the combined impacts of the fire itself (root kill, cambium kill on the tree bole, crown scorch and/or crown consumption) with other secondary agents, such as bark beetles, insect attacks or root disease pathogens. Forest stands within the fire perimeter were not included as proposed salvage units if it was determined that tree mortality was potentially low.

During sale area layout, unburned patches were excluded from proposed salvage either by excluding them from the harvest unit through boundary location or, for small patches within units, by marking live trees for retention.

Vegetation Recovery and Management Considerations

Proposed salvage activities are focused in areas where those activities would be most likely to produce results consistent with the desired conditions as described in the Forest Plan and minimize impacts to other resources. Wagenbrenner et al (2015) infer that;

"…post-fire salvage logging generally will have a shorter-term effect on larger-scale runoff and sediment yields in more productive sites, while areas with slower regrowth have a much greater potential for additional sediment from salvage logging to be delivered to the stream network."

While conducting reconnaissance it was noted that some of the stands that had been clearcut and burned in the past on southerly aspects within the burn areas had relatively poor reestablishment of vegetation. This was due in part to high insolation rates (i.e. exposure to the sun's rays or the amount of solar radiation reaching a given area) which contributed to excessive water stress in seedlings, shrub competition, and possibly to animal damage to seedlings.

With consideration of past reforestation difficulties and the inference made by Wagenbrenner et al (2015) we decided to generally avoid salvage activities on south/southwest aspects, particularly those with steep slopes (more than 35 percent). Many of these steep southerly aspects tend to have lower productivity potential because soils are shallower and more coarsely textured than soils with deep volcanic ash layers and insolation is more intense due to slope and aspect.

Because of these factors, it was perceived that salvage activities should be avoided on steep southerly aspects in the areas burned by the Grizzly Complex in order to;

1) avoid detrimental disturbance to soils and,

2) to retain the seed and shade from the fire killed overstory in order to facilitate adequate establishment of seedlings on these sites.

Ponderosa pine and, where appropriate, white pine and western larch could be successfully planted on un-salvaged southerly aspects that are not harvested in order to enhance diversity of the future forest composition where seed sources for these species are lacking and access for planting is reasonable.

Northerly and easterly aspects in the burned area have lower insolation rates due to topographic shading and tend to have greater productivity potential than southerly aspects due to deeper volcanic ash layers. Therefore northerly and easterly aspects are expected to revegetate more quickly and have greater resilience to post-fire salvage logging than southerly aspects.

On cooler sites above 4,000 feet elevation stands typically include subalpine fir, spruce and/or lodgepole pine and may include mountain hemlock. Douglas-fir is common with low to moderate stocking levels across all sites. Western larch and white pine are also common across all sites but tend to occur at low to very low stocking levels in medium to large size class stands. With the exception of Douglas-fir and western larch, each of the listed species are easily damaged and/or killed by low to moderate severity fires due to shallow rooting habit and/or thin bark. The needles of hemlock, grand fir and subalpine fir are all easily damaged by convective heat. Much of the fire area was burned by moderate to severe surface fire which consumed all or most of the organic material on the forest floor. These surface fires damaged the roots, stems and crowns of the aforementioned species, therefore very low rates of survival are expected.

Proposed salvage units occur on sites that historically supported stands with high proportions of western white pine in them. Larch was often intermixed with white pine on ridge top and mid-slope locations. Cedar was often intermixed with white pine on toe-slopes and in water drainage locations. White pine, larch and cedar were generally missing from the stands prior to the fire due primarily to the effects of past selective harvesting of these three commercially valuable species and because of white pine blister rust related mortality in white pine. Because the three species were virtually absent there is no longer an adequate seed source by which they can naturally reproduce in the aftermath of the fire. As a result the sites will naturally regenerate to a mixture of western hemlock and grand fir on the lower and mid elevations, or mountain hemlock, lodgepole and subalpine fir on the upper elevations. Douglas-fir, spruce and larch will also occur in many stands but they will occur in low densities and are unlikely to compete well with the hemlock and grand fir on the most productive mid and lower elevation sites.

All of the stands proposed for salvage were fully stocked stands of merchantable size trees. Since the large majority of the trees are now dead, without salvage large accumulations of down wood are expected to accumulate over the next 10 years as the trees fall down. Untreated the standing dead trees still have most or all of their fine twigs intact and cast significant shade on the sites which may increase the competitive advantage of the shade tolerant hemlock and true fir species and decrease the competitive advantage of white pine and western larch on the already shady northerly and easterly aspects where white pine grows best.

Art Zack (1994) studied early seral succession on warm/moist western hemlock habitat types in the Idaho Panhandle National Forests. Many of his plot locations occurred on the Coeur d'Alene River Ranger District and are very similar to many of the sites proposed for salvage. In the discussion section of his PhD dissertation, Zack concluded that establishment of conifer regeneration on these types of sites is not an issue since his plots averaged more than 4,800 trees per acre. Of 158 plots sampled by Zack, only 5 had no trees or were deficient in numbers of trees

while 5 plots had more than 20,000 trees/acre. Of his sample, 63% of the plots had been planted with 300-600 trees per acre, therefore all other seedlings established via natural regeneration. Zack stated,

"Although tree planting does not appear necessary to obtain adequate numbers of conifer trees, it may be needed to obtain tree species diversity, especially a diversity of early successional tree species. Even with adequate canopy opening and site preparation I recorded fewer early successional PINMON (western white pine) and LAROCC (western larch) layer groups than would have been likely after wildfires, prior to European settlement."

It is reasonable to expect dense shade-tolerant conifer regeneration, similar to that described by Zack in the underburned stands of grand fir and hemlock that occupy large expanses of the project area. In addition to potentially dense shade tolerant conifer regeneration, deep and dense layers of "jackstraw" logs may make it costly and physically very difficult to manage the future density of the new stands of trees that will develop.

If the proposed units are salvaged they would be planted with blister rust resistant western white pine and with western larch seedlings. Cedar would be included in the planting mix where appropriate such as on toe-slopes and within unharvested RHCA's that occur within or adjacent to the salvaged stands. Where appropriate hardwoods such as cottonwood, aspen or birch may also be planted.

Pre-fire Old Growth Considerations

Prior to the wildfires, there were approximately 3,265 acres that met the definition for old growth (Green et al. 1992, Zack et al 2011) in the North Grizzly, Grassy and Lower Flat fire perimeters. Based on burn severity, most of this acreage no longer meets the old growth definition. The burned stands or portions of stand no longer contain enough live trees per acre that are both old and large, and/or do not contain enough total live trees per acre to meet the stocking criteria.

During project development, any pre-fire old growth found to still meet the old growth definition was removed from proposed salvage units. For example, two proposed salvage units in the Lower Flat Fire (Units 2 and 19) were dropped from the proposed action after field reconnaissance showed that the stand did not burn extensively, and still had enough large and old trees to meet old growth criteria (Figure 8). Unit 19 was dropped because field surveys found it was in a stand of surviving old growth.

Figure 8. Unit 19 was dropped because field surveys found it was in a stand of surviving old growth.

Of the 3,265 acres that met the old growth definition before the fire, approximately 533 acres are proposed for salvage under Alternative 2. The 533 acres is derived from all or portions of 21 stands which occur in in a total of 25 proposed salvage units; all of these units have been field-verified as no longer meeting old growth due to fire related mortality and the Forest Plan definition of old growth.

Figure 9. A stand that no longer meets minimum old growth criteria and is proposed for salvage (Lower Flat Unit 24).

Additionally, many of the larger diameter western hemlock and, to a lesser degree, grand fir have substantial defect from Indian paint fungus and other damage agents that result in high rates of unmerchantable trees. The maximum log diameter (without bark) for the nearest lumber mills that tend to bid on Forest Service timber is 27-inches. Some of the trees in the proposed salvage units exceed 27-inches in diameter. Over-sized logs must be transported longer distances to mills that can utilize them. The cost for additional transport of the logs can effectively minimize their merchantable value. The reduced value of these larger trees due to the combination of fire damage, damage from ecological agents other than fire, and oversize charges may make it undesirable to cut them from an economic stand point.

From an ecological stand point these large trees provide valuable ecosystem services in the post fire environment as well as high quality habitat for numerous wildlife species (Lindenmayer et al. 2004 and Lindenmayer and Noss 2006). Retaining large snags is in agreement with post-fire logging recommendations (Karr et al 2004, Beschta et al. 2004, Lindenmeyer and Noss 2006, Hessburg et al. 2016) and would contribute to meeting or exceeding Forest Plan snag and course woody debris retention guidelines within the proposed salvage units.

Measurements of diameter at breast height (DBH, recorded at 4.5 feet above ground on upslope side of tree) and diameter at stump height (DSH, recorded at 1.0 feet above ground on upslope side of tree) within some of the proposed salvage units indicate that there, on average about 5-inches difference between DSH and DBH (Jason Jerman, personal observations). On unburned sites, differences between DSH and DBH are primarily due to increasing bark thickness near the base of stems, swelling or callus growth around wounds or fungal infections in lower portions of stems, and upper extensions of root buttresses in certain species (particularly in cedar and hemlock).

In addition, it appears that on average 4-6 inches of organic material (duff) was consumed on most sites by the fires which drops the initial point of measurement deeper into the now exposed rooting zone of the tree (Jason Jerman, personal observations). Measurement of DSH is most severely affected by the loss of the duff layer as measurement at 12-inches above ground now includes more of the upper root buttresses at or even below the root collar of the tree species than is normally included on unburned sites. Therefore, cutting designations for this project would focus on removal of trees less than 32-inches diameter at stump height (DSH), which would keep most of the largest log diameters less than 27-inches and would retain the largest trees on site as biological legacies.

Western larch, cedar and white pine are present in some proposed salvage units but generally absent throughout the project area. These trees provide high quality persistent snags and/or valuable seed sources. White pine greater than 20 inches DSH, cedar greater than 22 inches DSH and larch greater than 17 inches DSH and are dead or imminently dead would be preferentially retained as well. Stump diameters listed for white pine, larch and cedar would retain trees with breast height diameter at or around 15 inches. The DSH for cedar is greater than that of larch and white pine because cedar tends to have much more flare near the root collar than other species do. Therefore the salvage prescriptions would not be proposing to remove all dead or imminent dead trees of merchantable size from the proposed salvage units and would preferentially retain the largest of trees and the most persistent snag producing species.

Economic Considerations

Salvage units were only proposed in stands where enough merchantable timber was estimated to exist in order to provide an economically viable timber sale. Stands were excluded if the fire-mortality within the stand was not merchantable because of excessive rot and/or other defects. Economically viable timber sales can generate bid premiums which can then be utilized to fund reforestation efforts which is a restoration need of this proposed action.

Proposed salvage units needed to have reasonable access for timber removal using either ground or cable yarding systems. Due to the projected lower economic value of burned trees, expensive logging methods, such as helicopter yarding are not expected to be economically feasible. On slopes less than 40%, the harvested trees may be cut and removed using ground-based mechanized equipment, such as feller-bunchers, harvesters and skidders, or with limited hand-felling. Units with steeper topography would be harvested using hand felling and cable/skyline yarding systems.

Road Construction Considerations

In order to avoid or minimize new road construction, salvage harvest activities were identified in areas that could be reached from existing roads and trails that are open to public motorized use and/or administrative use. In order to support economically feasible logging systems, short segments of temporary road are proposed where existing roads are not available. Efforts were made to keep new construction of temporary roads as short as possible. Construction of new system roads was prohibited. Imposing limits to road construction was done in recognition that road construction is expensive and roads have been shown to contribute the greatest contributor to sediment production both in green tree and post-fire logging (McIver and Starr 2000)

Danger trees would be felled within 200-feet along either side of roads open to public motorized use and administrative roads proposed as haul routes within the fire perimeter in order to ensure

human safety along these routes. Also, danger trees classified as having an imminent or likely failure potential would be felled along the trails to ensure public safety.

Other Considerations

Potential salvage units which met all the initial prescreening criteria were also identified in the Steep Creek and South Bobtail fires, which are in the eastern part of the Grizzly Complex, and in the Whitetail fire which is part of the Clark Fork Complex. It was determined that due to likely shortages of staffing it was not possible to complete reconnaissance, diagnosis and analyze effects of post-fire logging on these additional areas. There were also concerns that there may be limitations on how much fire-killed timber volume could be harvested before checking and rotting caused enough wood quality deterioration to nullify the economic viability of post-fire salvage harvesting. Therefore, it was determined that the most efficient use of limited funding and staff could be accomplished by focusing salvage efforts in the Grassy, Grizzly and Lower Flat fire areas because of various attributes of their geographic arrangement, restoration potential, and potential merchantable volume.

Proposed Action and Alternatives

Alternatives Considered but Eliminated from Detailed Study

Federal agencies are required by NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14).

During development of this project, the interdisciplinary team considered a variety of alternatives to the Proposed Action that were not developed for detailed analysis. The alternatives considered and the reasoning behind not developing them for detailed study is listed below.

- *Salvage the entire burned area.* While this alternative would accomplish the need for recovering economic value of the timber burned in the fire, it would not achieve the balance of sustainability between economic returns and ecological values. It would require a considerable amount of temporary road construction, which is not consistent with desired conditions. Therefore this alternative was eliminated from further consideration.

- *Helicopter use to maximize salvage opportunities*. The use of helicopters for salvage was considered by the Forest Service early in the planning process. This option would increase the accessible acreage for salvage without having to build any more roads. Due to the extreme cost involved with helicopter logging, this alternative was eliminated from further consideration.

- *Combine the salvage harvest with a green tree harvest to increase the economic value of the timber sale*. While this alternative would address the need to recover the economic value of the burned timber, in order to include any substantial quantity of green timber it would require a larger analysis area and a longer, more complex analysis. Burned timber decays and loses economic value rapidly, and the potential to recover the value in the fire salvage portion of such an alternative would be compromised by the longer time necessary for this more complex assessment. Therefore this alternative was not taken forward into detailed analysis.

Alternatives Considered in Detail

Alternatives were developed consistent with regulations identified by the Council on Environmental Quality for implementing the National Environmental Policy Act (40 CFR Part 1502.14). The project interdisciplinary team analyzed in detail three alternatives:

- Alternative 1 is the no-action alternative (implementing only the minimum felling of danger trees along roads to improve public safety)
- Alternative 2 is the agency's proposed action to remove roadside danger trees, salvage timber, plant trees with more resilient species, and implement associated roadwork
- Alternative 3 is an alternative based on response to public comments, which would exclude any stands that satisfied old-growth criteria prior to the 2015 wildfires, and eliminating temporary road construction.

The action alternatives were designed to achieve the goals and objectives of the Forest Plan, and all applicable laws and regulations including the National Environmental Policy Act, National Forest Management Act, Clean Water Act, Endangered Species Act, Clean Air Act, and National Historic Preservation Act, among others. Under the action alternatives, the following activities are proposed to meet the purpose and need of the project:

- **Roadside danger tree removal** would occur to provide a safe and dependable transportation system free of unstable fire-affected trees or other hazards in areas of public and administrative use
- **Salvage harvest and associated road work (i.e. maintenance, reconstruction, temporary road construction)** would occur to recover the economic value of forest products in a timely manner to contribute to some employment and income for local communities
- **Reforestation/restoration** would occur to re-establish and restore forested conditions to trend the project area toward Forest Plan desired conditions; in particular, increase the representation of early seral conifer species and move towards Forest Plan desired conditions

Table 2 provides a summary comparison of all activities proposed under the alternatives. In the table, the salvage harvest acres do not include the acres of roadside danger tree removal. The tree planting acres do not match the acres of salvage, because additional planting would occur within RHCAs (which are excluded from salvage harvests).

Table 2. Summary of proposed activities, by alternative.

Proposed Activities	Alt. 1	Alt. 2	Alt. 3
Roadside danger tree removal (acres)	864[1]	1,325	1,250
Salvage harvest (acres)	0	1,700	877
Tree planting (acres)	0	1,837	988
Road maintenance (miles)	0	117	105
Temporary road construction (miles)	0	5	0

[1] *Under the No-Action Alternative, roadside danger trees would be felled to improve public safety. The trees would be left on site; no timber would be sold.*

The following descriptions of each alternative provide more specific information. Please refer to the enclosed alternative maps for activity locations. A large-scale map and other documents providing information are available on the project website:

http://www.fs.usda.gov/project/?project=48585. Detailed descriptions of each unit proposed under the alternatives are included in Appendix C - Design Features and Specific Activities.

Alternative 1 - No Action

The No-Action Alternative is the baseline for comparative analysis of the effects of the action alternatives, and is based on the premise that ecosystems continue to change in the absence of active management.

For this project, analysis of the No-Action Alternative represents the effects of implementing only the felling of danger trees along roads (a total of 864 acres), an administrative action that would occur regardless of the proposed action, to improve public safety while taking into account the effects of past, ongoing, and reasonably foreseeable activities. None of the salvage operations or reforestation activities associated with the action alternatives would take place, addressing to some extent the concerns cited in four letters opposing the project and/or recommending that the area be left to heal on its own over time.

The no-action alternative would not preclude activities already approved in this area or activities planned as separate projects. Fire suppression, road maintenance, and recreation use would continue. A list of ongoing activities that would continue independent of which alternative the responsible official chooses is provided in Table 2 with additional information in Appendix B (Past, Ongoing and Reasonably Foreseeable).

Alternative 2 - Proposed Action

The proposed action developed by the project interdisciplinary team was developed in response to the purpose and need for action in this area. It is the proposal that was presented to the public during the notice and comment period.

Roadside Danger Tree Removal

Within the project area, there are approximately 27 miles of roads open to public and/or administrative use that have a heightened risk of danger trees falling, blocking access and threatening public and employee safety. Road closure orders in place during fire suppression operations were lifted after the fire was controlled in October 2015; however, hazard warning signs remain in place along roads open to public travel.

To improve safety during project operations and for the public, individual danger trees (both green and dead) would be removed within a buffer area of 200-feet on either side of routes designated for public motorized use (except in RHCAs), existing roads not designated for public motorized use which would be opened and used as haul routes, and limited portions of non-motorized public trails within the Grassy and Lower Flat fire perimeters. These roadside danger tree treatments would only take place outside the salvage harvest units along an estimated 27 miles of road and totaling approximately 1,325 acres, including approximately 254 acres within RHCAs (where trees would be felled but not removed).

The 200-foot width was determined to be appropriate for the danger tree removal buffer based on average maximum tree heights and hillslopes. Mature trees on the Forest are often greater than or equal to 120 feet in height and occasionally exceed 150 feet in height. Trees falling on steep slopes can travel down slope further distances than their height alone would indicate. In addition, falling trees can strike other trees as they fall, causing a “domino effect”. When this occurs, sections of trees can strike the ground at distances further than the original trees would have

reached. The 200-foot buffer width would address these hazards to travel routes better than would a shorter distance. Only trees with the potential of striking the route would be felled.

Danger trees would be selected for removal based on their risk of falling and likelihood of striking an established road or trail if they fall. More trees would likely be removed above a road, where there is greater risk of the tree falling down into the road, than from below the road. Identification of danger trees would follow the Field Guide for Danger Tree Identification and Response (Toupin et al. 2008); the trees that are classified as having imminent or likely failure potential would be felled.

Figure 10. Flat Creek Forest Road 400 was burned over at multiple locations. Fire-killed trees are expected to fall over during the next few years, impeding public safety and access on roads and trails.

The 200-foot roadside buffer is not proposed where it would overlap proposed salvage units, because the salvage harvest would adequately eliminate hazards to the established routes. The roadside buffer is not proposed wherever it would overlap with previous regeneration harvests that are, or were, stocked with pole-size or smaller trees. These small-diameter and relatively short trees are not expected to present a health and safety hazard to users of the established routes. Therefore, the proposed danger tree removal acres reflect the 200-foot buffer, after subtracting out the area addressed by proposed salvage units and young, low-hazard stands.

The roadside danger trees that are cut down would be sold as various wood products or left on the ground. For example, the danger trees would be felled and left on the ground in RHCAs except where the down trees pose a risk of blocking road drainage structures (i.e., excessive tree crowns or branches above a culvert inlet). In this situation, trees or portions thereof may be removed by hand or by equipment that is located outside the RHCAs or does not leave the road surface. Where trails are located within salvage units, danger trees would be removed for their commercial value. If the trail is located outside a salvage unit, the danger trees would be felled and left on the ground. If a salvage unit adjacent to an identified road or trail is dropped during layout, the danger trees would be felled and may be removed to provide safe use of the route.

Salvage Harvest

The North Grizzly, Lower Flat, and Grassy fires collectively burned approximately 14,500 acres on NFS lands; salvage operations would harvest trees over approximately 1,700 acres within these burned areas. Salvage harvest activities were identified in areas that could be reached from existing roads and trails that are open to public motorized use and/or administrative use; short segments of temporary road are proposed where existing roads are not available.

A variety of silvicultural systems and logging systems would be used as appropriate for the conditions found at each site (tree species existing/desired on site, proportion of trees affected by the fire, severity of the burn, slope, aspect, etc.). Selected silvicultural systems will be based on site-specific conditions and are within the timber and vegetation practices outlined in the Forest Plan (plan components FW-STD-TBR-01, and FW-STD-TBR-04 through FW-STD-07).

In the units that have fairly gentle topography (approximately 37 percent of the proposed acres), salvaged trees would be removed using ground-based mechanized equipment such as harvesters and skidders. Units with somewhat steeper topography (roughly 63 percent of the proposed acres) would be harvested using cable yarding systems.

Most of the merchantable dead, dying or otherwise damaged trees would be cut and removed from within the salvage units. Unmerchantable (rotted, checked, or small-diameter) trees would be left, as well as enough merchantable trees to meet or exceed the snag retention and snag recruitment guidelines for wildlife habitat and soil productivity purposes.

Prior to the wildfires, there were 3,265 acres that met the Forest Plan definition for old growth in the North Grizzly, Grassy and Lower Flat fire perimeters. These stands no longer meet the old growth definition because they do not contain enough live trees per acre that are both old enough and large enough, and/or do not contain enough total live trees per acre to meet the minimum old growth criteria as defined by Green et al. (2011).

During project development, any pre-fire old growth stands found to still meet the old growth definition were dropped from proposed salvage units. Of the 3,265 acres that met the old growth definition before the fire, approximately 533 acres are proposed for salvage under Alternative 2. Within the burned areas, grand fir, western hemlock and Douglas-fir were the most prevalent tree species in stands designated as old growth prior to the fires.

Natural regeneration in the post-fire environment would reflect the pre-fire species composition, because there are not enough healthy surviving white pine, larch or ponderosa pine to provide seed to adequately stock the sites. In addition, lethal surface fire left much of the overstory canopy intact, which casts substantial shade on the sites. Shading from dead overstory, particularly on north and east aspects, would give shade-tolerant natural regeneration a substantial competitive advantage over the less shade-tolerant early seral species. Therefore, it is expected that grand fir, western hemlock and Douglas-fir would dominate the newly regenerating stands in the absence of post-fire management. Grand fir and Douglas-fir are highly susceptible to root diseases, western hemlock and grand fir susceptible to drought stress, due to high water demand, and all three species are hosts for spruce budworm. Stands dominated by any or all of these species would be susceptible to root diseases, defoliating insects, and drought. Without the proposed management activities, conditions in the former old growth stands would continue to trend away from desired conditions for species composition as stated in the Forest Plan.

Many of the larger-diameter grand fir and western hemlock present in these stands would be retained because they have substantial defect from Indian paint fungus and other damage agents,

which makes them valuable for numerous wildlife species and also contribute to Forest Plan snag and course woody debris retention guidelines and desired conditions. Western larch, Douglas-fir, cedar and white pine are also present. Where present, these species would be preferentially retained, unless they pose a safety hazard during logging operations or their removal is required incidental to location of skid trails or skyline corridors. As such, cutting designations for this project would focus on removal of trees less than 32-inches diameter at stump height.

Although the minimum number of snags and snag recruitment trees specified for retention varies according to a number of different factors (see Table 4 associated with FW-GDL-VEG-04, p. 20 of the Forest Plan), a minimum of five to seven snags per acre and one to six live trees per acre (where live trees are available) for snag recruitment would be left in most of the salvage units. In units with more live trees per acre, those trees would also be left if it is determined that they are not likely to succumb to secondary agents.

No new system road construction is proposed; and no existing open roads would be decommissioned with this project. An estimated 46 miles of currently closed roads would be opened temporarily for administrative access to proposed salvage areas. After activities are completed, these roads would be closed (with a gate, berm, or front-end obliteration) and, where appropriate, culverts and associated fill may be removed, the road surface out-sloped, water bars installed, the road prism revegetated with native species, and/or compacted surfaces scarified.

To support large trucks and equipment, some road reconstruction and typical road maintenance would need to occur on an estimated 117 miles of existing NFS roads, located both in and out of the fire perimeter area. The extent and scope of these activities would depend on actual site conditions found as the area, and could include clearing brush from the road shoulders to improve sight distance, blading and shaping the road, cleaning ditches, maintaining or improving drainage structures, and improving the road surface. Maintenance on some of the roads occurred as part of the post-fire activities in the fall of 2015, including blading, brushing and, where needed, establishing or re-establishing drainage features to reduce risk of road surface erosion. Only the road improvements needed to complete the treatments would be implemented; if a unit is dropped from the project, the associated road work would be dropped as well.

While existing roads and landings would be used wherever feasible, the implementation of the proposed action (Alternative 2) would require building approximately five miles of temporary roads to provide safe access and facilitate conventional logging systems. Temporary roads and landings would be generally located on dry ridgetops and designed to standards appropriate for the intended timber hauling while considering safety, cost of transportation, and potential to impact resources, in compliance with 16 USC 1608(b) and (c), and to make progress toward achieving forest-wide desired conditions (FW-DC-AR-07, IPNF Forest Plan).

At the completion of their intended use, the temporary roads would be decompacted, recontoured to the approximate shape of the surrounding terrain, and seeded or covered with debris to prevent erosion and accelerate hydrologic and vegetative recovery.

Reforestation

Tree planting would occur on a total of 1,837 acres. Reforesting the burned areas with native tree species (e.g. blister rust-resistant white pine and western larch) would hasten and enhance the overall recovery process, meet restoration objectives, and trend the vegetation component toward desired future conditions. Tree seedlings would be planted in the salvage units after harvest activities are completed. In the salvage harvest units, blister rust-resistant white pine and western

larch seedlings would be planted in combinations appropriate for individual stands. Western red cedar, ponderosa pine, Engelmann spruce and hardwoods would be included in the planting mix where appropriate.

Tree seedlings would also be planted in areas within or adjacent to the units where treatments are not being conducted and where the fire burned moderately or severely (which is why planting acres exceed salvage acres). Cedar and hardwoods may be planted within very moist riparian type settings, including riparian habitat conservation areas (RHCAs) that occur within or immediately adjacent to proposed salvage units.

If timely reforestation does not occur, the site preparation that occurred as a result of the fire activity would be lost on these moist sites since competing vegetation will dominate sites within a very short timeframe and make it impossible to replant shade-intolerant species successfully. Thus, it is imperative for these actions to be implemented as quickly as possible in order to take advantage of the natural site preparation followed by fuel removal, and to take advantage of higher bid values to help fund reforestation. It is very important to reforest promptly to create a more resilient forest after wildfire, as shown in the Northern Region Reforestation Strategy (Bollenbacher and Fox 2015).

Planting would be designed to meet requirements to adequately restock the lands within five years after final harvest (FW-STD-TBR-03).

Alternative 3 – Reduced Action

Based on public comments received in response to the proposed action (as scoped), an alternative was developed that would exclude from the proposed salvage any stands that satisfied old-growth criteria prior to the 2015 wildfires, and would eliminate the proposed five miles of temporary road construction. In some cases, all or portions of units were dropped because they could not be accessed without the temporary road construction. In comparison to Alternative 2, these changes resulted in an 823-acre (52 percent) reduction in proposed salvage. The reduced salvage would also change the proposed haul routes, decreasing the amount of roadside danger tree removal by 75 acres (6 percent). Aside from the differences in acreage, the direct in indirect effects of each activity proposed in Alternative 3 would be the same as the corresponding activities described for Alternative 2.

Roadside Danger Tree Removal

Alternative 3 would remove roadside danger trees in the same manner as Alternative 2, but to a lesser extent due to the dropping of units that met the old growth definition before the fire, and dropping all temporary road construction. Roadside danger tree treatments would take place outside the salvage harvest units along an estimated 27 miles of road and totaling approximately 1,250 acres, including approximately 254 acres within RHCAs.

Salvage Harvest

Alternative 3 would conduct salvage harvest activities in the same manner as Alternative 2, but would exclude units in stands that met the old growth definition before the 2015 fires and drop all temporary road construction. As a result of dropping the temporary road construction, there are some units that were dropped that did not meet the old growth definition before the fires, but would be not economically feasible to access without the temporary road construction. Under Alternative 3, there would be 877 acres of salvage harvest.

In the units that have fairly gentle topography (approximately 48 percent of the proposed acres), salvaged trees would be removed using ground-based mechanized equipment. Units with somewhat steeper topography (roughly 52 percent of the proposed acres) would be harvested using cable yarding systems.

Alternative 3 would not include any new road construction. Road management and maintenance would occur on an estimated 105 miles of road and would be conducted in the same manner as Alternative 2, but to a lesser extent without the road construction.

Under Alternative 3, an estimated 36 miles of currently closed roads would be opened temporarily for administrative access to proposed salvage areas; after activities are completed, these roads would be closed in the same manner as Alternative 2. Some road reconstruction and typical road maintenance would need to occur on existing NFS roads, located both in and out of the fire perimeter area; these activities would occur in the same manner as Alternative 2.

Reforestation

Alternative 3 would conduct tree planting in the same manner as Alternative 2, but to a lesser extent due to the reduction in proposed salvage as a result of dropping of units that met the old growth definition before the fire, and units that would drop out because it would not be economically feasible to access them without the temporary road construction. Under Alternative 3, tree planting would occur on a total of 988 acres.

Range of Alternatives

Section 102(2)(e) of the National Environmental Policy Act (NEPA) states that all Federal agencies shall “study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involve unresolved conflict concerning alternative uses of available resources…”.

The range of alternatives presented in this chapter was determined by evaluating public and internal comments along with the purpose and need for the project. Other influences included Forest Plan goals, objectives, desired conditions, and standards and guidelines; federal laws, regulations, and policies; and economic viability. Within these parameters, the alternatives display a reasonable range of outputs, treatments, costs, management requirements, design features and effects on resources and the human environment.

Design Features

The ecological effects of post-fire salvage logging can vary depending on treatment, fire severity, and biophysical setting. We can minimize effects through careful planning and project design.

The project interdisciplinary team developed design features to minimize or avoid adverse effects which could occur as a result of implementing proposed activities. The design features are based on Forest Plan direction and policy, best available science, site-specific evaluations, and public concerns; and would be applied to both action alternatives (except where specifically stated) during project implementation.

Project implementation includes the physical on-the-ground design of the project completed by layout crews; timber sale contract administration; and reforestation activities such as site preparation and planting. Design features are applied on the ground through physical design as instructed in silvicultural prescriptions, marking guides, and cruise plans. Some features address

conditions found on-the-ground during project activities, and are applied through the timber sale contract, which includes both standard and site-specific provisions.

Section 208 of the Clean Water Act authorizes and encourages state and local management of nonpoint pollution sources, which include forest practices. This project incorporates best management practices (BMPs) as laid out in the R1/R4 Soil and Watershed Conservation Practices Handbook to help meet the requirements of the Clean Water Act. BMPs are practices, techniques, or measures determined to be the most effective, practicable means of protecting our natural resources.

Idaho Department of Lands has the authority to administer the Idaho Forest Practices Act (Title 38, Chapter 13, Idaho Code) and the responsibility to ensure compliance with BMPs to control nonpoint sources of pollutants. Rules pertaining to the Idaho Forest Practices Act and application of BMPs are found at IDAPA 20.02.01. A guide (*Idaho Forestry Best Management Practices Field Guide: Using BMPs to Protect Water Quality*) is available on the Idaho Forestry Best Management Practices website: http://www.idahoforestrybmps.org.

There are a number of references addressing the effectiveness of BMPs; for example, *Effectiveness of Forestry Best Management Practices in the United States: Literature Review (Cristan et al., 2016)*; and *Assessing the Effectiveness of Contemporary Forestry Best Management Practices (BMPs): Focus on Roads* (National Council for Air and Stream Improvement, 2012). Other references supporting BMP effectiveness are cited by resource in the Environmental Effects discussions.

Site specific BMPs will be developed based on the proposed activities, water quality objectives, and site specific characteristics in order to avoid or minimize potential adverse impacts to water quality and watershed function from project activities. State monitoring results and professional judgment are used to develop site-specific BMP prescriptions.

All applicable BMPs would be applied to activities proposed in the Grizzly project area. Contract provisions that are requirements in timber sales are the mechanism by which BMPs are implemented during activities. Additionally, monitoring of BMPs occurs during and after harvest in order to ensure correct implementation and effectiveness. Additional specific unit design features or mitigation measures may be added if needed to minimize, avoid or mitigate adverse effects to a particular resource.

A complete list of design features (and whether the design feature would be implemented through contract provision, by the Forest Service, and/or other means) is provided in Appendix C.

Mitigation Measures

All alternatives were designed with input from interdisciplinary resource specialists and as such were created to reduce or avoid effects to resources. After analyzing the potential effects of activities, it was determined that no mitigation measures are necessary.

Monitoring Activities

Monitoring is the process of periodically and systematically gathering and analyzing data to understand trends over time. The most common monitoring is related to implementation (did we do what we said we were going to do?) and effectiveness (did we achieve our desired results?).

If an action alternative is selected for implementation, standard timber sale contract provisions will be used to direct how sale activities are conducted. Other activities performed under contract (such as road work), are monitored by a contracting officer's representative (COR) to ensure activities are implemented as designed. For example, sale administrators and other contracting representatives would monitor all timber sales to ensure that activities are conducted in accordance with contract specifications (that activities occur where and when they should to protect resources such as soils and wildlife, that yarding is accomplished as planned and specified in the contract to protect soils, that seedlings are planted at the appropriate spacing, etc.). Some aspects of the project, such as regeneration, are monitored for years after implementation to ensure objectives are met. In addition, the project interdisciplinary team would periodically review implementation of activities as a whole during field trips and follow-up meetings.

In addition, best management practices (BMPs) would be incorporated into many different phases of the project. The district hydrologist and engineering representative would review the location of all proposed temporary roads and all road maintenance to assure compliance with BMPs, and would monitor all temporary and reconstructed roads to ensure that they were built or restored to specifications. A sale administrator would visit each active cutting unit at a frequency necessary to assure compliance with the BMPs and the timber sale contract. Minor contract changes or contract modifications would be agreed upon and enacted, when necessary, to meet objectives and standards on the ground. Monitoring of BMPs has determined that recent projects on the IPNF have been implemented as designed and have achieved the desired objectives (IPNF Monitoring Reports for 2004 [pp. 37-44, 60; PF Doc. CR-026], 2003 [pp. 41-46, 76-77; PF Doc. CR-022], 2001 [pp.27-40; PF Doc. CR-017], and 2000 [pp. 34-41, PF Doc. CR-016]).

Research Opportunities

The bulk of the published literature about the ecological effects of salvage logging considers large-scale salvage that removes most, if not all, living and dead vegetation across large areas. There is limited research and monitoring data concerning smaller scale salvage projects that are designed to minimize undesirable ecological effects while realizing other social or economic benefits.

There is also little empirical data about fire-damaged grand fir and western hemlock, species which occur with great frequency in all sizes throughout the IPNF and within the areas burned in the 2015 fires. District Silviculturist Jason Jerman contacted Sharon Hood, a renowned research ecologist at the Rocky Mountain Research Station - Missoula Fire Sciences Laboratory (see http://www.firelab.org/profile/hood-sharon), to see if she had any further data related to published findings on grand fir and western hemlock. Their conversation brought the realization that the 2015 fires on the IPNF provide an excellent opportunity to further our understanding of the fire resiliency of these two species and others in moist habitats of the Inland Northwest. They also agreed it would be useful to monitor conifer establishment over time in the burned areas.

In order to assess the potential effects of salvage harvesting on overstory tree survival and regeneration establishment, it was determined that plots would be established in both unsalvaged and salvaged stands. This methodology is expected to provide baseline data which will be useful for validating the criteria we have proposed for assessing mortality/survival by conifer species. The data collected will also be useful for refining assessment of and prediction of long-term effects of mixed severity fires, with and without post-fire management activities, on regeneration given the contemporary forest conditions, which are significantly different than historic conditions.

Framework for Cumulative Effects Analysis

"Cumulative impact" is defined in the Council on Environmental Quality (CEQ) NEPA regulations as the "impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions…" 40 CFR 1508.7. The cumulative effects analysis in this EA, for each resource, focuses on those past, ongoing, and reasonably foreseeable future actions and activities whose effects overlap in both time and space with the direct and indirect effects of the Proposed Action or alternatives. Such a relationship defines relevancy for the cumulative effects analysis.

Residual impacts of past actions, activities, or disturbances are represented in the description of the current condition for each resource. The primary past event currently affecting conditions in the planning area is the 2015 Grizzly Complex Fire itself.

The incremental impacts associated with ongoing and reasonable foreseeable future actions are considered as additional to the direct and indirect effects of the action to determine cumulative effects. Ongoing actions include road-related recreation and dispersed camping, hunting, road maintenance, and firewood cutting.

With the exception of the effects of the 2015 fires, in general, there is limited potential for overlap in both time and space to occur between the residual impacts from past activities or actions and the direct/indirect effects attributed to the alternatives of the Grizzly Fire Salvage and Restoration Project.

NEPA requires analysis and disclosure of potential cumulative effects – the impact on the environment which results from the incremental impact of the action when added to other relevant past, present (ongoing) and reasonably foreseeable actions (those for which there are existing decisions, funding or identified proposals, but that have not yet been implemented), regardless of what agency or person undertakes such actions (40 CFR § 1508.7). Cumulative effects analysis is carried out in accordance with 40 CFR 1508.7 and in accordance with The Council on Environmental Quality Guidance Memorandum on Consideration of Past Actions in Cumulative Effects Analysis, dated June 24, 2005.

Effects of past activities are reflected in the description of existing conditions for each resource as appropriate, with supporting information in the project files as noted. Effects of ongoing and reasonably foreseeable activities are disclosed as part of the cumulative effects discussion for each resource as appropriate, with supporting information in the project files as noted. In order to have cumulative effects, the effects of activities must overlap in space and time; therefore, each resource may have a different set of past, present and reasonably foreseeable actions associated with it.

The following identifies past activities that have occurred in the project area, activities that are ongoing at this time, and activities that are reasonably foreseeable to occur (Table 3). Additional discussion of these activities is provided in Appendix C (Past, Ongoing and Reasonably Foreseeable Activities).

Table 3. Synopsis of past, ongoing and reasonably foreseeable activities.

Activities	Past	Ongoing	Reasonably Foreseeable
TIMBER MANAGEMENT			
Timber harvest and related activities on NFS lands	X		X
Precommercial thinning/timber stand improvement on NFS lands	X		
Tree planting on NFS lands	X		
FIRE/FUELS			
Prescribed burning for site preparation and fuels treatments	X		
Wildfires	X		
Fire suppression	X		
TRANSPORTATION			
Travel Plan implementation	X	X	X
Road construction	X		
Road decommissioning	X		X
Road maintenance	X	X	X
Trail maintenance	X	X	X
Use of motorized vehicles (full-sized, ATVs, motorcycles)	X	X	X
RECREATION			
Camping, snowmobiling, hunting, hiking, berry picking, fishing, Christmas tree cutting, mountain bike riding	X	X	X
WATERSHED IMPROVEMENT			
In-stream fisheries habitat improvement projects	X		
Culvert modification or replacement	X		
Large woody debris removal	X		
OTHER ACTIVITIES			
Firewood cutting/gathering	X	X	X

Environmental Consequences

Introduction

This section summarizes the potential impacts of the proposed action and alternatives for each impacted resource. The analyses are based on a thorough review of relevant scientific information, a consideration of responsible opposing views, and the acknowledgement of incomplete or unavailable information, scientific uncertainty, and risk.

The human safety, forest vegetation, and economics sections focus on the responsiveness of each alternative to the concerns underlying the need for action and associated objectives. The remaining resource sections focus on potential effects of implementing the proposed action alternatives in comparison to the No-Action Alternative. In all cases, the current condition of each resource is described only to the extent needed to provide a baseline to compare the changes that would occur under each alternative. Direct effects are caused by the action and occur at the same time and place. Indirect effects occur later in time as a result of the action, but are still reasonably foreseeable. Cumulative effects result from the incremental impact of an action when added to other past, ongoing and reasonably foreseeable actions, regardless of what agency or person undertakes the action. The geographic area used in the cumulative effects analyses vary, as discussed by resource.

The methodology used to describe and predict effects (indicators and measures of change) is also provided. Spatial and temporal boundaries set the limits for selecting the actions most likely to contribute to cumulative effects (FSH 1909.15, 15.2). Incomplete and/or unavailable information is identified where appropriate.

All proposed activities and effects are consistent with the 2015 Forest Plan (PF Doc. CR-048). Whereas Forest Plan desired conditions, goals and objectives help in identifying the purpose and need and designing activities in an area, standards and guidelines of the Plan are the mechanism by which specific projects meet legal requirements. Consistency with the Forest Plan and other legal requirements is described in Appendix D.

Issues

The project interdisciplinary team identified issues to address using comments from letters, comments received during the public meeting, and through frequent interactions with the public, other agencies, and local groups, along with resource condition information. The issues were separated into three categories: key issues, analysis issues, and issues addressed but not analyzed in detail.

Key issues are those issues associated with the purpose and need for the project, within the scope of the project and of sufficient concern to drive the development of the action alternatives. They were used to develop the focus and specific activities of the action alternatives and sharply define effects of the action alternatives against each other and the no-action alternative. The key issues associated with the purpose and need for the Grizzly Fire Salvage and Restoration project are addressed under Human Safety, Forest Vegetation, and Economics.

Table 4. Key issues.

Resource	Issue	Analysis Measures
Human Safety	Safe travel routes	Acres of roadside danger tree removal
Forest Vegetation	Representation of early seral species (forest cover) across the landscape	Acres and proportion of forest cover types
Economics	Recovery of the economic value of forest products in a timely manner to contribute to employment and income in local communities	Total Present Net Value (PNV) of the sale of timber; estimated number of jobs created

Analysis issues were not essential in developing action alternatives, but are important to analyze in detail to help sharply define the effects of the alternatives and assist the Forest Supervisor in making her decision.

Issues that were addressed but not analyzed in detail are those that were: 1) determined not to be affected by proposed activities; 2) outside the scope of the proposed actions; 3) already decided by law, regulation, Forest Plan, or other higher level decision; 4) irrelevant to the decision to be made; or 5) conjectural and not supported by scientific or factual evidence. These issues are identified and brief rationale is provided for why they did not need to be analyzed in further detail.

Human Safety

Introduction

Within the fire perimeters, there are approximately 27 miles of roads open to public and/or administrative use that have a heightened risk of danger trees falling, blocking access, and threatening public and employee safety. Road closure orders in place during the fire suppression operations were lifted after the fire was controlled in October 2015; however, hazard warning signs remain in place along roads open to public travel. Over time, additional danger trees would continue to fall because of increased defect, mortality, weathering agents, heavy snow, and other environmental factors. With this existing and predicted risk, there is a need to remove danger trees along specific routes to improve safety for forest users. As stated in the Alternative Descriptions, these roadside danger tree treatments would only take place outside of salvage harvest units.

The indicator used in this analysis is provided in the table below.

Table 5. Resource indicators and measures for assessing effects to human safety.

Resource Indicator	Measure
Safe travel/use of roads and trails	Acres of roadside danger tree removal

Effects to Human Safety

Summary: All alternatives would take some action to mitigate danger trees along open roads and trails, since leaving these dead and dying trees could create unsafe travel conditions. All alternatives would address, to varying degrees, the hazard by felling danger trees for a distance of 200-feet from either side of open roads and both motorized and non-motorized trails in the project area. Removing this hazard would provide for safer travel both into and out of the project area. Under Alternative 1, roadside danger trees would be felled on a total of 864 acres; the trees would be left on site – no timber would be sold. Under Alternatives 2 and 3, roadside danger tree removal would occur on a total of 1,325 and 1,250 acres, respectively. Therefore, the benefits to human safety would greatest if Alternative 2 is implemented.

Table 6. Summary comparison of effects to human safety.

Measure	Alternative 1	Alternative 2	Alternative 3
Acres of roadside danger tree removal	864	1,325	1,250

Direct and Indirect Effects

Alternative 1

Only a portion of the roadside danger tree removal would occur under Alternative 1. In the absence of danger tree removal along open roads and trails in the Grizzly Complex area, many fire killed and weakened trees would remain until they fall on their own. Dead trees, or snags, will likely fall at varying rates depending on several factors including size, species, and weather events. Even though some imminent danger trees could be dealt with, it would be difficult to stay pro-active with this activity as more and more trees become a hazard over time. Due to the unpredictable nature of when a danger tree falls, leaving a high number of them along roads and trails could create unsafe road use and travel and conditions for anyone who uses the area for years into the future.

Aside from the direct and immediate safety issues, leaving a large number of danger trees along access routes could impact future fire management decisions and tactics. As the number one priority of fire management is safety, we do not put fire personnel in unsafe areas, and this includes working around hazard or danger trees. Often, hazards can be mitigated before work is performed, single danger trees can be felled, or fireline rerouted. However, where there would be a large quantity of danger trees over an expansive area, it is reasonable to assume future fire suppression actions would be impacted through the need to keep firefighters, engines, and other equipment and operators out of high-hazard areas. This could be a consideration as long as danger trees persist.

Alternative 2

Danger trees created from the Grizzly Complex would be felled along open roads and trails, mitigating the risk to forest workers (including firefighters) and the public. It is expected that following roadside danger tree removal, access and travel by forest workers and the public alike would be safer. In the event of a fire, egress routes would be open. Many of the danger trees that could otherwise impact decisions to engage firefighters would be removed.

Salvage harvesting proposed under the project would reduce safety hazards posed by the large numbers of standing dead trees (snags) created by the Grizzly Complex Fire. Snags can fall at any time, posing a continued threat to people working or recreating in the forest. Of particular concern are hazards to crews working to reforest burned areas. While not all dead trees would be salvaged within the proposed treatment units, safety hazards to work crews conducting site preparation and tree planting would be substantially reduced by salvage tree removal.

Implementation of the danger tree and snag removal via a salvage sale would mean that danger trees are felled and removed in a timely manner, prior to additional deterioration that can make felling danger trees even more hazardous.

Alternative 3

The effects of Alternative 3 are expected to be similar to Alternative 2, only they would occur on fewer acres and would therefore not be as effective in providing for the safety of forest workers or the public.

Cumulative Effects to Human Safety

Alternatives 1, 2 and 3

Potential salvage and/or danger tree removal on private lands could increase safety for forest workers and forest visitors; however, any benefit would likely be minor due to the small amount of private land in the area. There would be no cumulative effects beyond those effects occurring as a result of activities proposed under the alternatives.

Forest Vegetation

Introduction

The analysis for the forest vegetation resource focuses on how the alternatives would affect the tree composition, structure (including old growth) and pattern and how those effects may impact the resistance and resiliency of forest vegetation to future disturbances and stressors (e.g. insects and diseases, wildfires and droughts). The Forest Plan for the Idaho Panhandle National Forests (IPNF) describes the forest vegetation conditions that are desired in order to improve the resistance and resiliency of the vegetation, and the Forest Vegetation analysis addresses how the alternatives would or would not trend the vegetation towards the desired conditions articulated in the Forest Plan. The analysis also considers how the proposed actions may impact snags, coarse woody debris, and openings in the forest canopy, as well as current and future timber resources in the area. Management direction that is relevant to the topic of forest vegetation is considered to determine if the alternatives would be consistent with direction in the Forest Plan as well as other policy, regulations and laws. Lastly, the analysis provides information needed to evaluate how well the various alternatives meet the purpose and need for proposing the project.

Table 7. Resource indicators and measures for summarizing effects to forest vegetation.

Resource Element	Resource Indicator and Measures
Effects to tree species composition and the resistance and resiliency of the forest vegetation toward disturbances and stressors	Number of acres that are planted with blister rust resistant western white pine, western larch, ponderosa pine and/or western redcedar seedlings.
Effects to pre-fire old growth	Number of acres of pre-fire old growth that are located within proposed salvage units or roadside danger tree removal units

The FEIS for the IPNF Forest Plan contains an extensive discussion of the need to improve the ability of the forest vegetation to be more resistant and resilient towards disturbances such as wildfires, insect and disease epidemics, weather disturbances such as droughts, and other potential climate change impacts (USDA 2013, pages 48-120). In the case of the Grizzly Complex project area, this means there is a need to increase blister rust resistant western white pine, western larch, ponderosa pine, and in some instances, western redcedar. There is a corresponding need to reduce the more insect and disease prone, fire and drought susceptible, generally shorter living grand fir, western hemlock, lodgepole pine, Douglas-fir and subalpine fir. One way to help accomplish this is to reforest the burned area with the species that are more resistant to diseases and more resilient to fire.

Western white pine is considered a “keystone” species to the warm/moist forest ecosystem of the inland northwest. White pine was clearly underrepresented in the project area prior to the 2015 fires and there is no reason to expect it to increase in representation in the coming years without intervention due to the lack of blister rust resistant seed on the burned sites. However, the recently burned warm/moist sites that occur within the Grizzly Complex, provide an excellent opportunity to help to increase the amount of white pine that is resistant to blister rust in that area. Reestablishment of western white pine (as well as western larch and ponderosa pine) is important relative to resistance and resilience within the burned areas because it is better adapted to survive potentially warmer and drier future climates that include longer summer droughts and higher frequency disturbances than grand fir and western hemlock in particular.

Approximately 85% of the overstory in the proposed salvage units is comprised of grand fir (33%) and western hemlock (52%). Hemlock is reported to be very intolerant of fire damage. Grand fir is moderately tolerant of fire damage (Hood et al. 2008), particularly in larger diameters (Flanagan, 1996). However, grand fir resistance to fire damage may vary depending on site conditions with greater resistance on dry habitats and less resistance on moist habitats (Burns and Honkala, 1990).

About 8% of the overstory in the proposed salvage units is comprised of subalpine fir, Englemann spruce, western white pine, western redcedar and lodgepole. Hood et al. (2007) in their evaluation of a widely used post fire tree mortality model noted that the majority (>70%) of Englemann spruce, subalpine fir, and western hemlock with scorch greater than 5% died within 3 years following fire. White pine and cedar also appear to have low tolerance for fire damage. However, cedar may survive more extensive fire damage, particularly cambium damage, than other thin bark conifer species.

The remaining 7% of the overstory in the proposed salvage units is comprised of Douglas-fir with trace amounts of western larch. Douglas-fir and larch are highly resistant to direct fire injury with resistance increasing as diameter increases. However, larger diameter Douglas-fir may be susceptible to secondary mortality from Douglas-fir beetles (Hood et al. 2007).

After a wildfire, there are a number of forest insects and diseases that will kill or further weaken trees that are already stressed from fire related injuries. In addition, fires can weaken tree roots, open-up stand conditions to greater wind exposure, and have other impacts that make trees more susceptible to being damaged from storms and windy conditions to the extent that they are killed.

Following wildfires, surviving Douglas-fir trees are known to be susceptible to fatal attacks by the Douglas-fir beetles (Cunningham et. al. 2005, Fowler and Sieg 2004, Furniss 1965, Hood and Bentz 2007, Hood et. al. 2007a, Ryan and Amman 1994 and 1996). Because of this and because

the Douglas-fir beetle was detected recently in the area during aerial surveys by the Forest Service (Forest Health Protection group of the Forest Service in Missoula), it is anticipated that this beetle will attack some of the trees that were weakened by the fire. In addition, it is expected that additional blowdown and stem breakage will occur in the project area in the coming years which will provide additional food and breeding grounds. Douglas-fir beetle populations can rapidly expand as a result of wind thrown trees which can create ideal habitat for populations to expand (Kegley 2011, Furniss et. al. 1979). In the late 1990's and early 2000's, a substantial outbreak of this bark beetle occurred on the IPNF and a portion of that outbreak was in the vicinity of the Grizzly Complex (Kegley and McConnell 2001). As noted below in the specific criteria for identifying dead/dying trees, if there are signs that this beetle has successful attacked Douglas-fir it would be considered dead or dying.

Other bark beetles that are likely to attack and kill trees that are stressed or otherwise impacted by the fire include: the spruce bark beetle that attacks Engelmann-spruce, the mountain pine beetle which commonly attacks lodgepole and western white pine, or the fir engraver beetle that attacks grand fir and subalpine fir and the western balsam bark beetle that attacks subalpine fir. Successful attacks by these beetles strongly suggest tree mortality in burned areas (Weatherby et. al 2001; Hood et. al 2010). During the last few years, aerial detection surveys conducted in the project area vicinity documented spruce bark beetle, mountain pine beetle, fir engraver beetle and Douglas-fir beetle activity. The presence of bark beetles appears to have been at low endemic levels for the past few years.

At the scale of the entire Grizzly Complex, approximately 25,127 acres burned. About 4,685 acres (18.6%) of the area burned in the Grizzly Complex was identified as old growth prior to the fires. At the forest wide scale, about 56,490 acres burned on the IPNF in 2015. Pre-fire old growth stands occurred on approximately 12,393 acres (22%) of the area burned in 2015 on the IPNF. A total of 1,369 acres of pre-fire old growth are proposed for area-wide salvage in three proposed post-fire salvage projects on the IPNF, including the acres proposed for salvage under Alternative 2 in this project.

From an ecological standpoint, large trees provide valuable ecosystem services in the post fire environment and provide valuable post fire habitat for numerous wildlife species (Lindenmayer et al. 2004 and Lindenmayer and Noss 2006). Retaining large snags is also in agreement with post-fire logging recommendations (Karr et al 2004, Beschta et al. 2004, Lindenmeyer and Noss 2006) and would contribute to meeting or exceeding Forest Plan snag and course woody debris retention guidelines within the proposed salvage units.

Measurements of diameter at stump height (DSH, recorded at 1.0 feet above ground on upslope side of tree) and diameter at breast height (DBH, recorded at 4.5 feet above ground on upslope side of tree) within some of the proposed salvage units indicate that there is, on average, about 5-inches difference between DSH and DBH (Jason Jerman, personal observations). Cutting designations for this project would focus on removal of trees less than 32-inches diameter at stump height (DSH), which would keep most of the largest log diameters less than 27-inches DBH and would retain the largest trees on site as biological legacies.

Trees larger than 32" DSH should only be cut if there would be other live trees or large dead trees retained within the local vicinity of the cut tree. This would facilitate economic viability of otherwise economically marginal salvage units without compromising the desire to retain large and/or living biological legacies where legacies of the previous stand may not otherwise be retained.

The Forest Vegetation Report provides additional background and context for post-fire forest conditions.

Methodology

Information Sources

The analysis is based on field reconnaissance of the project area, including field-sampled data, spatial data from Forest Service stand and activity databases, and other sources as noted. Refer to the Forest Vegetation Report for additional information.

Old Growth

The IPNF has adopted the definitions of old growth types that were developed by the Regional Old Growth Task Force, and documented in Green et al. 1992 (corrected via an errata in December 2011). That document is a comprehensive report that not only presents old growth type descriptions for thirty different types of old growth in Region One, but it also provides the background, ecological concepts and process that was used to develop them. For the IPNF, there are ten old growth types that are described in detail in that publication (see pages 13-22). The rationale for using those definitions is not only included in that document, but it is also presented in Bollenbacher and Hann (2008) along with a summary of the science and understanding of forest practices intended to create, maintain, and restore resilient old growth stands.

The adopted old growth definitions cited above are specific to forest type (the dominant tree species) and habitat type group, and are defined by a minimum number of trees of a minimum age and diameter, in stands with a minimum density. The most common old growth types on the IPNF require at least ten trees per acre that are 150 years in age and 21 inches in diameter, and have a minimum stand density of 80 square feet of basal area. A thorough discussion concerning how the IPNF has been using the Green et al. 1992 publication to identify old growth stands is described in USDA Forest Service 2013a.

Old growth stands are a subset of stands classified as large size class. Prior to the fires, there were 3,265 acres of forest stands that met the definition for old growth in the project area. A map of those stands is available in the project file (PF doc. VEG-31).

Assessment of Tree Mortality

In many of the forest stands in the area burned by the Grizzly Complex, it is not difficult to determine if trees are dead or will likely die in the near future. Obvious dead trees can be identified by extremely blackened tree boles, the complete absence of needles, or with crowns having all brown/red needles. However in other situations, it is more difficult to evaluate and predict whether or not an individual tree will likely die or survive. For this project, the information discussed above regarding the susceptibility of the various species to fire mortality, plus the material discussed in this section was used to assess whether a tree should be considered dead or dying. For a detailed description of the biophysical processes that occur when fire kills or damages trees see Michaletz and Johnson 2007 and for a comprehensive discussion of the topic of defining tree mortality, see Filip et al. 2007. In this section of the report, relevant science is summarized and then the specific criteria that will be used to predict mortality are presented.

In this analysis, the terms “dead” or “death” refer to the condition in which one or more of the three primary parts of the tree (crown, stem or roots) cease to function, and the term “dying” refers to a tree that has been damaged to the degree that there is a substantial likelihood of

imminent death (i.e. several months to five years). In some publications, the term “delayed mortality” is used for describing a tree that eventually dies due to second-order fire effects (Reinhardt et al. 2001). As noted in Filip et al. (2007) and described in detail in Waring (1987), imminent mortality occurs when the carbohydrate budget of the tree is deficit, and respiration exceeds photosynthesis in the tree and any stored carbohydrates are used up.

As described in DeNitto et al. (2000), the ability of a tree to survive fire injury is related to the amount of damage incurred to the crown, stem and/or roots. As noted in numerous scientific publications, there are various factors that can affect how much damage occurs to those tree components, the ability of a tree to survive the effects, and the indicators that can be used to predict mortality (e.g., Ryan and Reinhardt 1988, Hood et. al. 2010, DeNitto et. al. 2000, Fowler and Sieg 2004, Scott et. al. 2002, Hood et al. 2007, Kavanagh et al. 2010, Wyant et. al. 1986 and Hood et al. 2008). The following type of factors are generally recognized as affecting tree mortality from fires: tree species, tree age, tree size, season of fire, fire intensity, pre-fire tree vigor and growth rate, site quality, arrangement and distribution of fuels, insect and disease occurrence, and post fire moisture conditions.

Mortality from a fire may become evident over several years, with most mortality occurring within the first 2 years of fire, as a result of crown consumption, cambium kill, and/or root kill (Wagener 1961, Hood et al. 2010). However, significant levels of mortality can also occur as long as four years after the fire, due to second-order fire effects such as insect infestations (Hood and Bentz 2007, Ryan and Amman 1996, Weatherby et. al 2001). For trees suffering only root death or cambium death on the bole, it may take several years for the canopy to exhaust it resources and turn from green to red (Filip et. al 2007).

As noted in DeNitto et al. (2000) no system is going to be perfect in predicting which trees will die and which ones will survive, but reasonably reliable estimates can be made when relevant factors are considered. Consideration of the relevant science regarding determination of conifer mortality from fire injury led to the development of five criteria to assess for each tree in the Grizzly Fire Salvage project: 1) percentage live crown, 2) bole char at the root collar, 3) bark beetle/wood borer attacks 4) duff consumption over the rooting area and 5) wind/snow/root disease damage. If at the time of assessment any one of the five criteria is not met for a given tree then that tree shall be presumed dead/imminently dead. These criteria will be used to designate which trees shall be identified for salvage harvest within the proposed units. Not all the trees identified as dead/dying in the salvage units would be harvested, in order to meet Forest Plan snag retention guidelines and for other resource values.

This protocol is a reasonable approach to use for implementation because it is founded in the most current science and on site specific observations.

Identification of Danger Trees

Along the roads and trails within the project area where danger trees are proposed for cutting (and in some situations salvage removal), the following criteria and protocol would be used for identifying those danger trees. The Field Guide for Danger Tree Identification and Response (Toupin et al. 2008) would be the primary guidance, but other direction such as that found in Angwin et al., 2012 and Forest Service Manual (FSM) direction FSM 7733 would be utilized (USDA 2007).

The process for identifying danger trees is explained in depth in Toupin et al 2008, but in summary, it includes four general steps- identify any defects that the tree has and its potential to

fail, evaluate the amount and type of exposure that people have near the tree, determine the potential failure zone of the tree, and determine if the tree poses a danger to people. In the case of the Grizzly Fire Salvage project, the decision has been made that if a tree trees have a likely or imminent failure potential, and that the potential failure zone of the tree overlaps with roads or trails (or other sites such as trailhead parking areas), then the tree would be consider as a danger tree.

Incomplete and Unavailable Information

Records of past management activities from the first half of the 1900's is often incomplete. The details of potential future activities, such as tree planting or precommercial thinning of suitable lands that are not proposed for management under this project, may not be known in detail and are likely to evolve in response to future weather variations, funding.

If information for the topic that is being addressed is not available or is incomplete, it will be noted. It is important to note that future wildfires, insect and or disease epidemics, and even climate change may influence the vegetation conditions in the future but it is difficult to estimate future impacts.

Spatial and Temporal Context for Effects Analysis

The direct/indirect and cumulative effects analysis area would generally be confined within the Grassy, Grizzly and Lower Flat fire perimeters. Where appropriate, effects are discussed in broader spatial context (such as the impact of the proposed activities to pre-fire old growth) in order to provide a clear understanding of the scope of potential impact.

It is assumed that the current condition of the forest vegetation is a reflection of all past management actions, the biophysical environment as well as forest succession and disturbance processes. In general, the direct / indirect and cumulative impacts are described out in time for approximately 20 years. However, when discussing the resistance and resiliency of the forest vegetation a longer time period (100 or more years) is considered.

Effects to Tree Composition and the Resistance and Resilience of Forest Vegetation to Disturbances and Stressors

Summary: Alternatives 2 and 3 would increase the amount of blister-rust resistant western white pine, western larch and ponderosa pine where planted on upland sites. In addition, these alternatives would increase the amount of western redcedar on the riparian sites where they are planted. Planting activities associated with these alternatives would increase the resistance and resiliency of the future forest stands to disturbance and stressors like wildfires, insect and disease epidemics, and droughts and other climate change impacts. Alternative 2 would improve the tree composition on 849 more acres than Alternative 3. Both Alternatives 2 and 3 would trend the tree composition towards the desired conditions that are presented in the Forest Plan, while Alternative 1 would not.

Table 8. Summary comparison of effects to tree species composition and the resistance and resilience of forest vegetation to disturbances and stressors.

Resource Element	Resource Indicator and Measures	Alt. 1	Alt. 2	Alt. 3
Effects to tree species composition and the resistance and resiliency of the forest vegetation toward disturbances and stressors	Number of acres that are planted with blister rust resistant western white pine, western larch, ponderosa pine and/or western redcedar seedlings.	0	1,837	988

Direct and Indirect Effects to Species Composition and Resistance/Resiliency

Alternative 1

Alternative 1 does not propose any tree planting activities within the project area. Consequently the future forest composition would not include nearly as much blister rust resistant white pine, western larch, ponderosa pine or cedar as it would under the action alternatives in the treatment areas.

For a number of reasons that are discussed in more detail in Forest Vegetation Report, the natural tree regeneration that is predicted to occur in areas that are not planted is likely to be dominated by less desirable species (i.e., grand fir, Douglas-fir, western hemlock, lodgepole pine, subalpine fir) that are generally less resistant to common insect and disease agents, less resistant to fire impacts, less drought tolerant, and shorter lived tree species than those that would be planted in the action alternatives.

Art Zack (1994) studied early seral succession on warm/moist western hemlock habitat types in the Idaho Panhandle National Forests. Many of his plot locations occurred on the Coeur d'Alene River Ranger District and are very similar to many of the sites proposed for salvage. Zack stated, "Although tree planting does not appear necessary to obtain adequate numbers of conifer trees, it may be needed to obtain tree species diversity, especially a diversity of early successional tree species."

In a study of post-fire regeneration on dry mixed conifer sites in the Norther Rockies, Kemp et al. (2016) found that the composition of the post-fire regeneration reflected the composition of the pre-fire stand composition. In other words, without intervention, the tree species on the site prior to the fires will regenerate the site following the fires. It is reasonable to expect the same pattern to hold true on both warm/moist and warm/dry habitat types within the Grizzly Complex. Without planting the areas proposed for salvage, natural regeneration would eventually occur in all or most of the areas that are proposed for treatments, but in most instances the areas would likely regenerate to a preponderance of less desirable tree species.

It is reasonable to expect dense shade tolerant conifer regeneration, similar to that described by Zack (1994) in the underburned stands of grand fir and hemlock that occupy large expanses of the project area. In addition to potentially dense shade tolerant conifer regeneration, deep and dense layers of "jackstraw" logs may make it costly and physically very difficult to manage the future stocking density of the new stands of trees that would develop.

By not planting the desirable tree species on any of the burned areas as would the action alternatives, Alternative 1 would not increase the resistance and resilience of the forest vegetation to disturbance and stressors, and therefore forgo a substantial opportunity to trend the composition towards the desired conditions that are described in the Forest Plan. Specifically,

Alternative 1 would fail to help achieve the following goals, desired conditions and objectives in the Forest Plan: GOAL-VEG-01, FW-DC-VEG-01, FW-DC-VEG-03, FW-DC-06 and FW-DC-VEG-10.

In addition, this alternative would not meet the following objective that was established for this project: Re-establish and restore forested conditions to trend the project area toward Forest Plan desired conditions; in particular, increase the representation of early seral conifer species such as western white pine, ponderosa pine and western larch.

Alternatives 2 and 3

Direct and indirect effects relative to forest composition and resistance/resilience would be similar under Alternatives 2 and 3. The only difference between the two would be the spatial extent of the effects because Alternative 2 includes planting desirable tree species over approximately 1,838 acres, while Alternative 3 includes planting over approximately 988 acres.

As a result of planting the desirable tree species, the tree composition of the planted stands would be improved and the resistance and resiliency of the forest vegetation to disturbances/stressors would be enhanced.

The proposed planting would directly improve forest composition on the planted sites. Tree planting would establish western larch, ponderosa pine, western redcedar and blister rust resistant western white pine seedlings on sites where they historically occurred and are ecologically suited but are currently unlikely to naturally establish. Resistance and resilience to endemic insects and diseases and to non-native blister rust would be improved on the planted sites because the planted species have each been shown to contribute to both contemporary and future resistance and resilience to these biotic disturbance agents.

While Alternative 2 would make more progress toward that objective than would Alternative 3, both of these action alternatives would lead to improvements to the tree composition and in trending the forest vegetation toward the goals, desired conditions and objectives included in the Forest Plan.

Lastly, both of these alternatives would meet the objective that was identified for this project to: Re-establish and restore forested conditions to trend the project area towards Forest Plan desired conditions: in particular, increase the representation of early seral conifer species such as western white pine, ponderosa pine and western larch.

Cumulative Effects to Species Composition and Resistance/Resiliency

Alternatives 1, 2 and 3

The Potter’s Wheel project is a foreseeable future project that overlaps the portion of the Grassy Fire that occurs on the western side of Forest Road 265 and the ridgeline immediately above Road 265. The area is within the headwaters of Little Elk Creek. Currently there is no formal proposed action for the Potter’s Wheel project, therefore a quantitative or detailed qualitative analysis of cumulative effects is not possible. In general qualitative terms however, it is likely that an objective of the Potter’s Wheel project will be to increase the amount of white pine, larch and ponderosa pine in the upland portions of the project area. If new stands of white pine, larch and ponderosa pine are established in the Potter’s Wheel project area the species composition of the affected area would trend more towards the desired landscape conditions as described in the forest plan. It is therefore anticipated that the Potter’s Wheel project, and the planting activities

proposed in the Grizzly Salvage and Restoration project would cumulatively increase the acreage of white pine, larch and ponderosa pine stands within the two collective project areas.

The cumulative effects project list (Appendix B) contains no other foreseeable (formally planned) future actions that would add to the potential cumulative impacts on forest composition and the resistance and resilience of the future forest to disturbances and stressors. However, some reforestation activities are likely to occur in the short term (within 10 years) particularly on burned seedling/sapling and small size class stands (approximately 2,500 acres of previous plantations burned) and within some of the danger tree areas. Some pre-commercial thinning activities are likely to occur in portions of the project area in the next 15 to 25 years; the amount and location of the precommercial thinning is unknown due to varying site-specific natural regeneration rates, funding, and other factors that may affect the need and/or ability to conduct the thinning. Precommercial thinning would benefit the composition and resistance/resiliency toward disturbances, because it would reduce stand densities and favor the desirable species which would improve the composition and structure of the stands. Precommercial thinning is expected to be beneficial in many of stands within 15-25 years because of the anticipated high density natural regeneration (Zack 1994). Tree planting would improve the composition of the future stands as previously noted.

Because details concerning the scope and timing of potential future pre-commercial thinning and reforestation activities are not known at this time, it is not possible to quantify the effects with any certainty. However, if a substantial amount of reforestation and/or pre-commercial thinning were to occur in the foreseeable future in the project area, the effects would be beneficial and may offset part of the neutral direct and indirect effects to forest composition from implementing any of the alternatives.

It is possible that the owners of the Ferguson Ranch, a 116-acre private inholding within the area burned by the Lower Flat fire, may elect to salvage fire killed timber on their property. At the writing of this report it is unknown if any post-fire logging or reforestation activities would occur on this private property. However if the land owners do elect to salvage and/or reforest their property, the age class of the stands would not change because they have been set back to the stand initiation stage, just as most of the surrounding Forest Service land has. If they choose not to plant seedlings, a new forested stand dominated by western hemlock and grand fir with limited numbers of other species would naturally develop. This would be the expected outcome whether or not the landowners salvage the burnt timber. If the landowner chooses to plant white pine and/or western larch then the future stand of timber on their property may be more resistant and resilient to future disturbances. Therefore, cumulative effects of possible future developments, with or without salvage logging on the Ferguson Ranch are expected to be either neutral or positive.

Effects of Salvage Operations on Pre-Fire Old Growth

Summary: Alternative 2 would conduct salvage operations over approximately 19 percent of forest stands in the project area that met the definition of old growth prior to the fires, but that no longer meet that old growth definition due to the large number of trees that were killed. The salvage would reduce the number of dead trees but would retain the largest trees and any trees that are not classified as dead or imminently dead, retaining biological legacies within the salvage units. Alternatives 1 and 3 would not conduct salvage operations in pre-fire old growth stands; however, all three alternatives would conduct danger tree along roads that travel through pre-fire old growth.

Table 9. Summary comparison of effects to pre-fire old growth.

Measure	Alt. 1	Alt. 2	Alt. 3
Number of acres of pre-fire old growth located within roadside danger tree units	171	207	302
Number of acres of pre-fire old growth located within proposed salvage units	0	533	0
Total acres of pre-fire old growth within treatment areas	171	740	302

Direct and Indirect Effects to Pre-fire Old Growth

Alternative 1

While the wildfire itself substantially affected the size class distribution of forest stands within the project area, this alternative would not. As noted in the affected environment section of this report, the areas that burned with moderate and high severities and many areas that burned with low severity but were stocked with thin barked trees had such high mortality levels that the fire converted those stands to an early seral, stand initiation stage of development. These areas with high overstory mortality are in a grass/forb/shrub stage and will soon enter the seedling/sapling size class (0-5” dbh) as conifer seedlings establish.

The danger tree treatments along the roads and trails under the Alternative 1 would entail cutting dead/dying trees with no salvage of those trees. Any live trees that are deemed dangerous and are cut down along the roads and trails, would be minor enough in scope that the dominant size class for the entire stand would not change.

Alternative 1 does not propose any salvage operations in either pre-fire old growth stands or stands that may still meet the definition of old growth. However, as noted earlier, if this alternative were selected, cutting and/or removal of roadside danger trees would occur on approximately 171 acres.

Alternative 2

Alternative 2 would reduce the number of dead trees in approximately 533 acres of pre-fire old growth (about 19% of the total pre-fire old growth acreage within the project area) but, as stated above, would retain all dead western larch, white pine and cedar trees greater than 15 inches diameter, the largest trees of other species (particularly grand fir, Douglas-fir, and western hemlock) and any trees that are not classified as dead or imminently dead. Therefore biological legacies will be retained within the salvage units.

The largest diameter trees tend to occur within the pre-fire old growth stands and the majority of them are western hemlock with severe heart rot which are of no economic value. Many of these large rotten hemlock exceed 32 inches diameter stump height and would therefore not be cut unless they are so defective that they pose an imminent hazard. If any of these larger trees are felled because they are a hazard they would be left where they fall and would function on the site as large woody debris, which is also a biological legacy from the previous stand.

As with the other areas proposed for salvage operations, these pre-fire old growth stands that occur in salvage units would be planted to desirable species after the salvage operations are complete.

Alternative 3

Alternative 3 was developed in response to public concerns, and therefore does not propose any salvage within pre-fire old growth. However, since it was assumed that salvage units would address danger tree removal where they occurred within 200 feet of identified motorized routes, when the salvage units in pre-fire old growth were dropped from Alternative 3, it was necessary to add danger tree treatments to roadside areas that were no longer within salvage units. As a result there are more acres of danger tree removal proposed in Alternative 3 than there are in Alternative 2. Under Alternative 3, cutting and/or removal of danger trees would occur on approximately 302 acres of stands that are either pre-fire or existing old growth.

Because the 200-foot wide area along either side of a road or trail is likely to represent a fairly small percent of the adjacent area within a given stand, it is unlikely that removing danger trees would change the stand characteristics to the extent that an individual old growth stand would be impacted to the extent that they would no-longer meet the old growth definition.

Cumulative Effects to Pre-fire Old Growth

Alternative 1

As stated in the direct/indirect effects discussion, removal of roadside danger trees would be minor enough in scope that the dominant size class for the entire stand would not change. Because this alternative would not have any direct/indirect impacts on the distribution of size classes in the forest stands within the project area, there would also be no cumulative impacts.

Alternative 2

With regard to Alternative 2, the cumulative effects project list in the EA only contains one potential action that may have impacts to pre-fire old growth stands. As a future action, there could be some additional reforestation (tree planting) conducted in the area under a separate decision, and some of that reforestation could occur in other pre-fire old growth stands that are not proposed for planting under Alternative 2. If additional reforestation activities do occur in other pre-fire old growth stands, then those stands would be improved in regard to tree composition in ways that are similar to what was discussed earlier (Effects to Tree Composition and the Resistance and Resilience of Forest Vegetation to Disturbances and Stressors).

Alternative 3

Because Alternative 3 would not affect pre-fire old growth stands, there would be no cumulative effects from past, present or future actions.

Economics

Introduction

Management of the Forest has the potential to affect local economies, and people are an important part of that management. Use of resources and recreational visitation to the Forest generates employment and income in the surrounding communities and counties, and generates revenues that are returned to the federal treasury. The economics analysis discloses effectiveness of alternatives in meeting the Forest Plan objective to contribute to employment and income by providing forest products from National Forest System lands. The economic analysis is completed to determine the costs and revenues associated with the project and the economic impact to the local community. The value generated by the sale of the timber is measured against

the costs of timber sale activities and other project-related costs. This analysis is done to inform the decision maker of the economic feasibility of each alternative. The indicators for this analysis are displayed in the following table.

Table 10. Resource indicators and measures for assessing economic effects.

Resource Indicator	Measure
Project feasibility	Anticipated costs and revenues
Financial efficiency	Present net value
Economic impact	Potential job and labor income impacts

Methodology

Models and Information Sources

Project Feasibility Methodology

Project feasibility is used to determine if a project is feasible, that is, will it sell, given current market conditions. The estimation of project feasibility was based on the Region 1 sale feasibility model, which is a residual value timber appraisal approach that takes into account logging system, timber species and quality, volume removed per acre, lumber market trends, costs for slash treatment, and the cost of specified roads, temporary roads and road maintenance. The determination of feasibility relies on a residual value feasibility analysis that uses local delivered log prices and stump to mill costs to determine if a project is feasible (stumpage equals revenues minus costs). The appraised stumpage rate from this analysis is compared to the base rate (revenues considered essential to cover regeneration plus minimum return to the Federal treasury). The project is considered to be feasible if the appraised stumpage rate exceeds the base rates. If the feasibility analysis indicates that the project is not feasible, the project may need to be modified. Infeasibility indicates an increased risk that the project may not attract bids and may not be implemented.

Financial Efficiency Methodology

Financial efficiency provides information relevant to the future financial position of the program if the project is implemented. Financial efficiency considers anticipated costs and revenues that are part of Forest Service monetary transactions. Present net value (PNV) is used as an indicator of financial efficiency and presents one tool to be used in conjunction with many other factors in the decision-making process. PNV combines benefits and costs that occur at different times and discounts them into an amount that is equivalent to all economic activity in a single year. A positive PNV indicates that the alternative is financially efficient.

Financial efficiency analysis is not intended to be a comprehensive analysis that incorporates monetary expressions of all known market and non-market benefits and costs. Many of the values associated with natural resource management are best handled apart from, but in conjunction with, a more limited financial efficiency framework. These non-market benefits and costs associated with the project are discussed throughout the document.

Economic Impacts Methodology

Economic impacts are used to evaluate potential direct, indirect, and cumulative effects on the economy. Economic impacts are estimated using input-output analysis. Input-output analysis is a means of examining relationships within an economy, both between businesses and between

businesses and final consumers. It captures all monetary market transactions for consumption in a given time period. The resulting mathematical representation allows one to examine the effect of a change in one or several economic activities on an entire economy, all else constant.

The IMPLAN modeling system (MIG 2003) allows the user to build regional economic models of one or more counties for a particular year. IMPLAN translates changes in final demand for goods and services into resulting changes in economic effects, such as labor income and employment of the affected area's economy. The model for this analysis used the 2014 IMPLAN data from Shoshone, Benewah and Kootenai Counties, Idaho.

The economic impact effects are measured by estimating the direct jobs and labor income generated by (1) the harvesting and processing of the timber volume from the project, and (2) all restoration activities included in the project. Government work is not included in impact estimates since the work involved in this project is part of an ongoing government agency's vegetation management program.

Data used to estimate the direct effects from the timber harvest and processing were provided by the University of Montana's Bureau of Business and Economic Research (Morgan et al. 2007). This national data is broken into multi-state regions and is considered more accurate than that which is available from IMPLAN. The Northern Rockies BBER Region (Montana and Idaho) is used for this analysis. The BBER data represents the results of mill censuses that correlate production, employment, and labor income.

The direct employment and labor income benefit employees and their families and, therefore, directly affect the local economy. Additional indirect and induced multiplier effects (ripple effects) are generated by the direct activities. Indirect effects are felt by the producers of materials used by the directly affected industries. Induced effects occur when employees of the directly and indirectly affected industries spend the wages they receive. Together the direct and multiplier effects comprise the total economic impacts to the local economy. Potential limitations of these estimates are the time lag in IMPLAN data and the data intensive nature of the input-output model.

Spatial and Temporal Context for the Economics Analysis

The analysis area for the project feasibility analysis is the Grizzly Salvage area. It is approximately 25,127 acres in size and is located north of Kellogg, Idaho in Shoshone County. Salvage activities within the project area have the potential to impact the economic conditions of local communities and counties. To estimate the potential effect on jobs and income, a zone of influence (or economic impact area) was delineated, as described in the "Affected Environment" section. The temporal scope of this analysis is the duration of proposed activities; the project is expected to be implemented over a 2 year period, with most harvest activity occurring within the first year. Reforestation activities would be completed after harvest activities, and may take three to five years to accomplish.

Effects to Economics

Summary: Alternative 1 does not propose any salvage harvesting and is therefore not expected to generate any economic value. Both action alternatives would generate funds resulting in a positive present net value. Because there would be more volume harvested, Alternative 2 would generate more overall funds than would Alternative 3. Both action alternatives would also generate jobs; Alternative 2 would generate more jobs than Alternative 3. Overall, the largest number of jobs in both alternatives would come from the activities related to the salvage sale, but more non-timber related jobs would be generated by Alternative 2 than by Alternative 3. Alternative 2 would be more economically feasible than Alternative 3, because Alternative 2 generates more total revenue that may be used to fund other restoration not included in the timber sale provisions.

Table 11. Summary comparison of effects to economics.

Measure	Alternative 1	Alternative 2	Alternative 3
Project Feasibility - Anticipated total revenue ($)	0	2,314,000	1,570,000
Project Feasibility - Anticipated costs ($)	121,910	1,190,000	763,000
Financial Efficiency - Present net value	-121,910	1,124,000	807,000
Economic Impacts - Part- and full time jobs contributed	0	364	231
Economic Impacts - Labor income contributed	0	16,606,000	10,441,000

Direct and Indirect Effects to Economics

Alternative 1

The no-action alternative would not harvest timber or take other restorative actions, but would address the need for public safety on open forest roads and trails. Dangerous trees capable of falling onto the road or trail would be felled and left onsite. This would most likely be completed through a service contract with an estimated cost of approximately $121,910; with no commercial timber harvest under Alternative 1, no revenues would be collected to pay for the work. Employment would be negligible and economic impacts associated with the work would be limited. Fixed costs (such as road maintenance) would continue to be incurred.

Alternatives 2 and 3

Project Feasibility and Financial Efficiency

The appraised stumpage rate from the feasibility analysis was compared to base rates (revenues considered essential to cover regeneration plus minimum return to the Federal Treasury), which varies by alternative. The base rate is $3.02 per CCF (hundreds of cubic feet) for both Alternatives 2 and 3. The appraised stumpage rate and base rates for each alternative are displayed in Table 12. For either of the action alternatives, appraised stumpage rate is greater than the base rate, indicating that a sale under either of the alternatives is feasible (highly likely to sell).

Table 12. Project feasibility and financial efficiency summary (2015 dollars).

Measure	Alternative 1	Alternative 2	Alternative 3
Estimated timber volume (CCF)	0	53,984	33,942
Base rates ($/CCF)	0	3.02	3.02
Appraised stumpage rate ($/CCF)	0	23.66	27.04
Predicted high bid ($/CCF)	0	42.87	46.25
Total revenue ($)	0	2,314,000	1,570,000
Timber Harvest & Required Design Criteria - PNV ($)	-135,000	1,124,000	807,000
Timber Harvest & All Other Planned Non-timber Activities - PNV ($)	-135,000	1,124,000	807,000

Economic Impacts

Alternative 2 would result in more total jobs (170 direct and 364 total jobs) and more labor income ($8.5 million direct and $17.25 million total over the life of the project). Approximately 350 total jobs and $16.6 million of the total would be associated with the timber harvest activities, with the rest associated with non-timber activities. Collectively, on an annual basis, this would amount to approximately 182 jobs over each of the 2-3 years life of the project and about $8.6 million annually in labor income.

Alternative 3 would contribute fewer jobs (approximately 109 direct and 231 total jobs) and less labor income approximately $5.4 million direct and $11.0 million in total labor income over the life of the project. Approximately 220 jobs and $10.4 million of the total would be associated with the timber harvest activities, with the rest associated with non-timber activities. Collectively, on an annual basis, this would amount to approximately 116 jobs over each of the 2-3 year life of the project and about $5.5 million annually in total labor income.

Cumulative Effects to Economics

Alternative 1

Under Alternative 1, there would be minimal economic effects because the danger trees would not be harvested and processed into lumber. There would be no measurable cumulative effects to the economy as a result of implementing Alternative 1 in conjunction with ongoing and reasonably foreseeable activities.

Alternatives 2 and 3

Many factors influence and affect the local economies, including changes to industry technologies, economic growth, international trade, and the economic diversity and dependency of the counties. This analysis focuses on the cumulative impacts of proposed activities, past, ongoing and reasonably foreseeable activities on lands within the project area. The jobs and income associated with the action alternatives would contribute to the local economy during the life of the project.

Many of the costs and benefits associated with a project are not quantifiable in dollar terms. For example, neither the benefit to wildlife from habitat improvement nor the cost/benefits associated with the changes in visual quality from a project are quantifiable. These costs and benefits may be described qualitatively in the individual resource reports. Title 40 Code of Federal Regulations for NEPA (CFR 1502.23) indicates “For purposes of complying with the Act, the weighing of the merits and drawbacks of the various alternatives need not be displayed in a

monetary cost-benefit analysis and should not be when there are qualitative considerations." Management of the forest is expected to yield positive benefits, but not necessarily financial benefits.

Hydrology

Introduction

The following hydrology analysis provides a focused discussion of effects to hydrology under each of the alternatives. Particular attention is given to known and relevant historic management activities and natural historic disturbance processes, as well as the analysis of the environmental effects of the proposed activities. Analysis is based on best available science, relevant modeling, and professional interpretation based on conditions found through limited field visits and other observations. Supporting information is provided in the Hydrology Report. The following table lists the resource indicators and measures for the hydrology analysis.

Table 13. Resource indicators and measures for assessing effects to hydrology.

Issue	Indicators
Effects of activities on sediment delivery to streams	Change in risk of sediment delivery
Effects of activities on water temperature	Changes to temperature based on shading and sediment

Sediment delivery and water temperature were chosen as key indicators not only as a way to show effects of the alternatives pertaining to the objective, but also as a way to illustrate project compliance with the Clean Water Act and Idaho State water quality laws, as discussed in the Regulatory Framework and Compliance section (PF Doc. HYDRO-030).

Sediment Delivery

Forests generally have very low erosion rates unless they are disturbed (PF Doc. HYDRO-R02). Sediment delivery to streams is a natural process and results from events such as landslides and wildfires. These events can deliver tremendous amounts of sediment but are stochastic in nature and occur infrequently over time. Aquatic ecosystems on the forest have evolved within the context of these kinds of stochastic events, e.g. the wildland fire of 1889. The forest erosional processes in the project area are currently governed by the disturbance caused by the 2015 Grizzly Complex fires.

Post-fire erosional processes vary greatly from those in undisturbed parts of the watersheds. The wildfire removed much of the protective duff layer which protects soils by increasing infiltration and absorbing the erosive energy of raindrops and overland runoff. The amount of groundcover remaining after a fire is a primary control of post-fire erosion rates (PF Doc. HYDRO-R003, HYDRO-R004). Intense heat from the fire can create water-repellent soil layers and destroy soil structure, making the particles more easily detached and erodible. When these are combined with shallow overland flow, soil sealing can occur, where fine particles of ash and soil plug macropores which further increases runoff and subsequent erosion. The risk of debris flows immediately after a fire increases as a result of soil impacts coupled with increased potential for surface runoff.

A field visit through the area in March 2016 found that burned steep tributary streams and headwaters swales had large amounts of down woody debris in the channels, needle cast on side slopes, and revegetation occurring (for example, see Figure 12). Woody material showed no evidence of movement and side slopes had no evidence of sediment leaving the hillslopes and entering the stream channels.). None that were visited showed evidence of massive sediment transport, downcutting, deposition, or channel migration. The areas visited have experienced fall and spring rain events, snow pack and melt, and rain-on-snow events since the wildfire disturbance.

Figure 11. Broad area in the Flat Creek floodplain showing a low severity burn area.

Figure 12. Side tributary to Flat Creek that had a high severity burn.

The most common source of sediment in the project area resulting from human activities is from roads. Sediment from roads tends to be of a size which has more ecologically damaging properties. While sediment contributions from roads may be a relatively minor component compared to landscape scale sediment regimes (i.e. the wildfires), roads are areas where sediment delivery effects from management activities can be observed. Within the project area, roads exist in three broad conditions: open for motorized public use, closed administrative roads, and administrative roads that were used for fire suppression activities in 2015. The majority of the open public motorized roads within the project area received road maintenance during the suppression activities of 2015. This included blading, brushing, cleaning of culverts, and building rolling dips to aid in reducing sediment production from the road surfaces and subsequent delivery to project area streams.

Administrative roads exist in a broad spectrum of conditions, from fully brushed in and surface completely vegetated, to burned over and completely bare surfaces. Administrative roads used during fire suppression activities had existing culverts and ditches cleaned and waterbars installed to help disconnect the roads from delivering sediment to the project area streams. On field visits, culverts that had been cleaned during fire suppression activities were found to still be in good condition; there were no new material deposits on the upstream side of the culverts.

The actual amount of sediment delivery expected after the Grizzly Complex Fire has a high degree of uncertainty. Runoff response and subsequent sediment delivery in burned watersheds is a complex function of temporal and spatial variables involving climate, topography, burn severity, antecedent moisture conditions, and soil properties, among others. For instance, Moody and Martin (PF Doc. HYDRO-R005) found that the post-fire annual sediment yields from across the western United States varied by over five orders of magnitude. Of all the complex variables, post-fire sediment yields are primarily governed by the type of climate the year following the fire. A

wet year with high rainfall intensities would produce more sediment delivery than a dry year or a year with only low intensity rainfall events.

Temperature

Water temperature is an important factor in the composition and productivity of streams and is an indicator of water quality. Organisms such as fish, amphibians, and insects that inhabit streams can be greatly affected by changes to stream water temperatures. Stream temperatures in the project area are expected to be elevated as a result of the Grizzly Complex Fires due to loss of shade and cover in the riparian areas that were burned, and due to elevated sediment created by the wildfires. The greatest impacts would be expected in the reaches that had the highest percentages burned and the most linear miles of streams impacted by the fires. Dunham et al. (HYDRO-R006) reported average increases in mean stream temperatures ranging from 0.4 – 3.7°C, with increases in average daily maximum temperatures ranging from 3.2 – 7.2°C after wildfires in central Idaho. This same study noted a declining trend in temperatures after the fire but indicated that elevated temperatures can persist for a decade after wildfire. A study conducted in Oregon measured maximum temperature increases of 10°C after fires, which corresponded to the streams with the least amount of shade and streamflow (HYDRO-R007).

Methodology used for the Hydrology Analysis

Models and Information Sources

Scientific Modeling

Scientific models are used in this analysis as representations of different project area conditions so that predicted effects of the action alternatives can be compared with the current condition. There are many scientific models available; the following models used were chosen based upon best available science and the data available, as discussed below.

Sediment Delivery Methodology

Forest Service Water Erosion Prediction Project (FS WEPP) online interface tools were used as a means to compare sediment delivery from physical disturbance such as wildfire. The WEPP model is a physically based soil erosion model that provides estimates of soil erosion and sediment yield considering site-specific information about soil texture, climate, ground cover, and topographic settings (Elliot et al. 2000).

The accuracy of the predicted values from FS WEPP tools are, at best within plus or minus fifty percent. True erosion rates are highly variable due to large variations in local topography, climate, soil properties, and vegetative properties, so predicted values are only a single estimate of a highly variable process (HYDRO-R001). WEPP was chosen based on its availability and recent documentation. The WEPP models and supporting documentation can be found at: http://forest.moscowfsl.wsu.edu/fswepp/.

The Erosion Risk Management Tool (ERMiT) was used to estimate potential post-fire sediment delivery and sediment reductions from increases in ground cover. ERMiT is a web based application that uses WEPP technology to estimate erosion, in probabilistic terms, on burned and recovering forest. Input from salvage units are processed to combine rain event variability with spatial and temporal variables of soil burn severity and soil properties to produce a distribution of rain event sediment delivery rates with a

probability of occurrence in each of five post fire years. For the location of the fires in the Grizzly Project area, this includes rain on snow events in the precipitation model.

Water Temperature Methodology

Elevated stream temperatures can result from both natural and human-caused events. Land management (human activity) can increase stream temperatures by removing vegetation along streambanks, which reduces the amount of shade over the water thereby increasing the amount of solar radiation reaching the stream. Stream temperature can also be elevated by excessive sedimentation (i.e., build-up of boulders, rocks, gravel, sand, dirt, and silt), which results in a stream becoming wider and shallower, making it harder to shade and easier to heat. Sediment is a natural part of a stream system, but land management activities such as road building and timber removal can increase the amount of sediment entering a stream, delivering higher amounts of sediment than the stream can handle.

Due to the direct link between excess sedimentation and water temperature, qualitative discussion of water temperature in the project area are based on both sediment delivery and changes in shading.

Literature Reviews

There is scientific and social controversy surrounding post-fire salvage logging. There is little consensus in the body of available scientific literature as to the extent post-fire salvage logging impacts on processes such as overland runoff, erosion, sedimentation, and vegetative recovery. This is complicated by the limited amount of scientific research on this subject which can have great local and regional differences. Opponents of post-fire logging argue that it is unnecessarily damaging and is ecologically harmful. Others see it as a management tool where effects, if any, are overridden by disturbances caused by the fire itself. This report considered all the research but references the scientific publications considered most pertinent to this project based on similarities of hydrological and erosional processes, geographic areas studied, and specific activities proposed by this project. Research for this project included discussions with the Idaho Department of Environmental Quality (IDEQ) (PF Doc. HYDRO-031).

Spatial and Temporal Context for the Hydrology Analysis

Spatial and temporal boundaries set the limits for selecting the actions most likely to contribute to cumulative effects (FSH 1909.15, 15.2).

Spatial Context: Figure 13. Project map highlighting the relevant watersheds to be used as the spatial bounds for analysis.

illustrates the Grizzly Fire Salvage and Restoration Project location and the sixth-level hydrologic unit code (HUC) subwatersheds (hereafter referred to as watersheds) within which the project is situated. The areas chosen for analysis include the project area scale and watershed scale. The four watersheds within which the project takes place are Yellow Dog Creek – Middle North Fork Coeur d'Alene River, (hereafter Yellow Dog), Upper Tepee Creek, Steamboat Creek, and Flat Creek – Middle North Fork Coeur d'Alene River (hereafter Flat Creek).

Temporal Context: Past, ongoing, and reasonably foreseeable projects within the activity area and within the watersheds were considered for the cumulative effects analysis (Appendix B of this EA). Wildfires, timber harvesting, mining, and road construction activities have occurred throughout the watershed. Activities and their effects were analyzed using the methods listed above and incorporated into the current baseline condition; they were also used to look at historic

ranges of variability for the project watersheds. Ground-disturbing projects older than 1960 were not included, partly because more reliable record keeping started after 1960, recorded timber harvest activity on National Forest System (NFS) land was less intense and more widespread up to that point, and partly because it was determined that the effects of timber harvest on activities that occurred prior to that year would have minimal effects on water quality. Cumulative effects were considered out to the completion of the salvage harvest.

The direct and indirect effects of the proposed actions regarding road reconstruction and temporary roads are also analyzed in terms of their immediate, short-term effects on sedimentation to streams, as well as their long-term effects that might be realized after the complete implementation of the project.

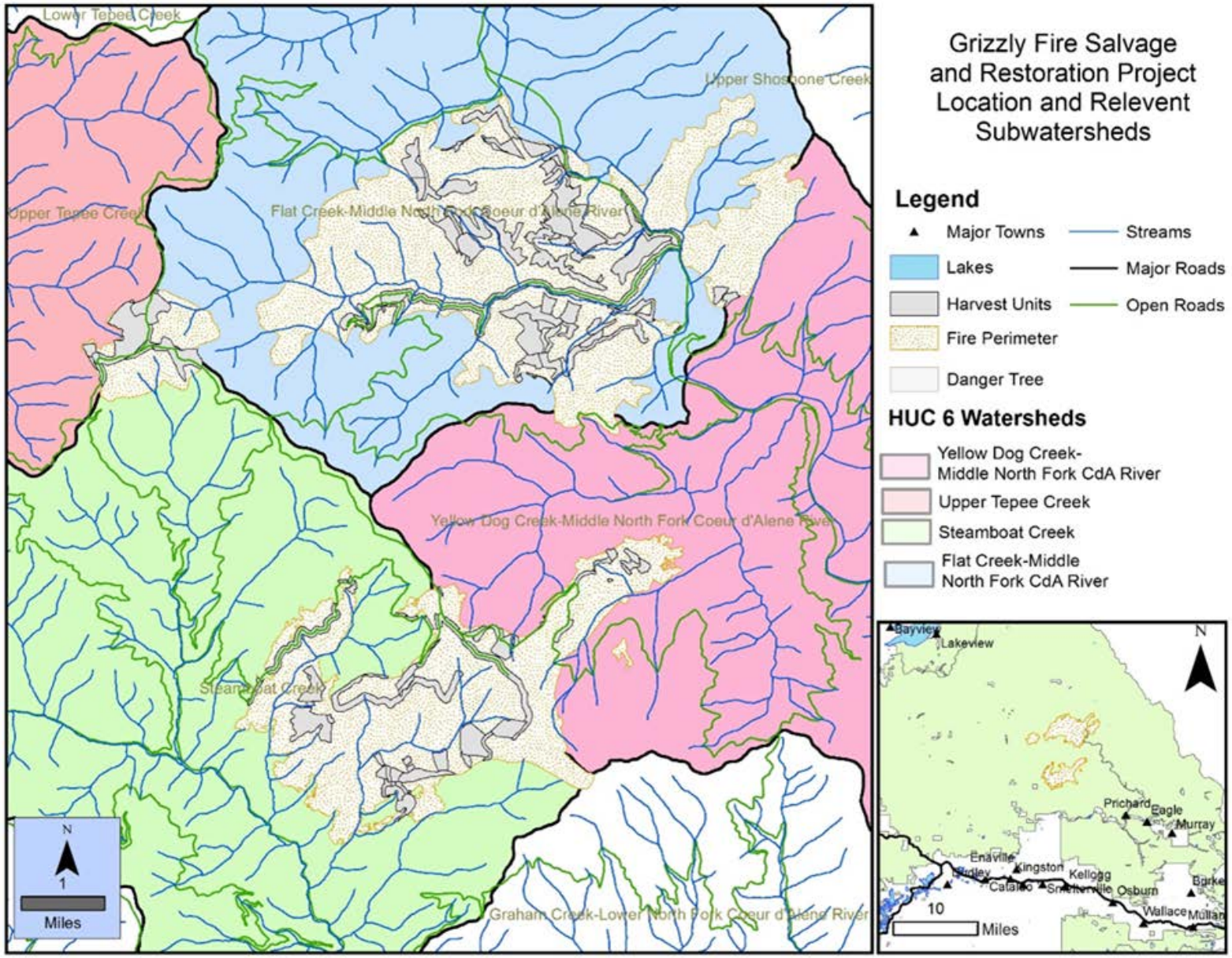

Figure 13. Project map highlighting the relevant watersheds to be used as the spatial bounds for analysis.

Effects to Sediment Yield

Summary: In the immediate project area, for all alternatives, there would be increased sediment delivery to streams in the short term due to the 2015 Grizzly Complex wildfires. Long-term sediment delivery risk would be reduced as vegetation re-establishes itself and grows, both in the burned and salvage areas. Alternatives 2 and 3 have a slightly lower risk of sediment delivery than Alternative 1 from the existing roads network. Under the action alternatives, roads would receive extra maintenance with the timber harvesting practices that would help with drainage features to reduce sediment production from road surfaces and lower the risk of culvert failures. The same effects are expected with temperature: all alternatives would potentially have increase stream temperatures in the short term in the burned areas, but would return to natural levels in the long term as vegetation re-establishes itself.

Table 14. Summary comparison of effects to sediment yield.

Measure	Alternative 1	Alternatives 2 and 3
Change in risk of sediment delivery	The felling of roadside danger trees would be incidental and since they would be left in place, soil disturbance and compaction would be minimized. Through the felling process, trees and woody material on the ground in the upland areas and riparian zones would create sediment traps, reducing erosion rates.	Road maintenance would help reduce potential sediment production and lower risk of culvert failures. Effects from Alternative 3 would be similar to but less than Alternative 2, because there would be less salvage and roadside danger tree removal, and no temporary road construction.

Direct and Indirect Effects to Sediment Yield

Alternative 1

Sediment contributions from roads would remain unchanged from the existing condition. Regular road maintenance activities would continue to repair areas that compromise human health and safety or preclude administrative use. On roads not open to the public (and not maintained), chronic sediment inputs to the creeks would continue unabated in the short and long term.

The danger tree felling does not include any new road building or any motorized access off existing open public roads. The felling of danger trees along roads would be incidental and since they would be left in place in the RHCAs, soil disturbance and compaction would be minimized and linear features that could capture water from yarding would not be present. Through the felling process, branches, bark and tops would break off, leaving down woody material on the ground in the both the upland areas and the riparian zones. These trees will be left in place, with both the tree bodies and the down woody material creating sediment traps for landscape sediment erosion. It is expected that the increased ground cover should reduce the erosion rates with respect to this variable.

Alternatives 2 and 3

In both Alternatives 2 and 3, salvage harvesting, danger tree removal, tree planting, and road reconstruction, temporary construction and maintenance would occur. As discussed below, the direct and indirect effects from Alternative 3 would be less than under Alternative 2, because

there would be less salvage and roadside danger tree removal, and no temporary road construction.

Studies of sediment production after post-fire salvage logging have had difficulty discerning increases that are directly attributed to logging (PF Doc. HYDRO-R008, HYDRO-R021, HYDRO-R009, and HYDRO-R020). Results from logging activities were often confounded by other processes such as road influences, unusual climates the year after the fires, or the disturbance effects from wildfire can overshadow the impacts typically observed from forest harvest activities. Site characteristics will generally have a profound influence on whether significant sediment is produced by a logging operation (PF Doc. HYDRO-R022).

In the danger tree harvest outside of the RHCAs and in all salvage units, whole tree yarding would take place. In this process, both for ground-based units and skyline units, trees would be felled and dragged. During the felling process, it is expected that branches, bark, and tops would snap off, and in some instances whole dead trees would be left as well. Additional logging slash would be generated during the yarding. With increased ground surface cover and roughness on the hillslope by the addition of this logging slash, the erosion rates should decrease with respect to this variable alone (PF Doc. HYDRO-R009). The added roughness on the ground surface would intercept and trap surface erosion more than on a slope without the same amount of surface cover. Table 15. Salvage as percent of watershed.

shows the percent of salvage harvest by project watershed. These numbers do not include the danger tree removal; due to the low numbers of trees being felled combined with no cross country machinery travel, the effects of treating roadside danger trees would be minimal.

Table 15. Salvage as percent of watershed.

Watershed	Watershed size (acres)	Acres of salvage - Alternative 2	% of watershed in salvage units – Alternative 2	Acres of salvage – Alternative 3	% of watershed in salvage units – Alternative 3
Yellowdog	31,636	86	0.3	56	0.2
Steamboat	26,802	450	1.7	296	1.1
Flat	32,252	970	3.0	377	1.2
Upper Tepee	22,987	180	0.8	136	0.6

Salvage harvesting would not take place within the RHCAs under any alternative; danger trees would be tipped/felled and left on site. Similar to the harvest units, branches, bark and tops would break off in the cutting process, leaving down woody material on the ground in the riparian zones. These trees would be left in place, creating further sediment traps for landscape sediment erosion entering the riparian zone. It is expected that the increased ground cover should reduce the erosion rates with respect to this variable.

Under either action alternative, all of the salvage units would have some ground disturbance from either machinery, yarding, or both. The ground-based salvage logging units would have greater ground disturbance from skid trails which would reduce the ground surface cover and reduce infiltration by compacting the surface. Numerous studies have shown that these linear features (skid, cable, roads, etc.) can concentrate overland flow, which increases surface runoff and erosion (PF Doc. HYDRO-R010). As with green tree logging, it is suggested that the highest erosion problem areas in salvage logging are associated with roads (PF Doc. HYDRO-R011, HYDRO-R012). Minimal effects from the skid trail networks would be expected through

inclusion of BMPs and specific design criteria (Appendix A) and would be consistent with the Forest Plan (EA Appendix D and PF Doc. PD-004). These effects would be elevated in the short term, but long term effects from skid trails would be reduced by decompaction, seeding, and leaving slash cover on the main skid trails, with scattered slash on minor trails. Additional BMPs and design criteria would focus on minimizing project related soil compaction, such as; limiting operations in wet weather, requiring minimum skid trail spacing and adding slash to skid trails. Soil compaction in cable yarding units would be limited because the leading end of logs would be suspended off the ground, and as a result of prescribed soil design features (refer also to the Effects to Soils, and Appendix C – Design Features and Specific Activities).

With specific design features (Appendix C), the temporary roads proposed in Alternative 2 (which are not proposed in Alternative 3) would have an elevated short-term risk (the life of the temporary road, typically less than five years) of sediment erosion, which is reduced through design features and BMPs included in the above references. The risk of sediment erosion is reduced in the long term as the roads would be decommissioned after harvest and planting are complete. The effects to sediment delivery from the existing road networks would vary depending on their current condition. Risk of sediment delivery from roads that were used during fire suppression activities would remain neutral; rolling dips, waterbars (administrative roads only), and other existing drainage features would be maintained. Other proposed haul routes on administrative roads would undergo reconstruction or increased maintenance that would include the installation of water drainage features such as waterbars. Increased functioning drainage features would reduce sediment production from the road surfaces (PDF Doc. HYDRO-R010).

Cumulative Effects to Sediment Yield

Alternative 1

The cumulative effects for the risk of sediment delivery will be discussed based on reduction in plant canopy, increase in soil water repellency, loss of surface cover, and consumption of soil organic matter. This discussion will mainly talk about the effects associated with the change in plant canopy and surface cover.

The loss of plant canopy mainly affects the overall water balance and net precipitation and is generally regarded as having a smaller effect on hillslope erosion than changes in surface cover and soil properties (PF Doc. HYDRO-R013). In the project area that has been impacted by wildfire there has been a reduction in plant canopy due to tree mortality. Impacts from fire typically last a few years before rapid revegetation occurs (PF Doc. HYDRO-R014). The risk associated with hillslope erosion and subsequent sediment delivery to streams would decrease as more time passes and more canopy cover establishes. In areas affected by fire suppression, such as the implementation and subsequent rehab of machine firelines, erosion would decrease as time passes and more ground cover is established. Landscape sediment contributions would also reduce as water repellant soil layers break down over a few months to a few years' time (see Soils Report for further discussion). Ground cover would increase as needlecast, branches, and tops drop from the burned tress. This would also lead to an increase in soil organic matter as they break down (see Soils Report for further discussion).

This anticipated reduction in sediment delivery to the streams as the forest recovers after the wildfire is supported by ERMiT modeling. The same steep hillslope burned with high severity fire has a 20% chance of exceeding 13.5, 5.8, 3.2, and 1.4 tons/year sediment delivery for the second through fifth years following the fire, respectively. This declining trend is consistent with

the sediment recovery described in the literature. The recovery modeling in full can be seen in the project files (PF Doc. HYDRO-032).

As discussed in the direct and indirect effects section, sediment contributions from roads would remain unchanged from the existing condition. Cumulatively, episodic sediment inputs from culvert failures would possibly increase in the future as more and more of the culverts on administrative roads are plugged by fire debris, get damaged from storms, and fall into general disrepair. Sediment inputs from general forest related activities, such as firewood gathering, recreation, etc. would be expected to remain unchanged from current conditions. Sediment inputs from salvage harvesting on private property in the Flat Creek Watershed would be expected to increase in the short term (5 years), until vegetation regrowth is established.

Alternatives 2 and 3

Alternative 2 and 3 have similar cumulative effects as Alternative 1. In the areas that are being proposed for salvage harvest, plant canopy was already reduced due to wildfire tree mortality. The removal of these dead and dying trees would not further impact the change in canopy cover. These impacts are still expected to recover in a few years as revegetation occurs after the units are harvested. While the effects of salvage logging on vegetative regrowth is highly uncertain, some studies indicate that vegetative regrowth in the salvage areas (without planting) would be slower than that from the unburned areas (PF Doc. HYDRO-R008). Overall, the risk associated with hillslope erosion and subsequent sediment delivery to streams would decrease as more time passes and more canopy cover establishes in the project area. Landscape sediment contributions would also reduce as water repellant soil layers break down over a few months to a few years' time (see Soils Report for further discussion).

Ground cover would increase as needlecast, branches, and tops drop from the burned tress as well as logging slash left from felling and yarding trees. This may lead to a net increase in surface cover in the areas that are being logged, which reduces the amount of erosion. Often times this is counteracted by a decrease in infiltration due to increased soil compaction from machinery during the salvage operations. This effect is dependent on the machinery spatial extent, local topography, and application of localized design features (such as scarifying/decompacting soils in units) and best management practices (PF Doc. HYDRO-R015). The effectiveness of treatments to reduce erosion, such as the placement of logging slash and mulch, have been proven in both burned and unburned areas (PF Doc. HYDRO-R008). A further discussion on the ground based impacts can be seen in the Soils Report. As logging slash and other surface cover break down over time, this would lead to an increase in soil organic matter as they break down and decrease risk of erosion (see Soils Report for further discussion).

The above discussion illustrates how many complicated factors play on the landscape during the recovery of a wildfire and salvage logging. It is understood that there would be sediment produced from the fire area and delivered to the project area streams. However, studies of sediment production after post-fire salvage logging generally have not been able to discern an increase that can be directly attributed to logging, although results have been mixed and complicated by different site-specific factors (PF Doc. HYDRO-R008). Due to so many variables, direct modeling of salvage logging is not possible. ERMiT modeling does have an option to model wildfire recovery areas with erosion treatment such as mulch. While not as fine of a material as mulch, logging slash would help catch sediment erosion (citation). ERMiT modeling provides exceedance calculations for burned areas that are treated with different weights of mulch (as seen in model runs in project file, PF Doc. HYDRO-032). For all levels of mulching, the probability of event sediment delivery is reduced from untreated conditions. From

these modeling results, it can be inferred that the probability of sediment delivery from the units treated with logging slash would be the same or reduced as the areas not treated with logging slash. Note that the values predicted by ERMiT do not account for debris flows or the influences of the existing road networks located in the project area.

Effects of salvage logging are more difficult to demonstrate at the watershed scale. Some studies have shown that there is no statistical difference from sediment concentrations between burned and salvaged catchments (PF Doc. HYDRO-R009, HYDRO-R008). As with localized effects, at the watershed scale, effects are highly dependent on the rainfall in the years following the wildfires and the local soil properties. At the larger scales the proportion of the watershed subjected to salvage logging decreases by the inclusion of more unlogged burned area as well as watershed areas that have not been burned. At the watershed scale, there is an increased potential for sediment storage in the landscape, thus decreasing the effect of post fire sediment delivery from both salvage and just wildfire (PF Doc. HYDRO-R008).

As discussed in the direct and indirect effects section, the risk of sediment contributions from roads would vary depending on condition. Cumulatively, the added maintenance included in the proposed action combined with the work already done to many of the project area roads during fire suppression activities would lessen their risk for episodic sediment inputs from culvert failures. On roads that weren't used for fire suppression but are proposed for use for the salvage activities, it is expected that the risk of sediment delivery would be less than if they weren't being used at all. This is due to the increased maintenance and drainage features which would reduce sediment production from the road surfaces.

Effects to Water Temperature

Summary: In the immediate project area, for all alternatives, there would be increased water temperatures in the short term in the burned areas but would return to natural levels in the long term as vegetation re-establishes itself and grows, both in the burned and salvage areas.

Table 16. Summary comparison of effects to water temperature.

Measure	Alternative 1	Alternatives 2 and 3
Changes to water temperatures based on shading and sediment	Felling and leaving of danger trees would have a negligible effect on water temperature due to these trees already having a reduced canopy from the wildfire, and the small number that will be felled.	The only proposed action in the RHCAs is the danger tree treatment. These trees have a reduced crown cover due to fire, therefore there would be a minimal change in shading of streams.

Direct and Indirect Effects to Water Temperature

Alternative 1

The proposal of felling and leaving of danger trees would have a negligible effect on water temperature due to these trees already having a reduced canopy from the wildfire and the small number that will be felled. This alternative does not treat roads. Not doing maintenance to reduce road-to-stream sediment delivery could affect channel width and sediment levels, which can in turn affect water temperature.

Alternatives 2 and 3

The proposed actions occurring in the RHCAs include the danger tree treatment and tree planting, as described in the Alternative Descriptions section. With the danger trees, these trees have a reduced crown cover due to fire, therefore there would be a minimal change in shading of the streams due to the implementation of this proposed action. The risk of sediment delivery is discussed above, which correlates to water temperature. Increased risk of sediment delivery means an increased risk in elevated water temperature from those actions and conversely a decrease in sediment risk is a reduced risk for water temperature. Tree planting in the riparian zone may potentially increase the crown cover in these areas over natural regeneration.

Cumulative Effects to Water Temperature

Alternative 1

Shade within the burned riparian corridors would begin to move towards natural conditions as shrubs and trees that provide streamside shade recover. The rate of progression and anticipated temperature changes would be slow and vary in time depending on the existing condition of the watershed including soils, vegetation, continuing activities, and intensity of past activities. As streams moved towards more natural form and function, shade levels would increase and sediment levels would decrease; the overall watershed health would increase.

Alternatives 2 and 3

Shade within the burned riparian corridors would begin to move towards natural conditions as shrubs and trees that provide streamside shade recover. There are no proposed activities that would alter this from conditions predicted from Alternative 1. The combination of road maintenance activities would reduce the risk to sediment delivery, which correlates to a reduced risk for elevated water temperature.

Fisheries

Introduction

The fisheries analysis took into consideration the hydrology analysis findings discussed earlier, particularly the suggestion that attributing increased sediment delivery directly to logging activities is typically "*confounded by other processes such as road influences, unusual climates the year after the fires, or the disturbance effects from wildfire can overshadow the impacts typically observed from forest harvest activities. Site characteristics will generally have a profound influence on whether significant sediment is produced by a logging operation.*"

The fisheries analysis considered in detail road maintenance within Riparian Habitat Conservation Areas (RHCAs), because these activities are known to affect streams. Effects include accelerated erosion rates, alteration of channel morphology, changes to the hydrograph, alteration of hillslope drainage, and increased risk of chemical contamination (Furniss et al. 1991). Additionally, excess sediment generated from roads is thought to be the leading cause of degraded habitat condition in the project area. In the Grizzly Fire Salvage and Restoration Project Area, road maintenance is proposed within RHCAs; this type of activity has the highest chance of affecting streams by altering the amount of sediment delivered to stream channels.

In terms of road construction and maintenance outside of RHCAs, research suggests non-channelized sediment generated outside this riparian buffer is not likely to reach a channel (Burroughs and King 1989, Belt et al. 1992, and Ketcheson and Megahan 1996).

All trees felled within RHCAs would be left in the riparian zone (if they pose a risk of blocking road drainage structures they would be moved, but still left in the RHCA), thus minimizing ground disturbance and increasing the amount of Large Woody Debris (LWD) adjacent to, spanning, or within stream channels; therefore there is no further analysis of this activity.

Planting desired tree species within RHCAs would result in minimal ground disturbance and would assist the riparian areas in moving toward the desired tree species composition, which would be beneficial to fish and their habitat in the long-term. Therefore, there is no further analysis of this activity.

Supporting information is provided in the Fisheries Report.

Resource Indicators and Measures for the Fisheries Analysis

Fish habitat and sensitive species are used to describe and compare effects. The following table lists the resource indicators and measures for the fisheries analysis.

Table 17. Resource indicators and measures for assessing effects to fisheries.

Issue	Indicators
Effects of activities on riparian habitat	Acres/percent of riparian habitat conservation areas affected by ground-disturbing project activities
Effects of activities on westslope cutthroat trout (a Sensitive species)	Qualitative analysis referencing habitat and hydrology resource indicators

Methodology

Models and Information Sources

No fisheries-specific modeling occurred; the fisheries analysis used information from the hydrology analysis, which includes project-relevant modeling. Refer to the Hydrology Report for discussion of specific models used and their assumptions, as well as existing and desired conditions.

Background and supporting information for this report was gathered from district fish and hydrology files, geographic information system (GIS) data, historical records, aerial photographs, and published and unpublished scientific literature. A transportation analysis process (TAPS) was completed in 2016 that provided recommendations for long-term road management objectives within the project area (PF Doc. TRAN-001a).

There is considerable controversy surrounding post-fire salvage logging. Published results discussing the extent post-fire salvage logging impacts on processes such as overland runoff, erosion, sedimentation, and vegetative recovery vary widely and can contradict another study. This is complicated by the limited amount of scientific research on this subject and is subject to great local and regional differences. Socially, opponents of post-fire logging argue that it is unnecessarily damaging and is ecologically harmful. Others see it as a management tool where effects, if any, are overridden by disturbances caused by the fire itself. The Fisheries report

considered peer reviewed research and references the publications considered most pertinent to this project based on similarities to this project.

The project is located in an area where fire suppression occurred until late fall. Knowledge of the area was obtained from spending time in the project area during fire suppression and rehabilitation activities, from visits for past projects, brief visits during spring melt, and from sharing of knowledge from other team members.

Riparian Habitat

Acres of RHCA disturbed is one surrogate for measuring potential changes to fish habitat. Road maintenance activities in riparian areas have the potential to alter rate of sediment delivery, which can lead to changes in fish habitat. GIS was used to calculate the total acres of RHCAs and the acres of RHCAs disturbed by project area roads.

Under all alternatives, the felling of danger trees does not include any new road building or any motorized access off existing open public roads. Because felled trees would be left in place inside RHCAs, there would be minimal ground disturbance. Felling would cause branches, bark and tops to break off, leaving down woody material on the ground in both the riparian zones. The tree bodies and other woody material would create sediment traps affecting rates of localized and landscape scale sediment erosion. It is expected that the increased ground cover would reduce the delivery of sediment to streams.

Westslope Cutthroat Trout

Pages 182 through 184 of the FEIS (CR-049) provide a general overview of life history and distribution across the forest. Management of populations is within the jurisdiction of Idaho Department of Fish and Game, while the Forest Service is tasked with management of habitats. Therefore, this report focuses on habitat measures as surrogates for impacts to westslope cutthroat trout.

Effects to Riparian Habitat

Summary: Alternative 1 would pose the lowest risk of negatively affecting fish habitat and fish. This alternative would not alter existing sediment delivery from roads, and the alternative would maintain existing adverse effects to habitat and aquatic organisms from roads within RHCAs over the short and long-term. Alternative 2 would have both short- and long-term negative effects because it proposes road reconstruction and temporary road construction. The effects of these actions would likely be masked by effects of the fire over the short- and long-term; however, it would increase the risk of delivering road-derived sediment to streams, resulting in decreased quality of habitat for westslope cutthroat trout. Alternative 3 would have effects similar to Alternative 2, but at reduced levels due to fewer acres of proposed activity.

Table 18. Summary comparison of effects to riparian habitat.

Measure	Alternative 1	Alternative 2	Alternative 3
Acres of riparian habitat conservation area disturbed by roads	21	32	24
Percent of total riparian habitat conservation area disturbed by roads	2.8	4.2	3.3

Direct and Indirect Effects to Riparian Habitat

Alternative 1

Alternative 1 would have no new direct or indirect effects; however, existing effects would continue in the short- and long-term, mainly expressed as elevated sediment levels delivered from roads affecting habitat. In the project area, roads and road-derived sediment are the leading cause of negative effect on streams, riparian areas, habitat and individual fish. Leaving road fill and culverts in floodplains, especially on closed roads, continues the existing risk of culvert failure and prism erosion. This would maintain existing stream habitat conditions into the long-term. This alternative would have the lowest risk of adversely affecting habitats and fish because no closed roads would be disturbed and no temporary road would be constructed.

There would be no change in acres of RHCAs affected by roads in the project area, thus implementing Alternative 1 would not result in a change in ground disturbance within riparian corridors. There would be no new effects and existing riparian conditions would be maintained and are subject to changes caused by natural and anthropogenic factors. These changes would occur both in the short and long term.

Alternative 2

Alternative 2 includes activities which utilize an additional 6.4 miles of road, and treat 250 acres of danger trees within RHCAs. These activities would have short-term effects of increased sediment delivery due to roads being constructed and vegetated prisms being disturbed; the duration of effects would be variable across the project area due to varying rates of revegetation. These activities are subject to BMPs that are designed to minimize or negate effects. The temporary roads would be decommissioned following completion of the project. Roads utilized for salvage, but not open to public use on the Motor Vehicle Use Map would be reclosed. These two final activities would reduce the long-term risk of delivering road derived sediment to streams which would negatively affect WCT and their habitat. Research such as Burroughs and King (1989), Belt et al. (1992), and Ketcheson and Megahan (1996) suggest BMPs are effective in protecting aquatic resources over the long term (more than 10 years). The long-term negative effects are related to open motorized routes remaining within the riparian corridor. These road segments would continue to deliver sediment to adjacent streams in the short- and long-term. These road segments would be maintained periodically as funding and prioritization allow.

Alternative 2 increases the acreage of RHCAs affected by roads by 11 (1.4%). This suggests an increased risk of road prism failure and more road-derived sediment delivered to streams in the long-term. Culverts and road fill that remain on open roads in RHCAs continue the existing risk of culvert failure and prism erosion. In these open road areas, this would maintain existing stream habitat conditions into the long term. If several road failures were to occur at the same time, additional short-term and long-term adverse effects to habitat and fish would occur because of the large-pulse of sediment delivered to streams.

Alternative 3

Effects of Alternative 3 would be very similar to Alternative 2, except it would not build any temporary road. Alternative 3 would treat an additional 239 acres of danger trees within RHCAs (under Alternative 2, these would be treated in the salvage units). Alternative 3 increases the amount of RHCAs affected by roads by 4 acres (0.5%). These activities would have a slightly lower risk of the effects described for Alternative 2.

Cumulative Effects to Riparian Habitat

Alternative 1

Alternative 1 does not propose any activities, so there would be no direct or indirect effects. With no new direct or indirect effects, there can be no cumulative effects.

Alternatives 2 and 3

Under Alternatives 2 and 3 there would be a net increase in acres of RHCAs affected by roads. This increase and the associated risk of increased sediment delivery combined with past activities, especially road construction would result in a short- and long-term negative cumulative effect. It is impossible to quantify this effect with any accuracy due to the highly variable nature of erosion as described in the Hydrology section. Alternative 3 would have slightly less cumulative effects than Alternative 2 because there would be seven fewer acres of disturbed RHCAs (Table 18).

Effects to Westslope Cutthroat Trout

Summary: Alternative 1 would poses the lowest risk of adversely affecting fish habitat and fish. This alternative does not alter existing sediment delivery from roads. This alternative would maintain existing adverse effects to habitat and aquatic organisms from roads within RHCAs over the short and long-term. Under Alternatives 2 and 3, the species would remain well-distributed throughout the project area and be subject to unquantifiable negative effects.

Table 19. Summary comparison of effects to Westslope cutthroat trout.

Measure	Alt. 1	Alt. 2	Alt. 3
Qualitative effects to species based on habitat and hydrology resource indicators	No change	Species would remain well-distributed throughout the project area.	Species would remain well-distributed throughout the project area.

Direct and Indirect Effects to Westslope Cutthroat Trout

Alternative 1

Alternative 1 does not propose any timber salvage activities, so there would be no direct or indirect effects.

Alternatives 2 and 3

Westslope cutthroat trout and their habitat would see short- and long-term negative effects. Increases in sediment would occur over the short term (less than five years), specifically during and shortly after road construction, reconstruction, maintenance, or intense or prolonged precipitation. Research (Wagenbrenner et al. 2015, Silins et al. 2009) suggest effects of post-fire salvage logging and transportation management vary over temporal scale, may be masked by the effects of the wildfire, and may be undetectable at the subwatershed scale. BMPs are applied to this project and are designed to minimize effects of harvest activities.

The negative effects of post-fire salvage logging would not measurably affect local or regional populations of WCT over the long-term (longer than 10 years) due to the relatively localized

spatial scale when considering the majority of the North Fork Coeur d'Alene River drainage is connected and accessible by fish.

Cumulative Effects to Westslope Cutthroat Trout

Alternative 1

Alternative 1 does not propose any activities, so there would be no direct or indirect effects. With no new direct or indirect effects, there can be no cumulative effects.

Alternatives 2 and 3

The combined negative effects of increasing RHCA disturbance under the action alternatives (discussed above), the effects of past activities (identified in Table 4 and Appendix B) and effects of the fires of 2015 would result in some level of degraded habitat for westslope cutthroat trout. Due to the masking effect of the wildfire it is impossible to directly quantify an increase attributable to salvage logging and transportation management. During implementation, BMPs would be monitored for implementation and effectiveness, which are the primary control mechanism for nonpoint sources of pollution on National Forest System lands (FSH 2509.22).

It is acknowledged there would be an incremental increase in sediment delivery to streams which contributes to degraded habitat for westslope cutthroat trout. These effects would occur across the project area and within the sixth-level watersheds.

Soils

Introduction

Past harvesting and the 2015 fires have shaped existing soil conditions in the Grizzly Fire Salvage and Restoration area. Fire alters many soil properties including organic matter content and nutrient related processes. Organic matter is one of the most important elements in retaining soil productivity and long term site health. Fire consumes organic matter and depending on the severity can significantly change organic matter content and therefore several other important aspects of soil productivity. Loss of organic matter can lead to decreases in long term available nutrients, changes in soil structure, and losses of soil porosity (Neary et al. 2005; DeBano et al. 1999; DeBano 1991). The recovery of organic matter following fire is key to restoring ecosystems productivity and disturbing the recovery of organic matter could lead to long term detrimental soil disturbance (Beschta et al. 2004).

The primary means of discussing the post fire conditions of soils is burn severity. Together with slope, burn severity influences the amount of soil erosion following a fire. Within the proposed treatment area, approximately 29% of the area is classified as low burn severity, 62% is moderate burn severity, and 15% is high burn severity.

Soils can be further affected by activities such as those proposed under the alternatives. Soil erosion can result in decreased soil productivity at a site due to the loss of surface soils. Surface soils in the project area contain higher organic matter and volcanic ash-derived mineral content compared to the subsurface soils. Removal of vegetation and/or ground disturbance associated with timber harvest or fire can increase erosion of the ash cap on certain landtypes where the erosion hazard ratings are high. Region 1 Soil Quality Standards require that detrimental soil

disturbance from management activities does not exceed 15 percent of an activity area or, if areas already exceed 15 percent detrimental soil disturbance prior to activities, that the activities be designed in such a manner that following implementation, there is no net increase in detrimental soil disturbance. In addition, coarse woody material retention must be appropriate to the habitat type (USDA 1999).

This analysis assessed direct, indirect and cumulative effects to soil productivity and stability as a result of proposed activities. The indicators for this analysis are displayed in the table below.

Table 20. Resource indicators and measures for assessing effects to soil productivity and stability.

Resource Indicator	Measure
Detrimental soil disturbance	Total acres of detrimental soil disturbance from past/proposed harvest activities (including skid trails, landings and temporary roads)

Skid trails would be closed following treatment to prevent illegal motorized access. Temporary roads would be rehabilitated when harvesting and planting activities are complete (Appendix C, Design Features and Specific Activities). Recovery would likely be slower than other thinning-related disturbance given the high traffic expected during harvest. Topsoil would be conserved and replaced where possible to further recovery. Road fill would be covered in slash for biological and site amelioration.

Hydrological recovery of the temporary roads would be expected within the first 10 years with soil infiltration rates lower than natural forest rates for the first 10 years (Luce 1997; Foltz and Maillard 2003). For the long term, infiltration rates improve over time as freeze/thaw and plant roots improve soil porosity though rates would remain lower than adjacent natural forest soil (Switalski et al. 2004). Soil biological function is restored as forest floor and native plant communities return to the temporary road base; the timing of restored function varies depending on specific site conditions.

Log landings are expected to be 0.25 to 0.5 acre in size. Existing landings sometimes receive minor blading or small tree removal in order to prepare them for use. Erosion control measures would be used if needed to avoid erosion and sediment transport from landing sites during maintenance and construction. All landings will be rehabilitated and returned to pre-implementation conditions. Rehabilitation measures include recontouring surfaces, ripping the surface to reduce compaction, seeding the surface where bare mineral soil is present and placing slash and other large woody debris along the surface to reduce soil erosion (Design Features, Appendix C). Subsoiling has been shown to be an effective tool in treating compacted soils in soil textures found in the project area that are susceptible to compaction including loams and silt loams found in the project area (Kolka and Smidt 2004). Landing subsoiling has been shown to be effective at reducing soil bulk density as long as soil moisture levels are not high (Carr 1989).

Figure 14. Surface fuels consumed in the fire and mineral soil exposed.

Methodology

Models and Information Sources

An erosion hazard assessment was used to summarize erosional characteristics based on landtype properties. This assessment described overall erosion hazards in the project area and at the unit scale to aid in the development of project design measures (Soils Report). Project design features (Appendix C) describe methods for minimizing impacts to the soil and techniques for restoring soil biophysical integrity.

Reports and maps generated by the Geographic Information System (GIS) were used to analyze effects to the soil resource as a result of proposed activities. Field sampled vegetation database (FSVeg) queries were conducted to identify past harvest activities and their time frames (PF Doc. PD-002). Existing detrimental soil disturbance estimates were determined using this GIS review in accordance with the Region 1 Approach to Soils NEPA analysis (USDA 2011), and verified through field surveys in each proposed treatment unit. The prior harvesting occurred at least 11 years ago, with the most recent ground-based harvesting occurring 26 years ago. The oldest prior harvesting was done over 95 years ago. The assumption was made that if there was past harvesting, the acres that were harvested would be assigned a value of 15% within the unit for the purpose of initial analysis.

Current detrimental soil disturbance level estimates are very conservative in order to provide as much protection for the soil resource as possible. The appropriate project design features have been applied to each unit based on site-specific burn severities and the level of existing/predicted detrimental soil disturbance.

Data Assumptions and Limitations

Much research has been conducted on the extent of ground disturbance from harvest activities. Disturbance has been shown to range from 4 to over 40 percent, depending on equipment used, method and season of operation, and silvicultural prescription (Rone 2011, Archer 2008, Clayton et al. 1987, Clayton 1990, Tepp 2002, Sullivan 1998, Reeves et al. 2011). For estimating the

potential amount of increased detrimental disturbance created by proposed activities, the following assumptions were made for ground based skidding, skyline yarding, and temporary road construction:

- Detrimental soil impacts from ground-based harvesting on areas with low to moderate burn severity are estimated at 10 percent of an activity area. Although past monitoring on the Forest has shown that the estimated detrimental soil disturbance levels from ground-based harvesting average 13 percent, those calculations include fuels treatments (i.e. grapple piling) that are not proposed under this project; therefore, the estimated detrimental soil impacts for this project are 10 percent (Rone 2011).

- Detrimental soil impacts from ground-based skidding on areas with high or very high burn severity and slopes greater than 20 percent are estimated at 13 percent of an activity area based on the use of designated skid trails (Rone 2011). The higher end of potential detrimental soil impacts are assumed on these steeper slopes where the soil cover and soil resiliency is reduced due to the impacts of the Grizzly Complex Fire. Expected impacts on these sites are greater than on slopes less than 20 percent or where soil burn severity is low to moderate and soil organic matter is intact (Beschta 2004; Wagenbrenner et al 2015).

- Estimated detrimental soil impacts from danger tree removal are 10 percent. This estimate is likely high, as danger tree removal would occur along roads approximately 200 feet on either side of the road. The first 60 feet on both sides of the road are considered part of the total soil resource commitment. Ground-based equipment may enter the next 140 feet on either side of the road, but this would be limited and directional falling would occur wherever possible.

- Estimated detrimental soil impacts from proposed cable yarding are three percent of an activity area and the disturbance on these sites is mostly concentrated at the landing (Rone 2011).

- Temporary road construction is estimated to impact an area with an average 25 feet width. This is based on the assumption of a running road surface 12-15 feet wide and an additional area 3-6 feet in width cleared of vegetation on each side of the road where the soil would likely be displaced and the organic litter layer disturbed and/or removed.

- Based on field observations in ground-based yarding units with existing disturbance, it is estimated that 50 percent of that disturbed area would be reused; therefore, impacts from proposed treatments would be reduced.

Detrimental soil disturbance is summarized in this document; unit-specific calculations are provided in the Soils Report with supporting documentation in the project files as noted.

Because detrimental soil conditions were estimated based on GIS and harvest history data, existing and estimated values for detrimental soil disturbance are not absolute and are best used to compare differences between alternatives. The calculation of the percent of additional detrimental disturbance from a given activity is also an estimate. This is because detrimental disturbance is a sum of a combination of factors including existing groundcover, soil texture, and timing of operations, equipment used, skill of the equipment operator, the amount of wood to be removed, and sale administration. The estimation of detrimental soil disturbance is based on

implementation of best management practices (USDA 2012), and assumes that soil recovery would occur over time.

Scientific Uncertainty and Controversy

Site and soil productivity relies on complex chemical, physical, and climatic factors that interact within a biological framework. For any given site and soil, a change in any key soil variable (i.e., bulk density, soil loss, nutrient availability, etc.) could lead to changes in potential soil productivity. Defining the threshold at which productivity is detrimentally disturbed has been the subject of much discussion and controversy. Powers (1990) cites that the rationale for the 15 percent limit of change in soil bulk density was largely based on the collective judgment of soil researchers, academics, and field practitioners, as well as the ability to detect change in productivity through current monitoring methods. Thus the soil quality guidelines are set to detect a decline in potential productivity of at least 15 percent. This does not mean that the Forest Service tolerates productivity declines up to 15 percent; rather it recognizes the complexity of detecting detrimental soils. The 15 percent change in areal extent realizes that timber harvest and other uses of the land result in an unavoidable footprint. This limit is based largely on what is physically possible with the use of harvest and skidding machinery.

Additional controversy surrounds the use of the term ‘irreversible’ in NFMA. NFMA has guidelines that “insure that timber will be harvested from NFS lands only where soil, slope, or other watershed conditions will not be irreversibly damaged.” The detrimental soil disturbance described in this analysis would not result in substantial and permanent impairment. Detrimental soil damage is reversible if chemical, biological, and physical soil processes (for example organic matter, moisture, top soil retention, and soil biota) are in place and time is allowed for recovery.

Spatial and Temporal Context for the Soils Analysis

Harvest treatment units are considered to be the activity area and are the spatial boundary for which direct and indirect effects on soil productivity were analyzed. Soil productivity is a site-specific characteristic. Loss of soil productivity in a treatment unit alone will not lead to a loss in soil productivity in an adjacent stand or other areas across a watershed. Temporary roads, skid roads and landings within unit boundaries are included in the analysis area. Temporary roads that are outside of a specific unit boundary are also included.

The analysis areas for consideration of cumulative effects are the same that are used for the existing and direct/indirect effects analysis. Assessment of cumulative effects on soil productivity at scales larger than the specific treatment unit boundary (such as the watershed scale) misrepresents the effects of management activities by diluting the site-specific effects across a larger area.

The temporal scale for assessing soil resource environmental effects includes both short- and long-term impacts. For the purposes of this analysis, short-term effects are defined as those that occur within about 10 years following proposed vegetation treatments. Long-term effects are defined as those that occur about 10-20 years or more following proposed vegetation treatments.

Effects to Soil Productivity and Stability

Summary: No adverse impacts to soils related to this project would occur under Alternative 1, as no ground-disturbing activities would be implemented. Under Alternatives 2 and 3, no activities are proposed on areas with landslide or high mass failure potential. By maintaining organic matter and native ground cover on at least 85 percent of the site (limiting disturbance to 15% or less of the unit area), nutrient cycling and availability should not be altered and soil productivity would be maintained. Reforestation activities would increase soil cover and allow for the establishment of new tree seedlings further increasing potential for nutrient cycling and future organic matter inputs to the soils, decreasing soil recovery time.

Table 21. Summary comparison of effects to soil resources.

Indicator/Measure	Alternative 1	Alternative 2	Alternative 3
Total acres of detrimental soil disturbance from past/proposed harvest activities (including skid trails, landings and temporary roads)	92	327	238

Direct and Indirect Effects to Soil Productivity and Stability

Alternative 1

No adverse impacts to soils related to this project would occur under Alternative 1, as no ground-disturbing activities would be implemented. The existing conditions resulting from the 2015 fires would persist. This alternative would not alter the current erosion and landslide potential and would retain the same amount of coarse woody debris, although more of the coarse woody debris would fall to the ground and come in contact with the soil surface. Over time, organic matter would be replaced where high burn severities eliminated the surface litter and duff. This would increase water holding capacity on the site over time.

These ecosystems are fairly resilient to fire as fire is a part of these forests (Hutto et al. 2016). Overtime natural recovery of vegetation and soil processes would occur in these sites. As vegetation re-inhabits sites, nutrient cycling would increase and litter layers would bounce back and soil productivity trend towards pre-fire levels.

Alternatives 2 and 3

Proposed activities would have the potential for both short and long-term direct and indirect effects on forest soils. However, by implementing prescribed soil design features such as keeping debris on site (which can decrease soil loss by up to 95% according to McIver and Starr, 2000), the project would meet the Region 1 Soil Quality Standards as well as the Forest Plan standards and would therefore not have a significant impact to soils. The direct and indirect effects for both alternatives would be similar, but because there would be fewer acres treated under Alternative 3, soils would be impacted on a smaller area. Harvesting activities are not proposed on areas with moderate or high erosion hazards, but harvesting activities are proposed on steeper slopes (20-35% slope) where the burn severity is high. Some potential erosion or sediment delivery could occur from these areas. These effects are not expected on areas with low erosion hazard ratings and low to moderate burn severities exist because soil design features will allow for increases in organic matter cover on the soil surface following treatment. Hydrophobicity is generally recovered one year following the fire (Wagenbrenner et al 2015; Reilly 2015) and the proposed treatments would not occur until at least one year following the Grizzly Fire. Reforestation

activities have also been shown to decrease erosion potential following salvage harvesting (Slesak et al. 2015).

No proposed harvesting will occur on areas with high mass wasting potential under either alternative. No change in mass failure potential is expected from the proposed action (Megahan and King 2004) because the current ratings are mostly low with some small portions where the potential is moderate. Soil design features and reforestation activities will encourage stable slopes and reduce potentials for soil stability issues following treatments.

Design measures to reduce the potential for erosion include the following: limiting the amount of excavated skid trails and landings; fully decommissioning all excavated skid trails and landings and placing large, woody material over the contoured slope for soil stabilization. See the design criteria for soils in Appendix C for a complete list of measures.

Cumulative Effects to Soils

Alternative 1

No cumulative impacts are anticipated as no ground disturbance would be implemented.

Alternatives 2 and 3

Harvesting and prescribed fire activities would not overlap in time and space with past, ongoing, or foreseeable projects except where past disturbance has occurred. The existing condition includes current detrimental soil disturbance. There are no other activities proposed within the current proposed units; therefore there would be no cumulative effects from thinning or prescribed fire.

Disturbance from general motorized use and recreational access has been occurring and will continue throughout the units indefinitely. Other recreational activities that occur off the developed roads, such as the gathering of miscellaneous forest products and hunting, are occurring in the project area. Closing skid trails in this area following treatment should prevent this occurrence and should not have additional effects on soils in the project area. Cumulative effects to soils from recreational vehicle use are not expected.

By maintaining organic matter and native ground cover on at least 85 percent of the site (limiting disturbance to 15% or less of the unit area), nutrient cycling and availability should not be altered and soil productivity would be maintained. Reforestation activities would increase soil cover and allow for the establishment of new tree seedlings further increasing potential for nutrient cycling and future organic matter inputs to the soils, decreasing soil recovery time (Certini et al. 2005). The project design features would ensure the Region 1 Soil Quality Standards, the established standard for protecting soil resources, are met; therefore, implementation of proposed activities would not have a significant impact to soils.

Botany

Introduction

Threatened and Endangered Plants

Currently, the U.S. Fish and Wildlife Service (USDI 2009, PF Doc. TES-11) lists two species as Threatened for the Idaho Panhandle National Forests (IPNF): water howellia *(Howellia aquatilis)* and Spalding's catchfly *(Silene spaldingii)*. Neither species is addressed in detail in this assessment, because no suitable habitat exists in the project area for either species, and because there are no documented occurrences of either these species on the IPNF. There are no federally-listed Endangered plants for the IPNF; therefore Endangered plants are also dismissed from detailed analysis.

There would be no effect to Threatened or Endangered plant species. Supporting information is provided in the Biological Assessment (PF Doc. TES-39).

Sensitive Plants

Sensitive plant species are determined by the Regional Forester as those species for which population viability is a concern, as indicated by a current or predicted downward trend in population numbers or in habitat capability which would reduce the species' existing distribution. Thirty species of Sensitive plants are known or suspected to occur on the Coeur d'Alene River Ranger District (PF Doc. TES-13)**.**

Vegetation management and associated activities have the potential to adversely affect suitable habitat and/or occurrences of Sensitive plants. The analysis of effects consists of a qualitative comparison of current distribution and condition of plant occurrences relative to the proposed activities, and the likely effects to existing occurrences and habitat from the proposed activities, as described below. Only plant species and habitat guilds that are known to occur or have a high likelihood to occur in the project area are addressed.

Supporting information is provided in the Plants Report and Biological Assessment (PF Doc. TES-39).

Methodology

Models and Information Sources

The potential for Threatened, Endangered, and Sensitive plant occurrence was based on a habitat assessment for species that are known or suspected to occur on the Coeur d'Alene River Ranger District. A Sensitive plant list for the Idaho Panhandle National Forests (IPNF) was provided by the Regional Forester in February 2011 (USDA 2011: PF Doc. 13).

For analysis purposes, the Coeur d'Alene Forest Threatened and Sensitive plant species list is grouped into habitat guilds; moist forest, wet forest, dry forest, grassland, subalpine, deciduous/ riparian, aquatic, and peatland guilds (Mousseaux, 1998; PF Doc. TES-5). Discussion of effects focuses on the moist, wet, and dry forest plant guilds, as these habitats are present in the project area.

Those areas that provided potentially suitable habitat for rare plants within proposed treatment areas before the 2015 fires, as well as those areas which incurred only low or moderate

vegetation/soil burn severity, may still provide suitable rare plant habitat post-fire. Photo interpretation, USFWS Wetland Maps, the Natural Resource Information System database (NRIS-TESP 2008, PF Doc. TES-61), the Idaho Conservation Data Center database (ICDC 2012, PF Doc. TES-3), and professional judgment were used to identify activity areas in need of field survey. Plant surveys were conducted in all units proposed for commercial timber salvage and danger tree removal; potential areas of suitable habitat were floristically surveyed to identify areas of highly suitable rare plant habitat and/or new rare plant occurrences. No Sensitive plants were found (PF Doc. TES-16).

Measurement indicators used in this document include the effects to sensitive plants and their habitat and effects on known populations. Sensitive plant population trends are the ultimate measure for this analysis. The effects analysis was conducted using the results of preliminary botanical surveys, pre-fire distribution and condition of Sensitive plant occurrences relative to the proposed activities, and the likely effects to existing occurrences and habitat from the proposed activities based on the literature and professional judgment. During project development, Features Designed to Protect TES Plants were developed to avoid detrimental impacts to listed plant species and habitat.

Effects to Sensitive plants and suitable habitat from proposed activities are generally described as very low, low, moderate or high, with the following definitions:

very low =	no measurable effect on individuals, populations or habitat
low =	individuals, populations and/or habitat not likely affected
moderate =	individuals and/or habitat may be affected, but populations would not be affected, and habitat capability would not over the long term be reduced below a level which could support sensitive plant species
high =	populations may be affected and/or habitat capability may over the long term be reduced below a level which could support sensitive plant species

The cumulative effects analysis for Sensitive plants considered the effects of each alternative in combination with the effects of past, present, and reasonably foreseeable future actions (Appendix B).

Spatial and Temporal Context for the Sensitive Plants Analysis

The geographic scale of the analysis for Sensitive plants is the Grizzly Complex Fire Salvage and Restoration Project Area boundary. Potential effects would be localized in nature to the activity area (i.e. timber sale unit, road construction segment).

The temporal scale of effects to habitat ranges from approximately 25 years to 100 years or greater, depending on the species. Moonworts may occur in younger stands of around 25 years old on moist to wet sites. Most other moist to wet site species require a longer time frame of 100 years or greater. This is the estimated time span required for shading from the tree canopy to re-establish and for understory communities to recover following wildfire or timber harvesting.

Incomplete and Unavailable Information

Historical occurrence information for rare plants in the project area is incomplete. Prior to 1988 the IPNF did not conduct rare plant surveys, and occurrence reports to the Idaho Conservation Data Center were incidental (IPNF 2010; CR-040).

Specific knowledge of population ecology is frequently lacking for sensitive plant species. Much of the current knowledge regarding sensitive plant species is based on observational (non-empirical) and even anecdotal information. Recent literature and monitoring reports on several species including Moonworts (USDA 2005; PF Doc. TES-67), Deerfern (USDA 2003, PF Doc. TES-7), Clustered lady's-slipper (Lichthardt 2003; PF Doc. TES-8), Henderson's sedge and Constance's bittercress (Lichthardt 1998; PF Doc. TES-9) and Idaho barren strawberry (Crawford 1980, PF Doc. TES-10), provide a greater understanding of the relationship of natural and management related habitat disturbance to the persistence of these species.

Effects to populations from disturbance events (natural or man-caused) are difficult to quantify with certainty for all Sensitive plant species. Protection of large occurrences and contiguous, unoccupied highly suitable habitat is assumed to be an effective conservation strategy (Burgman, et al 2001, PF Doc. TES-37). Examples of conservation strategies for Region 1 include Lichthardt, 1992 (PF Doc. TES-38), Lichthardt 2003 (PF Doc. TES-8), and Lorain, 1991 (PF Doc. TES-39a). As described in "Features Designed to Protect TES Plants" (Appendix C), populations would be protected, while some isolated individuals may be impacted by activities.

Effects to Sensitive Plants

Summary: Alternative 1 would have no impact to Sensitive plants or suitable habitat. Alternative 2 would have low impacts on sensitive plants or suitable habitat; while individuals of some sensitive plants may occasionally be impacted, cumulative impacts to species and habitats are expected to be low. The effects of Alternative 3 would be low, and somewhat less than the effects predicted for Alternative 2 because no new temporary road construction activities would occur and less pre-fire old growth and associated highly suitable wet and moist forest guild habitat would be impacted by timber salvage.

Direct and Indirect Effects to Sensitive Plants

Alternative 1

The No-Action Alternative would have no direct impact on Sensitive plants or habitat, because no harvest treatments and associated activities would occur. Ongoing and future authorized management activities would continue as planned.

Natural forest succession and recovery would not be disrupted. The response of each of the sensitive plant species to management activity varies by species, and in some cases, is not fully known. Local native vegetation has evolved with and is adapted to the climate, soils, and natural processes such as fire, insect and disease infestations, and windthrow. Any management or lack of management that causes these natural processes to be altered may have impacts on native vegetation, including threatened and sensitive plants. Indirect effects would depend on further natural disturbances.

Implementation of the No-Action Alternative would include felling of roadside danger trees to improve public safety. Because felled trees would not be removed, physical disturbance of soils and understory plant community would be isolated and temporally brief. Proposed tree felling

activities may indirectly affect undetected individuals of sensitive plant species. Locations of sensitive plants found during botanical surveys would be protected according to the project design features. Effects to Sensitive plants and suitable habitat from proposed tree felling activities would be low.

Tree planting and restoration activities would not occur. Natural regeneration in the post-fire environment would reflect the pre-fire species composition including plants found in pre-fire rare and sensitive plant habitat guilds.

Alternatives 2 and 3

The Grizzly Complex Fire project area contains habitat types for sensitive plants associated with the wet forest, moist forest and dry forest sensitive plant habitat guilds. Undetected occurrences may experience direct and indirect effects from vegetation treatments and road work. Potential effects include mechanical compaction, noxious weed competition/displacement, roadside dusting, hydrologic alteration due to treatment activities, and degradation of habitat. Undetected annual plants disturbed before seed set may experience decreased viability in subsequent years, due to a reduction of the seed bank. Perennial plants may experience ground disturbance to rootstocks (rhizomes, taproots, and bulbs), potentially inhibiting the plants ability to resprout from rootstock. The extent of direct and indirect effects for undetected occurrences is speculative due to lack of known locations.

Timber salvage (excluding winter harvest) under the action alternatives may affect sensitive plants and habitat by creating unfavorable conditions for establishment and persistence, at least in the short term. Soil compaction may occur, which can alter current and future success of understory plants due to mortality, reduction in future recruitment, changes in soil moisture, and changes in mycorrhizal associations. Physical disturbance of the understory community may eliminate species from the stand that are disturbance intolerant, particularly plants which have shown little tolerance for logging disturbance.

The temporal recovery of individual plants after disturbance is species-specific and may depend on factors of the disturbance and effects to the microsite, tolerance of the species to disturbance, and presence of regenerative methods of survival (i.e. rhizomes, taproots, bulbs, corms). Frequent and intense disturbance may favor species that grow in disturbed areas, and cause a decline of forest understory species that have low dispersal rates (Halpern and Spies 1995; TES-86). Alternative 3 would implement salvage activities on 877 acres, so effects to Sensitive plants would be less than Alternative 2 (which would salvage timber on 1,700 acres).

The yarding methods proposed for the action alternatives consist of skyline, cable, and ground-based yarding (escaliner-swing, tractor or forwarder). Some ground disturbance would result from the yarding process. Tractor yarding has the potential to cause the most detrimental and long lasting impacts to sensitive plant habitat, but effects would be confined mainly to designated skid trails. The effects of skyline yarding would be somewhat less than those resulting from tractor yarding. Soil compaction and displacement can affect soil structure, microorganisms and nutrient levels, which in turn lengthens the time it takes for native plant communities to recolonize. Features of the action alternatives related to soils would minimize soil displacement and compaction (see Effects to Soil and Appendix C, Design Features and Specific activities).

Proposed tree felling activities (including roadside danger tree removal) may indirectly affect undetected individuals of sensitive plant species. Known locations of sensitive plants would be

protected according to the project design features (Appendix C). Effects to Sensitive plants and suitable habitat from proposed tree felling activities would be low.

Alternative 2 proposes 5 miles of temporary road construction, which constitutes a long-term impact to moist and wet forest guild sensitive plant habitat. Temporary road construction activities would expose bare soil and parent material, creating suitable substrates for weed germination. In addition, use of these temporary roads could also contribute to the dispersal and spread of weed seeds. No road construction would occur under Alternative 3.

Road reconstruction and reconditioning would take place under both action alternatives and may directly and indirectly affect undetected individuals of sensitive plant species. These activities vary in the potential to affect sensitive plant habitats and species. Known locations of sensitive plants would be protected according to the project design features (Appendix C).

Cumulative Effects to Sensitive Plants

Alternative 1

Under the No-Action Alternative, there would be no significant cumulative effects to Sensitive plants because the No-Action Alternative would have no direct impact on Sensitive plants or habitat.

Alternatives 2 and 3

Reasonably foreseeable and ongoing activities on National Forest System lands in the cumulative effects analysis area would have immeasurable impacts to Sensitive plants. These activities are regulated by the Forest Service to minimize resource impacts; therefore effects to plants are very low. Timber harvesting, Travel Plan implementation, and Outfitter Guide activities have been through the NEPA process, and features to protect Sensitive plants have been implemented. These activities would have a low level of cumulative effects to TES plants.

Implementation of projects on National Forest System lands would have low impacts on sensitive plants or suitable habitat, since Federal lands are managed to maintain sensitive plant populations. Sensitive plant habitat assessment is conducted for all ground and/or vegetation disturbance on the District. While individuals of some sensitive plants may occasionally be impacted, cumulative impacts to species and habitats are expected to be low.

The added effect of implementing Alternative 3 in combination with the effects of past, present, and reasonably foreseeable future actions would be low, and somewhat less than the cumulative effects predicted for Alternative 2 because no new temporary road construction activities would occur and less old growth and associated highly suitable wet and moist forest guild habitat would be impacted by timber harvest.

The Forest Service has no control over timber harvesting and related activities on private lands. Impacts to TES plants have likely occurred in the past and are continuing because there are no policies in place providing protection of rare plant species on private lands. Because no baseline data exists for TES plants on private lands, it is not known to what extent activities have affected plants there and on nearby National Forest System lands.

Wildlife

Introduction

A preliminary analysis was conducted for each potentially-affected wildlife species and their habitat to determine the scope of project analysis. As described under "Methodology," only one species, black-backed woodpecker, was identified as being potentially affected by the proposed activities.

The 2015 Grizzly Complex Fires burned largely at moderate to high intensities, in western hemlock and grand fir greater than 10 inches in diameter (for more detail, please refer to the Forest Vegetation section). This created an abundance of potential black-backed woodpecker habitat. The burned areas are now considered high quality habitat, and woodpecker use of this habitat is expected over the next several years. A review of recent pre-fire aerial imagery determined that the high quality habitat is contiguous throughout the burned areas (PF Doc. W-12). A black-backed woodpecker was observed in the area during a field visit in April 2016 (PF Doc. W-8).

The following table lists the resource indicators and measures for the black-backed woodpecker analysis.

Table 22. Resource indicators and measures for assessing effects to black-backed woodpeckers.

Issue	Indicators
Changes in high-quality habitat	Acres of high-quality foraging and nesting habitat

High quality habitat is defined as timbered stands with greater than 40% canopy cover (pre-fire) that have burned with moderate to high severities in large (approximately 200 acres) patch sizes (Russell et al. 2007). This is further refined to only include stands over five inches average diameter (PF Doc. W-11). Trees smaller than this (seedlings and saplings) are generally not large enough to support woodborer beetle larvae which make up the bulk of the black-backed woodpecker diet (Dixon and Saab 2000). Nesting habitat is considered to be stands averaging at least ten inches diameter as nest trees are generally at least ten inches in diameter (Bonn et al. 2007). Given the long distances black-backed woodpeckers can travel to colonize burns (Yunick 1985), it is not felt that the size of the salvage or roadside danger tree units would prevent black-backed woodpeckers from using habitat throughout the project.

Methodology

Species Not Analyzed in Detail

A preliminary analysis was conducted for each potentially-affected wildlife species and their habitat to determine the scope of project analysis. The species listed in the following table: 1) do not have suitable habitat or are not regularly present or expected to be in or near the proposed activity area; or 2) are affected at a level that does not increase risk to the species, or effects have been adequately mitigated by altering the design of the project. For these reasons, these species were not analyzed in detail. Additional analysis information and effects determinations for these species are located in the project file (PF Doc. W-17).

Table 23. Summary of rationale for wildlife species not analyzed in detail.

Species	Rationale for Elimination from Detailed Analysis
T&E SPECIES	
Canada Lynx (*Lynx canadensis*)	The project does not occur within a designated lynx analysis unit (LAU) or lynx critical habitat, and does not affect lynx habitat.
PROPOSED FOR LISTING	
North American Wolverine (Gulo gulo)	No potential denning habitat in the Grizzly Salvage Project. No decrease in prey densities or increased access to remote areas.
SENSITIVE SPECIES	
American Peregrine Falcon (*Falco peregrinus anatum*)	No suitable habitat exists in the Grizzly Salvage Project for this species.
Bald Eagle (*Haliaeetus leucocephalus*)	No known nests or roost sites in the project's vicinity. No treatment of potential habitat.
Black Swift (*Cypseloides niger*)	No suitable habitat present and black swifts are not known or suspected to occur in the activity area.
Flammulated Owl (*Otus flammeolus*)	No suitable dry forest type habitats present. This species is not known or expected to occur within the Grizzly Salvage Project.
Common Loon (*Gavia immer*)	There are no lakes within the Grizzly Fire Salvage Project that are considered potential habitat.
Harlequin Duck (*Histrionicus histrionicus*)	The stretch of river along the Grizzly Salvage Project is not considered suitable habitat.
Pygmy Nuthatch (*Sitta pygmaea*)	No suitable habitat present. This species is not known or expected to occur within the Grizzly Salvage Project.
Fisher (*Pekania [Martes] pennanti*)	Proposed activities are occurring in post-fire habitats that are not considered suitable for fishers.
Fringed Myotis (*Myotis thysanodes*)	No suitable dry forest type habitats present. This species is not known or expected to occur within the Grizzly Salvage Project.
Gray Wolf (*Canis lupus*)	No reduction in prey densities, increase in public motorized access, or disturbance to potential den or rendezvous sites.
North American Wolverine (*Gulo gulo*)	No potential denning habitat in the Grizzly Salvage Project. No decrease in prey densities or increased access to remote areas.
Northern Bog Lemming (*Synaptomys borealis*)	No suitable habitat exists in the project's activity area for this species.
Townsend's Big-eared Bat (*Corynorhinus townsendii*)	There is no suitable roosting habitat within or near proposed treatment areas. This species is not known or suspected to occur in the area.
Coeur d'Alene Salamander (*Plethodon vandykei idahoensis*)	No documented sightings or suspected habitat occurs within the activity area. Potential streamside habitat protected by RHCAs.
Western Toad (*Bufo boreas*)	Potential breeding habitat is protected by RHCA buffers. Post-project, there would be no change to the open, motorized road system.

Species Analyzed in Detail

As displayed in the following table, the only species that warranted detailed analysis was black-backed woodpecker, a designated Sensitive species.

Table 24. Wildlife species analyzed in detail.

Species	Preferred Habitat	Rationale for Detailed Analysis
Black-backed Woodpecker (*Picoides arcticus*)	The presence of bark-beetle outbreaks and post-fire areas in forested habitats	Danger tree removal and salvage harvest would reduce potential foraging and nesting habitat.

Models and Information Sources

Effects on black-backed woodpeckers are determined by changes in high quality habitat. High quality habitat is defined as timbered stands with greater than 40% canopy cover (pre-fire) that have burned with moderate to high severities in large (approximately 200 acres) patch sizes (Russell et al. 2007). This is further refined to only include stands over five inches average diameter (PF Doc. W-11). Trees smaller than this (seedlings and saplings) are generally not large enough to support woodborer beetle larvae which make up the bulk of the black-backed woodpecker diet (Dixon and Saab 2000). Nesting habitat is considered to be stands averaging at least ten inches diameter as nest trees are generally at least ten inches in diameter (Bonn et al. 2007).

Spatial and Temporal Context for the Wildlife Analysis

For black-backed woodpeckers, National Forest System (NFS) lands within the Grizzly Fire Salvage and Restoration Project were used as the analysis area for direct, indirect, and cumulative effects. This area is approximately 14,000 acres, and with an estimated 12,678 acres of existing high-quality back-backed woodpecker habitat, is large enough to accommodate up to 25 home ranges.

Since other ownerships are highly susceptible to adverse habitat modifications, the presence of suitable habitat on these lands cannot be relied upon over time. As a result, this analysis assumes lands outside of national forest do not contribute adequate habitat for this species.

The temporal scope of the analysis is a function of the nature of the proposal, the geographic scope of the analysis, ongoing management goals and actions, and natural events. The analysis assesses effects based on both existing conditions at the time of the analysis and potential conditions (e.g., capable habitat that may or may not be currently suitable) at some undetermined time in the future. The analysis will provide a representation of effects until, at some point in time, future unforeseeable actions or events result in appreciable change. The temporal scope of the analysis will be influenced by the location and nature of future management actions and natural events. The time period that project-related disturbance may be present is expected to be approximately 5 years. The road work and harvest activities are anticipated to be completed in the first two years with tree planting continuing the following three years. The effects of vegetation management from this project may be still apparent 50 or more years beyond this (i.e. survival and growth of planted white pine and larch), barring other natural or artificial disturbance in the area.

Effects to Black-backed Woodpeckers

Summary: Under any alternative, an estimated 78-94 percent of high-quality habitat would remain after treatment, providing multiple home ranges (19-23) and maintaining black-backed woodpeckers throughout the project. Some individuals may be displaced by disturbance during project activities, however the majority of the high quality habitat within the fire perimeters would remain untreated and available for the birds. Consequently, the activities proposed under any alternative, in conjunction with the past, present and reasonably foreseeable actions, ***may impact black-backed woodpeckers or their habitat, but will not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species.***

Table 25. Summary comparison of effects to black-backed woodpeckers.

Measure	Alt. 1	Alt. 2	Alt. 3
Acres of high-quality foraging habitat	1,763	1,696	1,704
Acres of high-quality nesting habitat	11,898	9,858	10,685

Direct and Indirect Effects to Black-backed Woodpeckers

Alternative 1

This alternative does not include any salvage units, however danger tree felling for public safety would still occur within 200 feet of roads and trails open to the public. Danger trees cut would be left in place, and would not be removed and sold. This treatment of danger trees would occur on 864 acres within the project. Of this, approximately 780 acres are considered high quality black-backed woodpecker habitat. This is 6% of the existing high quality habitat within the analysis area. Although not a regeneration treatment, it is expected that enough snags would be dropped with this alternative to create more open conditions that would no longer be considered high quality habitat. However it could function as lower quality habitat as any live trees expected to survive would be retained, as well as any snags that are not likely to pose a danger to roads or trails due to tree height, slope, and distance from the road or trail. Although the quality and quantity of habitat would be reduced with this alternative; there would still be approximately 11,898 acres of high quality habitat (94% of the existing level) available to support black-backed woodpeckers in this project.

Alternative 2

This alternative proposes timber salvage on approximately 1,700 acres and danger tree removal from about 1,325 acres, for a total of 3,025 acres. Of this, approximately 2,820 acres are considered high quality black-backed woodpecker habitat. This is 22% of the high quality habitat within the analysis area. The salvage harvest would retain any live trees expected to survive, as well as enough snags within salvage units to meet or exceed Forest Plan guidelines. Although the quality and quantity of habitat would be reduced with this alternative; there would still be approximately 9,858 acres of high quality habitat (78% of the existing level) available to support black-backed woodpeckers in this project. Given the long distances black-backed woodpeckers can travel to colonize burns (Yunick 1985), it is not felt that the size of the salvage or roadside danger tree units would prevent black-backed woodpeckers from using habitat throughout the project.

Alternative 3

This alternative proposes timber salvage on approximately 865 acres and danger tree removal from about 1,250 acres for a total of 2,115 acres. Of this, approximately 1,993 acres are considered high quality black-backed woodpecker habitat. This is 16% of the high quality habitat within the analysis area. The salvage harvest would retain any live trees expected to survive, as well as enough snags within salvage units to meet or exceed Forest Plan guidelines. Although the quality and quantity of habitat would be reduced with this alternative; there would still be approximately 10,685 acres of high quality habitat (84% of the existing level) available to support black-backed woodpeckers.

As displayed in the table below, indicators of impacts from proposed activities are resultant changes from the existing, post-fire condition in the amount and quality of recreational use in the area, site condition of recreation infrastructure, level of public safety, and access to and availability of recreation opportunities.

Table 26. Resource indicators and measures for assessing effects to recreation.

Resource Element	Resource Indicator	Measure
Developed and dispersed recreation activities	Proposed timber harvest and associated activities may affect site conditions, recreation opportunities, and user experience of developed and dispersed recreation and activities	Change in ROS, harvest acres, and qualitative assessment of the extent to which site facilities, recreation character, user satisfaction, and range of recreation opportunities are affected by project activities
Roads open to unrestricted public travel (MVUM roads)	Operations adjacent to open roads may affect dispersed recreation access/availability, user experience, and public safety	Miles of open roads affected by project activities, most particularly timber harvest, roadside tree removal, and log hauling
Summer and winter recreation trails	Operations on and adjacent to recreation trails may affect site conditions, access/availability, user experience, and public safety	Miles of trail affected by project activities, most particularly timber harvest, road (trail) reconstruction, danger tree removal, and log hauling

Dispersed recreation, both motorized and non-motorized, is the primary type of recreation in the project area. One developed campground (Big Hank) is located within the area analyzed for recreation; the fire burned up to the campground, but it is not within the fire perimeter and there are no project activities proposed within the developed site.

The salvage area encompasses popular hiking trails, heavily used travel corridors, designated Off Highway Vehicle (OHV) summer trails, and groomed snowmobile routes. Hunting, fishing, camping, hiking, OHV riding, snowmobiling, viewing wildlife and nature, and driving for pleasure are the primary recreational activities here. Gathering of firewood and forest edibles also occurs.

The North Fork Coeur d'Alene River is eligible for Wild and Scenic River designation for recreation opportunities; where it lies alongside or weaves in and out of the project area, it is popular for fishing, dispersed camping, and water play.

The Grizzly Salvage project lies within the permitted area of an outfitting and guiding special use authorization, but the permitted trails are outside of the project area.

Supporting information is provided in the Recreation Report.

Methodology

Models and Information Sources

Determination of existing conditions for recreation activities, facilities, and opportunities are derived from Geographic Information System (GIS) databases of road and trail mileages, trail and facilities inventories and maintenance work, observations pre- and post-fire by recreation specialists and other technical personnel, and contact with recreation user groups and individuals.

Quantitative measurements of effects to use levels and patterns, infrastructure, and public safety on trails and unrestricted open roads are calculated using miles and percentages of routes subject to road construction/reconstruction, harvest activities, and log haul within and outside the project area.

Both quantitative and qualitative measurements are used to analyze effects to the quality of the recreation experience. Harvest acres and miles and percentages of routes subject to project activities provide a quantitative measure of the extent of effects such as noise, dust, commercial activity, logging traffic, and changes in site conditions. A qualitative measure of effects to recreation quality is any change in Recreation Opportunity Spectrum (ROS) categories. ROS is a method used by recreation planners to describe the desired set of outdoor recreation experiences that meet the needs and expectations of forest visitors for a given recreation setting and helps guide management within the categories of settings. In addition, descriptions of the type of effects, such as changes in scenery, overstory shading, vegetative buffers, and recreation infrastructure provide a qualitative assessment that speaks to the effect of activities on the character of the recreation resource and user satisfaction.

OHV (summer use) refers collectively to both motorcycles and ATVs (All-Terrain Vehicles) but may include other types of OHVs without handlebars or a straddle seat if they meet the 50-inch-or-less requirement. OHV trails in the Grizzly area are two-track trails open only to motorcycles and other OHVs equal to or less than 50 inches in width. Designation of motorized trails on this district applies only to non-winter travel. Over snow travel is not currently restricted to designated routes, but most snowmobiling in the area occurs on marked and groomed winter routes.

Spatial and Temporal Context

The analysis area for recreation resources is bounded on the north by Road 804, on the west by Roads 265, 260 (including the fire perimeter west of those roads), 2329, and 400, extending along that road to the junction with the Old River Road (County Road 503). The west boundary follows roughly Trail 807 and the western side of the fire perimeter to Road 208 (including the fire perimeter east of 208), and north to the junction of Roads 208 and 804. For effects to snow trails, Road 208 to the winter trailhead at Shoshone Camp is included.

Effects to recreation from activities proposed under the Grizzly Salvage project are described as short term (within approximately 5 years of project completion), mid-term (approximately 5-25 years) and long term (25 to 30+ years).

Incomplete and Unavailable Information

The current, post-fire condition of recreation resources has not been fully assessed due to the short time frame required to recover value from fire-killed trees. It is assumed that pre-fire recreation quality has been diminished to some extent due to fire effects such as removal of vegetative buffers and overstory shade; creation of ash, downfall, and danger trees; and, changes in the forested nature of the recreation setting.

There is potential for unauthorized motorized access points to be created where new road construction or reconstruction crosses or junctions with open roads and trails, but the potential for and extent of unauthorized use is uncertain. In addition, some breach points have already been created by the fire that removed vegetation on flat ridges and opened the area up to unrestricted overland access. Efforts will be made to restrict illegal motorized access from these sites through education, signage, and enforcement patrols. Where terrain permits, physical barriers may be

installed to restrict access. In addition, future changes in technology and design of OHVs may also affect the capability and impacts of both authorized and unauthorized motor vehicle use in unanticipated ways.

It is also unknown for certain which haul routes will be used by the purchaser, but the routes most likely to receive most, if not all primary haul traffic from within the project area to the district boundary are Roads 208 and 400.

Effects to Recreation

Summary: The No Action alternative would not change the current, post fire recreational use of the area. Some routes would remain hazardous to public travel due to the presence of fire-killed and weakened trees. In time, normal road and trail maintenance operations would remove danger trees as funding and workforce capacity allows. Under Alternatives 2 and 3, project activities would adversely affect user experience and recreation use of roads and trails to a moderate to moderately-high degree in the short-term, during the implementation phase. Alternative 2 would have greater effects (moderately-high) to recreation access and user experience than Alternative 3 (moderate) because more acres affecting high use recreation areas would be harvested, resulting in greater noise, equipment and log haul traffic, and access disruption to forest visitors. Both action alternatives would have a positive effect on access and site conditions of OHV Trails 807 and 807A in the longer term by clearing brush that currently restricts access. Use and user satisfaction of groomed snowmobile trails would not be affected if proposed activities do not occur during the snowmobile grooming period. Adverse effects to use patterns would be high if operations were conducted during the winter months on roads groomed for use as winter trails.

Table 27. Summary comparison of effects to recreation.

Resource Element/Indicator	Alternative 1	Alternative 2	Alternative 3
Developed and dispersed recreation sites and activities: Proposed timber harvest and associated activities may affect the range of opportunities, site conditions, and user experience of developed and dispersed recreation activities.	There would be no activities that would affect current recreation opportunities, user experience, or characteristics of dispersed and developed recreation settings. Immediate removal of danger trees may not occur.	There would be no change in ROS designations or the range of recreational opportunities. There would be moderately high adverse effects to user satisfaction in the short-term due to operations. There would be short to mid-term effects to recreation settings from harvest activities. Effects would be low to moderate in harvest units, depending on the post-fire condition of the site. There would be no long-term adverse effects. There would be minimal effects to recreation character in roadside salvage areas and no difference between action alternatives.	There would be no change in ROS designations or the range of recreational opportunities. Moderate adverse effects to user satisfaction in the short-term would be less than for Alt. 2 due to half as many harvest acres and less activity in the vicinity of Big Hank Campground, lower Flat Creek, and Grassy Mtn. Low short to mid-term effects to recreation settings of harvest units would be less than for Alt. 2 due to about half as many harvest acres under this alternative. There would be no adverse long-term effects. There would be minimal effects to recreation settings of roadside salvage areas as with Alt. 2.

Resource Element/Indicator	Alternative 1	Alternative 2	Alternative 3
Roads open to unrestricted public travel (MVUM roads): Effects to access/availability, user experience, and public safety as measured by miles of MVUM roads affected by project activities	There would be no harvest units, roadside salvage corridors, road work, or log haul activities along open roads to disrupt access to dispersed recreation or impact user satisfaction. Therefore, there would be no effects to recreation access or user experience associated with open roads. Fire-created danger trees would remain along recreation roadways.	Short-term adverse effects to recreation access and visitor satisfaction during implementation. Forest visitors would be subjected to temporary closures or traffic delays on about 26 miles of MVUM roads passing through or alongside harvest units or roadside salvage corridors. They would experience increased noise, dust, and commercial traffic and encounter log trucks on 45 miles of roads used as haul routes. Alt. 2 would result in approximately 6,000 log truck loads to be hauled out. These effects would be temporary. Design features that require proper signing and prohibit weekend and holiday log hauling would reduce adverse effects to public safety.	There would be little difference between the two action alternatives in the mileage of MVUM roads subjected to temporary closures or traffic delays due to proposed activities. Alt. 3 would have short-term adverse effects associated with about 25 miles of roads through or alongside harvest units or roadside salvage areas. There would also be no difference between action alternatives on miles of open roads subject to log haul or to public safety. However, Alt. 3 would result in less log truck traffic than Alt. 2 with an estimated 3,800 truckloads of volume removed. Effects to MVUM roads would be temporary.
Summer and winter recreation trails: Effects to site conditions, access/availability, user experience, and public safety measured by miles of trail affected by proposed activities (including road reconstruction, miles of routes through treatment units and danger tree removal corridors, and miles of haul routes)	No impacts to current trail conditions and use, user experience, or public safety. Existing post-fire danger trees may remain until project funds are available for removal; improvements to Trails 807 and 807A would not occur.	Short-term adverse effects to use, user experience, and site conditions of Trail 32. Design features would lessen adverse effects to the trail and hasten recovery of the recreation character of the trail and surrounding area in the mid to long-term. Trails 807 and 807A would be subjected to road reconstruction, harvest activity, and log haul, but short-term adverse effects to use would be low due to limited accessibility and access would improve once operations are completed. Adverse effects to the recreation setting would be low and would be masked once vegetation is re-established. Snowmobile use would not be affected if operations do not occur during the period of snowmobile grooming. Design features would reduce effects to use and safety of snow trails if winter activities are agreed upon during implementation.	Same as Alternative 2.

Direct and Indirect Effects to Recreation

Alternative 1

No timber salvage activities are proposed under the No-Action Alternative, therefore there would be no direct or cumulative effects to recreation resources from this alternative. Without the proposed action, recreation opportunities and post-fire site conditions would not be affected, but access may be restricted as fire-killed or damaged trees continue to fall over time. While danger

trees would be removed along several routes, there would still be an indirect effect of lost opportunities for rapid removal of danger trees on the landscape (off routes) that may pose a risk to public safety, and for improvements to Trails 807 and 807A.

Alternatives 2 and 3

Direct and indirect effects to recreation access and public safety on open roads would be similar for both action alternatives, but total miles affected and degree of effects would vary slightly between alternatives. Short-term adverse effects include disruption of recreation access, increased traffic, and exposure to log trucks and other harvest equipment during operations. These would be of moderately high impact to recreation, but of short duration.

Alternative 2 would affect about 26 miles of MVUM roads adjacent to or through harvest units and danger tree removal corridors. An estimated 30 MMBF of volume would be removed along haul routes traveled by forest visitors. This equates to about 6,000 log truck loads. Harvest activity along Road 400 in the Lower Flat area and along Roads 260 and 265 in the Grassy Mountain area would disrupt recreation access during implementation to a moderate degree, but the effect would be temporary. Harvest activity along Roads 6923 and 6924 would affect access while operations are occurring, but the impact would be low because the roads receive limited recreational use.

Alternative 3 would affect about 25 miles of MVUM roads adjacent to or through harvest units and danger tree removal corridors. There would be an estimated 20 MMBF of volume removed along haul routes traveled by forest visitors. This equates to about 3,800 log truck loads. Disruption to recreation access would be minimal along Roads 400, 6923, and 6924, and moderate along Roads 260 and 265 in the Grassy Mountain area.

Under both action alternatives, design features would keep high use recreation corridors open during operations and minimize traffic delays to reduce disruptions to recreation access. Effects to recreation use and quality as a result of increased traffic, noise, dust, and commercial activity would be short-lived, lasting only as long as operations are occurring.

An indirect effect of Alternatives 2 and 3 would be temporary displacement of recreational travel from high use routes impacted by harvest activities, to other roads in the project area. This effect would be temporary.

Little Elk Creek Trail #32: Under either alternative, a small portion (0.3 mile) of Little Elk Creek Trail #32 would be affected, primarily during operations. Adverse effects of proposed activities on the upper portion of Trail 32 are loss of use during operations, impacts to the trail corridor from road reconstruction and log haul across the trail, loss of buffering vegetation as a result of harvest activities adjacent to the trail, and evidence of management activities affecting user experience and “sense of place.” Positive effects include increased public safety due to removal of danger trees, and increased views from the trail. Design features would reduce longer term adverse impacts to the trail and regrowth of understory vegetation will mask cut stumps and skid trails in time.

Halsey Creek Trail #451: A potential indirect effect is increased use of Halsey Creek Trail #451, which is another non-motorized trail in the vicinity, but outside the project area and not subject to closure during implementation of the Grizzly Salvage project. This would be a minimal and short-term effect.

Centennial Falls Trail #400: There would be no direct effect to Trail 400 from activities proposed in this project. Danger tree removal corridors would occur only along motorized routes. Post-fire hazards along the trail will be treated through normal trail maintenance operations. An indirect effect would be disruption in access to the trail by activities in harvest units or danger tree removal corridors along Road 400. This effect would be short-term, lasting only while operations are occurring in those areas.

Fern and Shadow Falls Trail #513: There would be no direct or measurable indirect effects to Trail 513 from proposed activities. This trail was not subjected to fire activity and no salvage activities are proposed in the vicinity of the trail, or along the secondary roads that access the trail. Trail visitors will experience some haul traffic along Road 208, but it will not occur on weekends or holidays, so the indirect effect to the trail would be minor.

Felder Trail #807 and Felder Too Trail #807A: Both Felder Trail 807 and Felder Too Trail 807A would be reconstructed for log hauling and other timber sale or vegetation management activities for their entire length, a total of 11.7 miles. Trail mileage adjacent to harvest units or within danger tree removal corridors would be 3.3 for Trail 807 and 2.4 for Trail 807A. Log haul could potentially occur on the entire length of both trails, depending upon the extent of roadside danger tree removal outside of harvest units.

Since the existing brushed-in condition of the trails limits OHV accessibility, closures due to road work and harvest activities would not adversely affect their current recreational use. User experience would unlikely be adversely affected by harvest activities because the trail route occurs in an area of past harvest activity where evidence of timber management is extensive and expected by trail users. Road work proposed in both action alternatives to make the routes suitable for log haul would improve trail access and the condition of the roadbed. Design features that minimize the extent of brushing where possible would aid in retaining a more trail-friendly corridor width once operations are completed. The direct effects of project activities would be an improvement in the access and condition of 11.7 miles of OHV trails. Indirect effects would be increased recreational use of the trails and the potential for increased interest by partners in maintaining these trails in the future.

Groomed Snowmobile Trails: Design features prohibit winter activities unless approved by Forest Service managers so that conditions would be assessed and the provisions agreed upon to minimize any impacts to snowmobile use and safety. There would be no effects to snowmobiling use, patterns, or safety resulting from proposed activities if winter operations are prohibited. If activities occur during the snowmobile grooming season, there would be a direct adverse effect to 28.4 miles of snowmobile trails due to road plowing, and access to an additional 13.3 miles within the analysis area would be restricted. The primary access to many more miles of snow trails outside the project area would also be restricted. Haul routes servicing the Grassy Mountain and Grizzly Ridge portions of the project area would require plowing Road 400 from the snowmobile trailhead parking at Steamboat to the Grassy Mountain area, effectively eliminating access to popular winter trails on the west side of the project area. Winter operations in the Lower Flat area would require plowing Road 208 from the Shoshone Camp trailhead to the junction of Road 329, affecting the route on the east side of the project area that connects to snow trails on the north, east, and west of the project area. Restricting winter activities to only the Flat Creek units and providing for dual use of Road 208 for project activity and snowmobile traffic would have the least impact on snowmobile use, but would increase the risk to public safety.

Cumulative Effects to Recreation

Alternatives 1, 2, and 3

Past, present, and reasonably foreseeable activities relevant to cumulative effects for recreation include timber harvest, stand improvement treatments, and other resource work that would affect the use or quality of recreation routes in the project area. Intermediate treatments such as pre-commercial thinning or pruning would have little effect on recreation. There is potential for timber harvest on a portion of private land located just south of Big Hank Meadow, which would result in additional log haul traffic along Road 208. If harvest did occur, the effect to recreation would be low and of short duration. The reasonably foreseeable Potter's Wheel timber project overlaps a portion of the Grizzly Salvage area, including Trail 32 (Appendix B). Harvest units and access roads adjacent to and in the vicinity of the trail would likely adversely affect the use and quality of recreation on the trail in the short- to mid-term. In addition, potential use of Road 400 as a primary haul route for that project would extend the duration of pressure on open roads, lengthening the public's exposure to increased log truck traffic on a heavily used recreation road. This would be a fairly minor, short-term effect.

Scenic Quality

Introduction

The management of scenic resources is integral to providing quality recreation settings and opportunities, as well as contributing to the quality of life and mental well-being of forest visitors. The scenic quality analysis focuses on the visual effects of management activities proposed for the Grizzly Fire Salvage and Restoration Project (Grizzly Salvage Project) to determine whether the activities would meet forest plan guidelines for scenic quality.

One of the project's objectives is to re-establish forested conditions and increase the representation of early seral conifer species which is of particular relevance to the scenery resource of the area because these actions would enhance the scenic attractiveness (in terms of visual diversity) and integrity (degree of intactness) of the existing landscape over time.

Sensitive viewpoints in the project area include Big Hank Campground and Little Guard Lookout. Sensitive travel routes include Roads 208 and 260/265; Trails 81 and 32; and the North Fork Coeur d'Alene River (Figure 15), which provides essentially the same views as seen from Road 208.

Figure 15. Road 208 follows the course of the North Fork Coeur d'Alene River.

The 2015 fire activity within the area ranged from intense crown fires that consumed all the vegetation in an area, to surface fires that burned with varying degrees of severity, often leaving green crowns intact, but roots and lower boles were killed by intense heat. Fires burned in a mosaic pattern leaving irregularly-shaped edges and unburned areas scattered throughout the area. Roads and trails weave in and out of the fire perimeter; forest visitors may experience conditions along a gradient from unburned to severely burned over a relatively short distance.

Foreground views in burned areas range from burnt snags devoid of needles, no understory vegetation, and ash-covered ground, to pockets of charred tree trunks with green crowns and lightly burned understories (Figure 16 and Figure 17). Middle-ground views range from swaths of black snags, orange crowns, or green trees to areas of individual green tree crowns intermingled with the orange crowns of burned trees (Figure 18 and Figure 19).

Background views are less distinct and provide a perspective of the pattern of the fire disturbance over the landscape (Figure 20). The formation of patches and stringers of dead trees creates irregular breaks in the continuous carpet of green tree canopies. Mimicking the irregular patterns of natural disturbance helps maintain and restore scenic integrity.

Figure 16. A foreground view of an area that experienced intense fire activity.

Figure 17. A foreground view of an area that experienced spotty ground fire.

Figure 18. A middleground view of an area that experienced swaths of fire activity.

Figure 19. A middleground view of live and dead tree crowns.

Figure 20. Foreground, middleground, and background views in the project area.

The following table lists the resource indicators and measures for the scenery analysis.

Table 28. Resource indicators and measures for assessing effects to scenery.

Resource Element	Resource Indicator	Measure
Scenic Integrity	Scenic Integrity Objectives (SIOs) – *very high, high*, *moderate* or *low*	Extent to which proposed activities would affect intactness of attributes described in the Landscape Character Description
Visibility	Concern Levels - 1, 2, or 3 (1 being the highest) and Distance Zones - *Foreground* (up to 1/2 mile from the viewer), *Middleground* (up to 4 miles from the foreground), and *Background* (4 miles from the viewer to the horizon).	Whether proposed activities would meet assigned scenic integrity objectives within the context of Concern Level of the viewpoint and distance zones of viewed activities
Scenic Attractiveness	Scenic Attractiveness Class (intrinsic scenic beauty of the project area); Class A (Distinctive), Class B (Typical), or Class C (Indistinctive).	Whether proposed activities would meet the assigned Scenic Attractiveness Class

Supporting information is provided in the Scenery Report.

Methodology

Models and Information Sources

Scenic Integrity Objectives

General direction for scenery management is provided by the Scenery Management System (SMS) found in the Department of Agriculture Handbook 701, Landscape Aesthetics: A Handbook for Scenery Management (USDA, 1995). The Scenery Management System is a systematic approach to inventory, analyze, and monitor scenic resources. The system is used in the context of ecosystem management to determine the relative value and importance of scenery, assist in establishing overall resource objectives, and ensure high-quality scenery for future generations.

Specific scenic resource management direction is provided by the Forest Plan and is described in terms of Scenic Integrity Objectives (SIOs), which provide a measurable standard for scenery management. They describe a desired level of scenic quality and diversity of natural features based on physiological and sociological characteristics of an area, and refer to the degree of acceptable alterations of the landscape. Although management activities may alter the scenic integrity of the landscape, proposals must be consistent with the scenic integrity objectives assigned in the Forest Plan.

This analysis considers the landscape character of the project area, existing scenic integrity, and objectives for scenery in areas proposed for treatments. Effects to the scenic resources are discussed in general terms and whether or not the proposed activities would meet the prescribed scenic integrity objectives.

Scenic integrity objectives represent the desired condition (degree of intactness) of attributes described in the landscape (scenic) character description. The desired scenic integrity objectives for the project area as assigned by the Forest Plan fall primarily in the Moderate category, but range from Low to High (Figure 21). Most proposed management activities would take place in Moderate scenic integrity objectives with a few Lower Flat units within the North Fork Coeur d'Alene River corridor in the High category.

The North Grizzly area has had extensive regeneration harvest activity in the past and harvest units are dominant features on the landscape. This area is still progressing toward meeting the scenic integrity objective of Moderate. The Lower Flat area currently meets the SIO for Moderate and High, and Grassy Mountain is also progressing toward the scenic integrity objective of Moderate.

Visibility

Treatment units and their associated scenic integrity objectives were evaluated in relation to visually sensitive viewpoints identified in the Forest Plan to determine the extent to which proposed activities would likely be seen, and the likelihood that those activities would adversely affect scenic integrity objectives.

Concern levels were determined for the IPNF through public involvement and resource specialist assessments during development of the Forest Plan, and represent the relative importance of aesthetics across the landscape as determined by public concerns and expectations. Concern Levels take into account the viewing context of the individual(s), the typical duration of the view (e.g. walking versus riding an ATV), degree of discernable detail, the number of viewers, and the

potential for seasonal variation. Distance zones are described as foreground (up to one-half mile from the viewer), middleground (up to four miles from the foreground), and background (four miles from the viewer to the horizon).

Sensitive viewpoints within the North Fork Coeur d'Alene River corridor are Concern Level 1 and have foreground and middleground views of Lower Flat units within a scenic integrity objective category of High. Sensitive viewpoints and corridors in the Grassy Mountain area are Concern Level 2 and have foreground, middleground and background views of units located within a scenic integrity objective category of Moderate. Sensitive viewpoints include Big Hank Campground and Little Guard Lookout. Sensitive travel routes includes roads, trails, and the North Fork Coeur d'Alene River.

- Big Hank Campground is a developed site along the North Fork Coeur d'Alene River valued for its large overstory trees and dense shade. It is assigned a Concern Level of 1, but vegetative screening limits the extent of the viewshed from this site. The scenic integrity objective of viewed units is High; with foreground views.

- Road 208 is a heavily used recreation corridor with a Concern Level of 1. It is the primary access to many developed campgrounds, dispersed camping sites, and favorite fishing holes along the North Fork Coeur d'Alene River. Much of Road 208 within or near the analysis area has limited views because it either hugs the base of slopes or has heavy vegetative screening, though there are several segments and turnouts with longer viewsheds and places where the fire burned next to the road. The scenic integrity objective for this route is High, with foreground and middleground views.

- The North Fork Coeur d'Alene River is a Concern Level 1, and provides essentially the same views of proposed units as are seen from Road 208. The scenic integrity objective is High, with foreground and middleground views.

- Roads 260/265 in the vicinity of Grassy Mountain are Concern Level 2 and have several areas of expansive views. These roads have foreground, middleground, and background visibility and travel through areas burned by the Grassy Mountain fires. Scenic integrity objective of the viewed units is Moderate.

- Little Guard Lookout and Trail 81 are both Concern Level 1 and have middleground and background views of Lower Flat units that occur in both the High and Moderate scenic integrity objectives. Trail 81 is a high ridgetop hiking trail outside the fire perimeter that will have middleground and background views of the Lower Flat area. Bennett Peak is one high point along the trail that provides an indication of select views along the trail.

- Trail 32 is a non-motorized trail with a Concern Level of 2. The fire burned intensely at the top of the trail, resulting in loss of vegetation viewed in the foreground and middleground.

While Road 400 receives high recreation use, particularly along Flat Creek to the trailhead for Centennial Falls Trail, it is assigned a Concern Level of 3 and not considered sensitive because viewing distances are limited or sensitivity to modified views is low. All other roads within the analysis area are designated Concern Level 3.

Both Trails 400 and 513 are hiking trails to scenic falls and are assigned a Concern Level of 1. However, the trails follow creek bottoms and are screened by vegetation, so do not have views

into the areas proposed for treatment. Trails 807 and 807A are OHV trails that have limited accessibility, low visual sensitivity, and are designated Concern Level 3, so are not considered sensitive travel routes.

To analyze visual impacts, topographic maps and Google Earth images were studied to determine the visibility of treatment areas from high recreation use areas and Concern Level 1 and 2 sites and travel routes. Local knowledge of site conditions and viewsheds, site visits by resource specialists, and Google Earth simulations were also used to assess visibility. Due to the short time frame and time of year of analysis, it was not possible to conduct a field review of viewpoints at the higher elevations. Such viewpoints were identified and treatment units for each alternative were imported into Google Earth and draped over the landscape. Units were then viewed from ground level or "street view" at a variety of representative sensitive locations to determine impacts to scenery over the short-term, mid-term, and long-term. Google Earth modeling does not account for terrain and vegetative screening from viewpoints, so in most cases, simulations over-estimate visibility of treatment units.

Scenic Attractiveness

The Scenic Attractiveness classification for the area of interest is Class B. Class B represents a landscape where some outstanding qualities are present, but in general the overall appearance is typical for that region. The Scenery Management System recognizes natural disturbance events, such as wildfire, as typical for this landscape region

Spatial and Temporal Context

The geographic scope of the scenery analysis for the Grizzly Salvage Project includes all areas visible from high concern level use areas and travelways both within and outside the area of interest, as discussed above. Viewpoints of greatest concern are at high use recreation sites and along heavily traveled roads and popular trails where there is high visibility into the project area. These areas have a high concern level because they are in areas where forest users are found to congregate, travel and/or have high concern for scenic resources. Such sensitive viewing locations would be affected by the proposed management activities because management would have the potential to be seen in the foreground, middleground, and background viewing zones. Direct and indirect effects analysis focuses on the viewshed within which the proposed activities can be seen, and the extent to which proposed treatment units affect the scenic integrity objectives assigned to that piece of ground. The cumulative effects area is similar to that for the direct and indirect effects, except that it takes into account the entire viewshed, as opposed to focusing on the individual units and surrounding area.

Effects to scenery from activities proposed under the Grizzly Salvage and Restoration Project are described as short term (within approximately 5 years of project completion), mid term (approximately 5-25 years) and long term (25 to 30+ years).

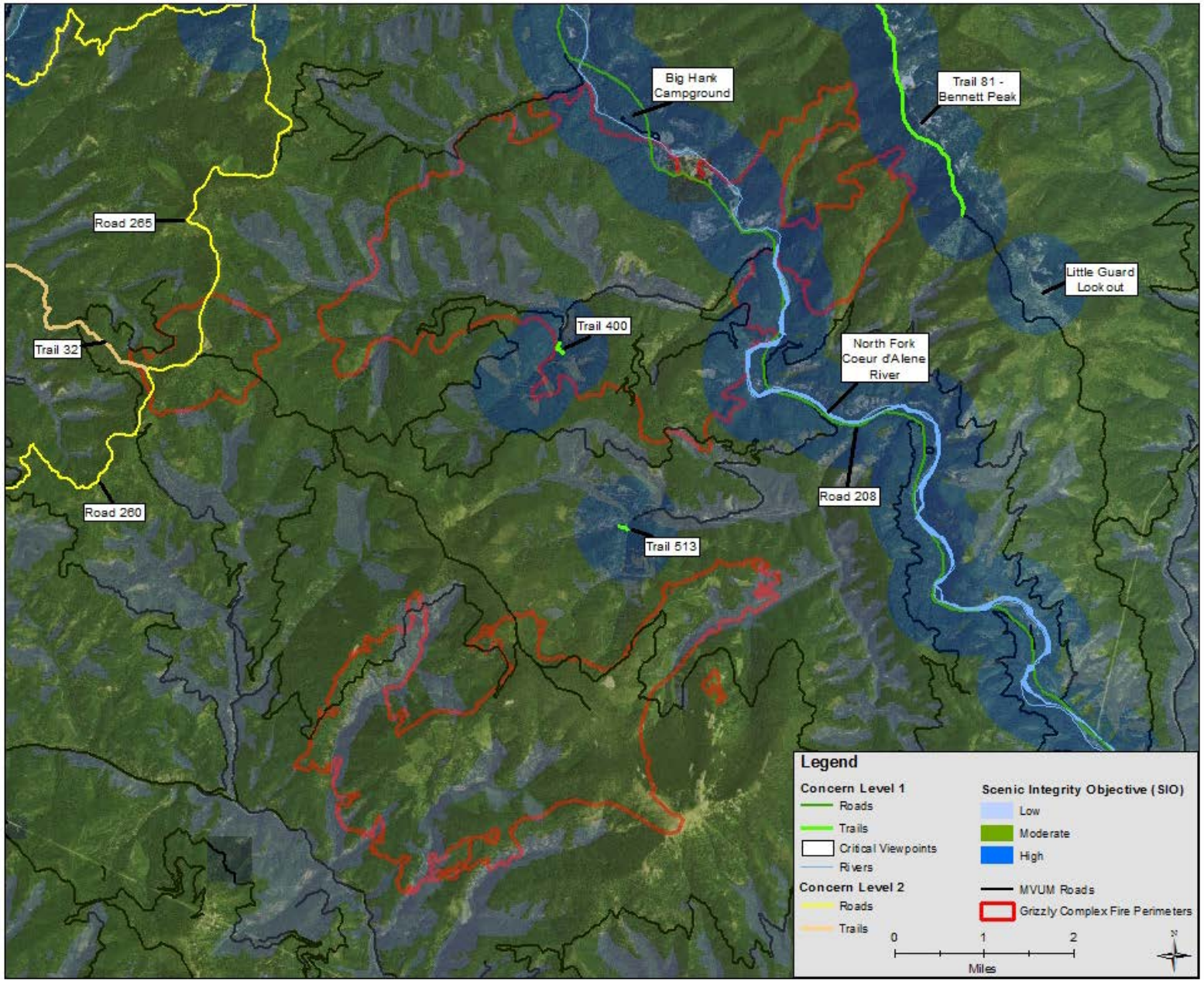

Figure 21. Scenic integrity objectives and sensitive viewpoints/travel corridors.

Effects to Scenic Quality

Summary: Both Alternatives 2 and 3 would be in compliance with the affected scenic integrity objectives of Moderate and High within the project area. Alternative 2 would result in more effects to scenery than Alternative 3 because the harvest unit acreage is higher and temporary roads would be constructed. However, the differences between alternatives do not alter the timeframe within which scenic integrity objectives would be met under either action alternative. Under Alternative 1, scenic integrity objectives would be met but the landscape would recover at a much slower rate because Alternative 1 would do nothing to restore vegetation in the area.

Table 29. Summary comparison of effects to scenery.

Measure	Alternative 1	Alternatives 2 and 3
Scenic Integrity and Visibility - Compliance with Scenic Integrity Objectives (SIOs)	Existing SIOs are Low to Moderate in North Grizzly and Grassy Mountain areas, Moderate to High (with minor amounts of Low) in Lower Flat. The landscape would recover over time, but at a much slower rate than Alternatives 2 and 3, which would implement restoration activities.	In areas with an SIO of Low: both alternatives would be in compliance. In areas with an SIO of Moderate: both alternatives would be in compliance or attain compliance within the mid-term. In areas with an SIO of High: both alternatives would be in compliance in the mid- to long-term (25-30+ years). Based on unit locations and design features, Alternatives 2 and 3 would be in compliance with scenic integrity objectives for sensitive viewpoints and travel routes.
Scenic Attractiveness	Existing Class B (Typical) would be maintained	Existing Class B (Typical) would be maintained

Direct and Indirect Effects to Scenery

Alternative 1

There would be no direct or short-term effects to the post-fire scenic condition of the area under Alternative 1. Without harvest activities in burned areas, charred snags and standing dead and dying trees would persist and dominate the affected landscape in the short-term. In the mid- to long-term, snags would continue to fall and forest fuels would build up over time. Sites would become vegetated with forbs and shrubs, and natural tree regeneration comprised of primarily hemlock, grand fir, and Douglas-fir would occur. Indirect effects would be the lost opportunity to increase species diversity by planting seral species, thus reducing forest health and resiliency and visual diversity in the future. With the increased fuels and reduced resiliency of the resulting forest, large scale disturbances from fire or insect and disease outbreaks could lead to changes in scenic integrity in the long-term. While for some, this may have a negative impact on the scenic quality of the area, these activities are considered natural processes and the resource area would continue to progress toward or meet assigned scenic integrity objectives.

Alternatives 2 and 3

The action alternatives would have similar effects on scenic quality, due to location and design of proposed units.

Big Hank Campground: Big Hank Campground sits across the river at the base of the slope where Lower Flat units 25 and 26 would be located, potentially having foreground views into units 25-28. However, field review determined that the low vantage point as well as vegetative screening in the campground and along the river obscures views to the proposed units. From the parking pads and campsites most views are blocked by conifers, and in more open areas and alongside the river, views are screened by cottonwood trees. Even without leaves, the crowns of the cottonwood trees obscure views of the hillsides behind them, but when leafed out during the season of campground use, views would be blocked altogether. Both action alternatives would meet the scenic integrity objective of High in the short-term due to limited visibility from the campground.

Little Guard Lookout: Little Guard Lookout sits high above and to the east of the project area. Views of many proposed harvest areas would be blocked by terrain, though there would be middleground views of Lower Flat unit 7 and background views of Lower Flat units 5, 6, 8-12, and 24-28, including temporary roads in units 7-11, and 24-25. Half of unit 6 and units 7 and 25-28 would be located within a scenic integrity objective of High; the other units would be within a Moderate objective. Irregular unit boundaries, application of design features to break up long linear edges and screen temporary roads, and riparian buffers that create fingers of leave trees would lessen visual impacts of units with the High objective. Once tree regeneration fills in and gains in height, effects of harvest activities would diminish. From the Little Guard Lookout vantage point, Alternatives 2 and 3 would meet the scenic integrity objective of High in the mid- to long-term, and meet the objective of Moderate in the short-term, considering riparian buffers and design features that would result in management activities not dominating the landscape.

Road 208: Once north of the junction with Road 802, Road 208 provides some foreground and middleground views into the burned area and Lower Flat units 6, 7, 22, and 26-28, which all fall within the scenic integrity objective category of High. Fire burned up to and across the roadway in places and roadside salvage would occur to remove danger trees along the travel corridor. Roadside turnouts and popular fishing sites provide opportunities for lengthy views of management activities. The most prominent scenery effects would be foreground views of Lower Flat unit 7 and roadside danger tree removal areas. The seedtree harvest prescription and design features that would retain pockets of trees and understory vegetation, limit stump height, and reduce slash near the roadway would lessen visual effects to some degree. The other units would be only partially viewed from turnouts or viewed while traveling the paved roadway, so would be subject to shorter viewing periods. Once understory vegetation and trees are re-established, cut stumps, slash, and skid trails or cable corridors would be masked.

Though Alternative 3 would not include Lower Flat unit 25 and the size of unit 6 would be less than in Alternative 2, there would be little difference in visual effects between the two alternatives. The scenic integrity objective of High would be met in the long-term along the Road 208 corridor under either action alternative.

North Fork Coeur d'Alene River: Road 208 follows the river corridor, so the areas seen from the river are generally the same as for the road, though viewing periods may be longer. Differences in seen areas occur where the river departs from the road and/or the base of the hillside and offers a longer viewshed than points on the road. One such area is the boat launch

site at Big Hank Meadows which would provide middleground views of Lower Flat units 6, 22, 26, 27, and 28. In other areas, visibility is essentially the same as along Road 208. Both Alternatives 2 and 3 would meet the scenic integrity objective of High from this travelway in the long-term, once tree and shrub vegetation is well established in harvested areas.

Roads 260/265: Grassy Mountain units would be viewed in the foreground and middleground at certain points along these Concern Level 2 travel routes and there would also be middleground and background views of Lower Flat units 1, 3, 8, 14, and 16-18 from points along Road 265. Foreground views of Grassy units 2, 3, and 4 and roadside danger tree removal corridors would be moderated by silvicultural prescriptions and design features that limit stump height, reduce slash, and retain pockets of screening vegetation where possible. The primary middleground view is of Grassy units 1, 2, and 3, the latter including a temporary road viewable from the travel corridor. However, most of these acres would have a shelterwood harvest which will soften the visual impact and the road would be removed from the landscape after operations are completed. Once brush and tree regeneration grow up in the Grassy units and minimize the evidence of ground disturbance and harvest residue, visual effects of foreground views would be muted and meet the scenic integrity objective of Moderate in the mid-term. Grassy Mountain units viewed in the middleground, and Lower Flat units seen in the middleground and background from points along Road 265 would have intermittent roadside screening and be subordinate to the landscape, so would meet the objective of Moderate in the short-term.

Even though most of the Lower Flat units with potential to be viewed from Road 265 would be dropped under Alternative 3, the effect would be the same as under Alternative 2, in that the scenic integrity objective of Moderate would be met in the short-term.

Trail 81: Trail 81 has middleground and background views into the Lower Flat salvage area at open points along Shoshone Ridge. At vantage points not blocked by trailside vegetative screening, trail users would see many of the Lower Flat harvest units. About half of unit 6 and units 7, 25, 26, 27, and 28 (first tier of units in view) would occur in areas with a scenic integrity objective of High. Units 6, 7, and 26 and temporary road T4 would have the most visual effects. However, when design features, riparian buffers, and silvicultural prescriptions are accounted for, Alternatives 2 and 3 would meet the scenic integrity objective of High in the mid- to long-term, once tree regeneration is established and reaches a height of 20 to 30 feet. Unit 6 would have extensive areas of leave trees in drainages that follow natural patterns, and unit 7 would have a fair amount of Douglas-fir and larch overstory retention. The second tier of harvest units viewed from this scenic point would fall into a scenic integrity objective category of Moderate and would meet the standard of not dominating the landscape in the short-term.

Trail 32: Scenery from Trail 32 would be impacted by harvest activities in the foreground and middleground, though the shelterwood prescription for Grassy unit 3 and design features that limit stump height, reduce accumulations of slash near the trail, re-establish trail tread, and retain pockets of screening vegetation would help to reduce effects to scenery. The trail is assigned a concern level of 2 and views are of management activities within a scenic integrity objective of Moderate. Within the mid-term, once brush and tree regeneration become established and attain a height of 15 to 20 feet, Alternatives 2 and 3 would meet the Forest Plan scenic integrity objective of Moderate.

Cumulative Effects to Scenic Quality

Alternative 1

There would be no human-caused change in the scenic quality of the area of interest in Alternative 1 in the short term. The existing openings would continue to revegetate and within 20 to 30 years would no longer appear as distinctly as openings. Alternative 1 would not change the existing landscape character of the geographic area encompassed by the Grizzly Salvage Project and there would be no cumulative effects.

Alternatives 2 and 3

Proposed management activities would follow the pattern of fire activity, in many cases creating unit boundaries that appear irregular and mimic the mosaic of natural disturbance, particularly with retention of riparian buffers and patches of unburned trees within cutting units. Temporary roads would not remain on the landscape after operations are completed, so the visual effects to the landscape as a whole would not vary much from the openings that have occurred and will continue to do so as a result of the recent fires. The proposed Potter's Wheel vegetative management project located west of the salvage area would also create openings likely to be visible to some extent from Roads 260/265, but the impact would be designed to be within scenic integrity guidelines. Possible timber harvest on private land along Road 208 just south of Big Hank Meadow may have some additional visual effect for a short distance along the North Fork Coeur d'Alene River corridor, but the likelihood of private harvest and degree of scenic impact is unknown.

Given the productivity of the Coeur d'Alene River Basin area and the advanced developmental stage of many existing openings, cumulative visual effects to scenery would meet scenic integrity objectives of High, Moderate, and Low throughout the landscape over time. In the long-term, trees in older harvest units would become mature and blend with adjacent uncut stands and more recent units would fill in and more closely match variations in pattern and texture that occur naturally. In the future, the scenery of the project area would be enhanced with the re-establishment of white pine and larch, which add color and textural interest to the landscape.

Other Issues Addressed But Not in Detail

Introduction

Some concerns are either addressed through alternative design or are outside the scope of this project. These concerns are discussed only briefly because they are either not relevant to the project or its resources, they are beyond the scope of the project, or they have been addressed by virtually eliminating any potential effects through alternative design or through design features (described in Appendix C). Some have been addressed in the resource discussions above; the following are additional concerns were briefly considered and subsequently eliminated from further study, for the reasons stated.

Air Quality

Burning of forest fuels affects air quality through the production of smoke, which contains particulate matter that can be a human health hazard. Under Alternative 1, there would be no burning of logging slash. Under Alternatives 2 and 3, there would be the possibility of a minor amount of prescribed burning following salvage activities and roadside danger tree removal (burning landings and possibly some small hand or excavator piles).

The District would conduct any pile or landing burning in accordance with the recommendations of the Montana Idaho Airshed Group. The District strictly complies with the procedures and recommendations of the Airshed Group and the proven protocols assure compliance with all legal and regulatory requirements regarding air quality. All Forest Plan standards would be met.

Aquatic Organisms - Management Indicator Species

As stated in the MIS selection paper (USDA 2014), which was developed during Forest Plan revision, MIS in the revised Forest Plan were chosen because they represented an issue or a concern. They were not chosen because of a viability concern. Additionally, it states that viability of the MIS will not be analyzed in future projects, nor will they be monitored at the project level. Therefore, there is no further discussion of aquatic organisms.

Carbon Cycling and Storage

The importance of the carbon storage capacity of the world's forests is tied to their role globally in removing the atmospheric carbon that is contributing to ongoing global warming. Forests are in continual flux, emitting carbon into the atmosphere, removing carbon through photosynthesis, and storing carbon as biomass (sequestration). Unlike other forest regions that are a net source of carbon to the atmosphere, U.S. forests are a strong net carbon sink, absorbing more carbon than they emit (Houghton 2003; US EPA 2013; Heath et al. 2011).

The Forest Service has prepared agency guidance on "Climate Change Considerations in Project Level NEPA Analysis" (http://www.fs.fed.us/emc/nepa/climate_change/index.htm). In general, that guidance recognizes that while some actions may warrant qualitative or even quantitative analysis of the effects of an action on climate change, some actions are at such a minor scale that the effects would be meaningless to a reasoned decision.

The proposed activities may alter the rates and timing of that flux within the individually-affected forest stands. However, these changes would be localized and infinitesimal in relation to the role the world's forests play in climate change. Effects would be indistinguishable from the effects that occurred during the wildfires, or from the effects of not taking action in the Grizzly project area. The affected forests will remain forests, not converted to other land uses, and long-term forest services and benefits will be maintained.

There are no Forest Plan standards related to carbon or climate change. Meaningful and relevant conclusions on the effects of a relatively minor land management action (such as the Grizzly Fire Salvage and Restoration Project) on global greenhouse gas emissions or global climate change is neither possible nor warranted. Therefore, this issue is not addressed further.

Cultural Resources

All known cultural resource sites would be protected under any alternative, as provided for in the Programmatic Agreement between the IPNF, the Advisory Council on Historic Preservation, and the Idaho State Historic Preservation Officer. An appropriate inventory is in progress and will be completed prior to project implementation. No cultural properties have been located within the area of potential effect. As specified in the Design Features (Appendix C), any further discovery of cultural resource sites would be inventoried and protected if found to be of cultural significance. A decision would be made to avoid, protect or mitigate effects to these sites in accordance with the National Historic Preservation Act of 1966. No further discussion of this concern is warranted.

Fire/Fuels

The Forest Plan identifies the reduction of hazardous fuels in the wildland-urban interface (and where values are at risk) as a desired condition (plan component FW-DC-FIRE-02). Given the consumption of surface fuels throughout the project area and the location outside the WUI and away from other values-at-risk, reduction of hazardous fuels has been determined to **not** be an issue in the Grizzly Fire Salvage and Restoration area.

Invasive Plants

Existing infestations of certain weed species may continue to increase on Federal lands within the project area and adjacent private lands. Activities under the action alternatives would minimize (but not eliminate) the risk of weed spread by application of design features (Appendix C). All Forest Plan and other legal requirements would be met (Appendix D). Additional information is provided in the Noxious Weeds Report.

Minerals

There are no mineral claims within the area where activities are proposed under the Grizzly Fire Salvage and Restoration Project. There would be no effect to mining operations under any alternative, therefore no additional discussion is necessary.

References

The following are references that were utilized in the effects analyses for all resources. Not all of these are cited within this document, which summarized the findings of the analyses, but all were cited within the resource reports upon which this document is based.

Adams, M.B. 1999. Acidic deposition and sustainable forest management in the central Appalachians, USA. Forest Ecology and Management 122: 17-28.

Amaranthus, M. Jubas, H. Arthur, D. 1989. Stream Shading, Summer Streamflow and Maximum Water Temperatures following Intense Wildfire in Headwater Streams. Presented at Symposium on Fire and Watershed Management. USDA Gen. Tech. Report PSW-109. (PF Doc. HYDRO-R007)

Archer, V. 2008. Clearwater Soil Monitoring: Soils Report. Orofino, ID.

Ballard, W.B., J.S. Whitman and C.L. Gardner. 1987. Ecology of an exploited wolf population in south-central Alaska. Wildlife Monographs, Number 98. 54 p.

Belt, G.H., O'Laughlin, J., and T. Merrill. 1992. Design of forest riparian buffer strips for the protection of water quality: Analysis of scientific literature. Idaho Forest, Wildlife and Range Policy Analysis Group. p. 35.

Benavides-Solorio, J., L. MacDonald. 2005. Measurement and prediction of post-fire erosion at the hillslope scale, Colorado Front Range. International Journal of Wildland Fire, 14, 457-474. (PF Doc. HYDRO-R003)

Beschta, R. Rhodes, J. Boone, K. [and others] 2004. Postfire Management on Forested Public Lands of the Western United States. Conservation Biology. Vol. 18. No. 4. P. 957-967 (PF Doc. HYDRO-R012)

Beschta, R.L., Rhodes, J.J., Kauffman, J.B., Greswell, R.E., Minshall, G.W., Karr, J.R., Perry, D.A., Hauer, F.R., Frissell, C.A., 2004. Postfire management on forested public lands of the western United States. Conserv. Biol. 18, 957–967.

Beschta, Robert L., Frissell, Christopher A., Gresswell, Robert, Hauer, Richard, Karr, James R., Minshall,G. Wayne, Perry, David A., Rhodes, Jonathan J., 1995. Wildfire and salvage logging: Recommendations for ecologically sound post-fire salvage management and other post-fire treatments on federal lands in the west. www.saveamericasforests.org/congress/Fire/Beschtareport.htm

Bonn, J., B. Dixon, E. Kennedy, and D. Pengeroth. 2007. Black-backed Woodpecker Northern Region Overview, Key Findings and Project Considerations. USDA Forest Service, Missoula, MT. 41 p.

Brown, J.K., E.D. Reinhardt, and K.A. Kramer. 2003. Coarse Woody Debris: Managing benefits and firehazard in the recovering forest. USDA Forest Service. Rocky Mountain Research Station, Ogden, Utah. RMRS-GTR-105. 16 p.

Burroughs, E.R., and J.G. King. 1989. Reduction of soil erosion on forest roads. U.S. Department of Agriculture, Forest Service, Intermountain Research Station, Ogden, UT. p. 21.

Busse, M.D., P.H. Cochran, W.E. Hopkins, W.H. Johnson, G.M. Riegel, G.O. Fiddler, A. W. Ratcliff, and C.J. Shestak. 2009. Developing resilient ponderosa pine forests with mechanical thinning and prescribed fire in central Oregon's pumice region. Can. J. For. Res. 39:1171-1185.

Cambi, M., G. Certini, F. Neri and E. Marchi. 2015. The impact of heavy traffic on forest soils: a review. Forest Ecology and Management 338: 124-138.

Carr, T. 1989. An evaluation of forest soil tillage using the winged subsoiler on landings in the Prince George Forest District: A Pilot Study. Contract Report Silviculture Branch, Ministry of Forests, Victoria, B.C. 24p.

Cassirer, E.F. and C.R. Groves. 1991. Harlequin duck ecology in Idaho: 1987-1990. Idaho Dept. of Fish and Game, Boise, Idaho. 8 p.

Cassirer, E.F., C.R. Groves, and D.L. Genter. 1994. Conservation assessment for the Coeur d'Alene Salamander *Plethodon idahoensis*. USDA Forest Service. Region 1. 55 p.

Cassirer, E.F., J.D. Reichel, R.L. Wallen, and E.C. Atkinson. 1996. Harlequin duck (*Histrionicus histrionicus*) United States Forest Service/Bureau of Land Management habitat conservation assessment and conservation strategy for the U.S. Rocky Mountains (draft). Idaho Dept. of Fish and Game, Nongame and Endangered Wildlife Program, Lewiston, ID. 42 p.

Certini, G. 2005. Effects of fire on properties of forest soils: a review. Oecologia 143:1-10.

Choromanska, U. and T.H. DeLuca. 2002. Microbial activity and nitrogen mineralization in forest mineral soils following heating: evaluation of post-fire effects. Soil Biology and Biochemistry 34: 263-271.

Chou, Y., Conard, S., Wohlgemuth, P. 1994. Analysis of post-fire salvage logging, watershed characteristics, and sedimentation in the Stanislaus National Forest. In: Proceedings of ESRI users conference; 1994 Palm Springs, CA. 492-499. (PF Doc. HYDRO-R021)

Clark, L.R. and R.N. Sampson. 1995. Forest ecosystem health in the inland west: A Science and Policy Reader. Forest Policy Center, Washington D.C. 37 p.

Clayton, J.L. 1990. Soil disturbance resulting from skidding logs on granite soils in Central Idaho. USDA Forest Service Research Paper INT-436.

Clayton, J.L.; Kellogg, G; Forester, N. 1987. Soil disturbance Tree-growth relations in central Idaho clearcuts. Gen. Tech. Rep. INT-GTR-372. Ogden UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 6p.

Copeland, J.P. 1996. Biology of the wolverine in central Idaho. M.S. Thesis, University of Idaho, Moscow, ID. 138 p.

Copeland, J.P., J.M. Peek, C.R. Groves, W.E. Melquist, K.S. McKelvey, G.W. McDaniel, C.D. Long, and C.E. Harris. 2007. Seasonal habitat associations of the wolverine in central Idaho. Journal of Wildlife Management 71:2201–2212.

Copeland, J.P., K.S. McKelvey, K.B. Aubry, A. Landa, J. Persson, R.M. Inman, J. Krebs, E. Lofroth, H. Golden, J.R. Squires, A. Magoun, M.K. Schwartz, J. Wilmot, C.L. Copeland, R.E. Yates, I. Kajola, and R. May. 2010. The bioclimatic envelope of the wolverine (Gulo gulo): do climatic constraints limit its geographic distribution? Canadian Journal of Zoology. Vol. 88. 14 p.

Craig, G.R. and J.H. Enderson. 2004. Peregrine falcon biology and management in Colorado, 1973-2001. Colorado Division of Wildlife Technical Publication No. 43. 68 p. plus appendices.

Cristan et al. 2016. Effectiveness of forestry best management practices in the United States: Literature review. Forest Ecology and Management, 360 (2016) 133-151. 19 p. http://dx.doi.org/10.1016/j.foreco.2015.10.025

DeBano, L.F. 1991. The effects of fire on soil properties. Paper presented at the Symposium on Management and Productivity of Western-Montane Forest Soils, Boise, ID, April 10-12. 5p.

Debano, L.F., D.G. Neary, P.F. Ffolliot. 1998. Fire: It's Effect on Soil and Other Ecosystem Resources. New York, NY: John Wiley & Sons, Inc. 175p.

DeLuca, T. and G.H. Aplet. 2008. Charcoal and carbon storage in forest soils of the Rocky Mountain West. Fron. Ecol. Environ. 6: 18-24.

DeLuca, T.H. and K.L. Zouhar. 2000. Effects of selection harvest and prescribed fire on the soil nitrogen status of ponderosa pine forests. Forest Ecology and Management 138: 263-271.

DiTomaso, J.M. 2000. Invasive weeds in rangelands: Species, impacts and management. Weed Science 28(2): 255-265.

Dixon, R.D. and V.A. Saab. 2000. Black-backed Woodpecker (Picoides arcticus), The Birds of North America Online (A. Poole, Ed.). 14 p.

Donato, D.C., Fontaine, J.B., Campbell, J.L., Robinson, W.D., Kauffman, J.B., Law, B.E., 2006. Post-wildfire logging hinders regeneration and increases fire risk. Science. Vol 311.

Dunham, J.B., A.E. Rosenberger, C.H. Luce, and B. E. Rieman. 2007. Influences of wildfire and channel reorganization on spatial and temporal variation in stream temperature and the distribution of fish and amphibians. Ecosystems 10:335-346. (PF Doc. HYDRO-R006)

Elliot, W. 2004. WEPP internet interfaces for forest erosion prediction. Journal of American Water Resources Research. (PF Doc. HYDRO-R014)

Elliot, W., D. Hall, D. Scheele. 1999. FS WEPP Forest Service Interfaces for the Water Erosion Prediction Project Computer Model. U.S.D.A. Forest Service Rocky Mountain Research Station and San Dimas Technology and Development Center. (PF Doc. HYDRO-R001)

Elliot, W., D. Hall, D. Scheele. 2000. DisturbedWEPP Interface for Disturbed Forest and Range Runoff, Erosion and Sediment Delivery. U.S.D.A. Forest Service Rocky Mountain Research Station and San Dimas Technology and Development Center. (PF Doc. HYDRO-R002)

Ellison, L.E., M.B. Wunder, C.A. Jones, C. Mosch, K.W. Navo, K. Peckham, J.E. Burghardt, J. Annear, R. West, J. Siemers, R.A. Adams and E. Brekke. 2004. Colorado bat conservation plan. Colorado Committee of the Western Bat Working Group. 107 p.

Engle, J.C. and C.E. Harris. 2001. Idaho species of special concern element state rankings reviews. Non-game and endangered wildlife program, Conservation Data Center, Idaho Department of Fish and Game, Boise, Idaho. 104 p.

Fleming R.L., R.F. Powers, N.W. Foster, J.M. Kranabetter, D.A. Scott, F. Ponder Jr., S. Berch, W.K Chapman, R.D. Kabzems, K.H. Ludovici, D.M. Morris, D.S. Page-Dumroese, P.T. Sandborn, F.G. Sanchez, D.M. Stone, and A.E. Tiarks. 2006. Effects of organic matter removal, soil compaction, and vegetation control on 5-year seedling performance: a regional comparison of Long-Term Soil Productivity sites. Can. J. For. Res. 36:529-550.

Foltz, R.B, and E. Maillard. 2003. Infiltration rates on abandoned road-stream crossings. Paper Number 035009. ASAE Annual International Meeting. Las Vegas, Nevada. 11p.

Furniss, M.J., Roelofs, T.D., and C.S. Yee. 1991. Road construction and maintenance. American Fisheries Society Special Publication 19: 297-324.

Garrison, M. T. and J. A. Moore. 1998. Nutrient management: a summary and review. In: Intermountain Forest Tree Nutrition Garrison-Johnston, M. T., J. A. Moore and G. J. Niehoff. 2001. Cooperative Supplemental Report 98: 5.

Garrison-Johnston, M. 2003. Geologic controls on tree nutrition and forest health in the Inland Northwest. Presented at GSA Ann. Mtng, Seattle, WA. 9 pp.

Garrison-Johnston, M., T.M. Shaw, L.R. Johnson, and P.G. Mika. 2004. Intermountain Forest Tree Nutrition Cooperative, Presentation at the Potassium Meeting, IPNF, Coeur d'Alene, ID, April 23.

Ghalambor, C. 2003. Conservation assessment of the pygmy nuthatch in the Black Hills National Forest, South Dakota and Wyoming. USDA Forest Service, Rocky Mountain Region, Black Hills National Forest. 60 p.

Glossary of Wildland Fire Terminology. National Wildfire Coordinating Group – Incident Operations Standards Working Team, 2008. PMS 205. 186 p. Available at: http://gacc.nifc.gov/nrcc/dc/idgvc/dispatchforms/glossary.pdf

Graham, Russell T., Harvey, Alan E., Jain, Theresa B., Tonn, Jonalea R. 1999. The effects of thinning and similar stand treatments on fire behavior in western forests. Gen. Tech. Rep. PNW-GTR-463. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 27 p.

Graham, Russell T.; Harvey, Alan E.; Jurgensen, Martin F.; Jain, Theresa B.; Tonn, Jonalea R.; Page-Dumroese, Deborah S. 1994. Managing coarse woody debris in forests of the Rocky Mountains. Res. Pap. INT-RP-477. Ogden, UT: U.S. Department of Agriculture, Forest Service, lntermountain Research Station. 12 p.

Green, P.; Joy J. Sirucek, W. Hann, A. Zack, B. Naumann, 1992. Old growth forest types of the Northern Region. Missoula, MT: United States Department of Agriculture, Forest Service, Northern Region. 60 p.

Grier, C.C., K.M. Lee, N.M. Nadkarni, G.O. Klock, and P.J. Edgerton. 1989. Productivity of forest of the United States and its relation to soil and site factors and management practices: A review. PNW-GTR-222. United Stated Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, Oregon.

Groves, C. R. 1989. Status and Distribution of the Plethodon vandykei idahoensis in Idaho. Part II. Idaho Department of Fish and Game. Boise, Idaho. 20 p.

Groves, C.R., E.F. Cassirer, D.L. Genter, and J.D. Reichel. 1996. Coeur d'Alene salamander. Natural Areas Journal 16:238-247.

Hansen, J. 1986. Wolves of Northern Idaho and Northeastern Washington. MT Cooperative Wildlife Research Unit, U.S. Fish and Wildlife Service. 88 p.

Hayes, S.W., Keegan, C.E., Morgan, T.A. 2013. University of Montana Bureau of Business and Economic Research: Estimating Harvesting Costs. PF Doc. FIN-11

Heath, L.S., J.E. Smith, C.W. Woodall, D.L. Azuma, and K.L. Waddell. 2011. Carbon stocks on forestland of the United States, with emphasis on USDA Forest Service ownership. Ecosphere 2(1):art6 doi:10.1890/ES10-00126.

Heinemeyer, K.S. and J.L. Jones. 1994. Fisher biology and management: a literature review and adaptive management strategy. USDA Forest Service Northern Region, Missoula, MT. 108 p.

Hessburg, P.F., et al. Tamm Review: Management of mixed-severity fire regime forests in Oregon, Washington, and Northern California. Forest Ecol. Manage. (2016), http://dx.doi.org/10.1016/j.foreco.2016.01.034

Hillis, J. M., M. J. Thompson, J. E. Canfield, L. J. Lyon, C. L. Marcum, P. M. Dolan, and D. W. McCleerey. 1991. Defining elk security: the Hillis Paradigm. p. 38-43 *in* Proceedings of a Symposium on Elk Vulnerability, compiled by A. G. Christensen, L. J. Lyon, and T. N. Lonner. Hosted by the Montana Chapter of The Wildlife Society. Montana State University, Bozeman, MT, April 10-12, 1991.

Hillis, M., A. Jacobs and V. Wright. 2002. US. Forest Service Region One Draft Black-backed Woodpecker Assessment. 16 p.

Hornocker, M.G. and H.S. Hash. 1981. Ecology of the Wolverine in Northwestern Montana. Canadian Journal of Zoology. Vol. 59. 15 p.

Houghton, R.A. 2003. Revised estimates of the annual net flux of carbon to the atmosphere from changes in land use and land management 1850-2000. Tellus B: 378-390.

Howie, R.R. and R. Ritcey. 1987. Distribution, habitat selection, and densities of flammulated owls in British Columbia. Pages 249-254 in Biology and Conservation of Northern Forest Owls. Gen. Tech. Rep. RM-GTR-142. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.

Hutto, R.L. 1995. Composition of bird communities following stand replacement fires in Northern Rocky Mountain (U.S.A.) conifer forests. Conservation Biology 9: 1041-1058.

Hutto, R.L., R.E. Keane, R.L. Sherriff, C.T. Rota, L.A. Eby, and V.A. Saab. 2016. Toward a more ecologically informed view of severe forest fires. Ecosphere 7(2): 1-13.

Idaho Department of Administration (IDA) 2015) IDAPA 58, Title 01, Chapter 2 – Water Quality Standards. http://adminrules.idaho.gov/rules/current/58/index.html (PF Doc. HYDRO-R018)

Idaho Department of Environmental Quality (IDEQ). 2001. Subbasin Total Maximum Daily Loads of the North Fork Coeur d'Alene River(17010301). (PF Doc. HYDRO-R016)

Idaho Department of Environmental Quality (IDEQ). 2012. Integrated report. (PF Doc. HYDRO-R015)

Idaho Department of Environmental Quality (IDEQ). 2013. Upper (North Fork) Coeur d'Alene River Subbasin Temperature Total Maximum Daily Loads. Addendum to the 2001 Subbasin Assessment and Total Maximum Daily Loads of the North Fork Coeur d'Alene River (17010301) (PF Doc. HYDRO-R017)

Idaho Department of Fish and Game. 2014. Elk. Project W-170-R-34. Idaho Department of Fish and Game, 600 South Walnut, Boise, Idaho. 79 p.

Idaho Department of Fish and Game. 2015. 2015 Idaho Wolf Monitoring Progress Report. Idaho Department of Fish and Game, 600 South Walnut, Boise, Idaho. 71 p.

Jennings, T. N., Smith, J. E., Cromack Jr, K., Sulzman, E. W., McKay, D., Caldwell, B. A., & Beldin, S. I. 2012. Impact of postfire logging on soil bacterial and fungal communities and soil biogeochemistry in a mixed-conifer forest in central Oregon. Plant and soil, 350(1-2), 393-411.

Jason Jerman, 2016. Personal observations of the difference between paired measurements of tree diameter at breast height and stump height on the same trees within the area burned by the Grizzly Complex. Observations were made on multiple grand fir, western white pine, Douglas-fir and western hemlock.

Jones, J.L. 1991. Habitat use of fisher in north central Idaho. M.S. thesis, University of Idaho, Moscow, Idaho. 17 p.

Keinath, D. A. 2004. Fringed myotis (*Myotis thysanodes*): A technical conservation assessment. USDA Forest Service, Rocky Mountain Region. 64 p.

Karr, J. R., J.J Rhodes, G.W. Minshall, F.R Hauer, R.L. Beschta, C.A Frissell, and D.A Perry. 2004. The effects of postfire salvage logging on aquatic ecosystems in the American West. BioScience, 54:1029-1033.

Keller, B. 2000. *Myotis thysanodes* (Fringed Myotis). Digital atlas of Idaho online. Available: http://imnh.isu.edu/digitalatlas/bio/mammal/mamfram.htm

Kemp, K.B, P.E. Higuera and P. Morgan. 2016. Fire legacies impact conifer regeneration across environmental gradients in the U.S. northern Rockies. Landscape Ecology March 2016, Volume 31, Issue 3, pp 619-636.

Ketcheson, G.L., and W.F. Megahan. 1996. Sediment production and downslope sediment transport from forest roads in granitic watersheds. Res. Pap. INT-486. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 11 p.

Kingery, H. and Ghalambor, C.K. 2001. Pygmy Nuthatch (Sitta Pygmaea) in The Birds of North America No. 567. A. Poole and F. Gills (eds.). The Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union, Washington D.C. Cited in Ghalambor, C. 2003. Conservation Assessment of the Pygmy Nuthatch in the Black Hills National Forest, South Dakota and Wyoming. USDA Forest Service, Rocky Mountain Region, Black Hills National Forest.

Knorr, O.A. 1993. Black Swift (*Cypseloides niger*) Nesting Site Characteristics: Some New Insights. Avocetta 17:139-140. *Cited in* Wiggins, D. A. 2004. Black Swift (*Cypseloides niger*): A Technical Conservation Assessment. USDA Forest Service, Rocky Mountain Region.

Kolka, R.K. and M.F. Smidt. 2004. Effects of forest road amelioration techniques on soil bulk density, surface runoff, sediment transport, soil moisture and seedling growth. Forest Ecology 202: 313-323.

Larsen, I., L. MacDonald, E. Brown, D. Rough, M. Welsh, J. Pietraszek, Z. Libohova, J. Benavides-Solario, K. Schaffrath. 2009. Causes of Post-Fire Runoff and Erosion: Water Repellency, Cover or Soil Sealing? Soil Science Society of America Journal, 73: 1393-1407. (PF Doc. HYDRO-R004)

Leege, T.A. 1984. Guidelines for Evaluating and Managing Summer Elk Habitat in Northern Idaho. 27 p.

Lindenmayer, D. B. and R.F. Noss. 2006. Salvage logging, ecosystem processes, and biodiversity conservation. Conservation Biology 20: 949-958.

Loeffler, C. (ed.). 1998. Conservation plan and agreement for the management and recovery of the southern Rocky Mountain population of the boreal toad (*Bufo boreas boreas*). Boreal Toad Recovery Team and Technical Advisory Group. 80 p.

Luce, C.H. 1997. Effectiveness of road ripping in restoring infiltration capacity of forest roads. Restoration Ecology 5 (3):265-270.

Mann, L.K., D.W. Johnson, D.C. West, D.W. Cole, J.W. Hornbeck, C.W. Martin, H. Riekerk, C.T. Smith, W.T. Swank, L.M. Tritton, and D.H. Van Lear. 1988. Effects of whole-tree and stem-only clearcutting on postharvest hydrologic losses, nutrient capital, and regrowth. Forest Science 34: 412-428.

Maxell, B.E. 2000. Management of Montana's amphibians: a review of factors that may present a risk to population viability and accounts on the identification, distribution, taxonomy, habitat use, natural history, and the status and conservation of individual species. Report to USFS Region 1, Order Number 43-0343-0-0224. University of Montana, Wildlife Biology Program. Missoula, Montana. 161 p.

McCallum, D.A. 1994. Review of Technical Knowledge: Flammulated Owls, chapter 4 in Flammulated, Boreal, and Great Gray Owls in the United States; A Technical Conservation Assessment. Hayward G.D. and J. Verner. Tech. Eds. Gen. Tech. Rep. RM-253. Fort Collins, CO. USDA Forest Service. Rocky Mountain Forest and Range Experiment Station 214 p.

McEllin, S.M. 1979. Nest sites and population demographies of white-breasted and Pigmy (sic) nuthatches in Colorado. Condor 90:348-352.

McIntyre, J.W. and J.F. Barr. 1997. Common loon (*Gavia immer*) in The Birds of North America, No. 313. A. Poole and F. Gill (eds.). The Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union, Washington, D.C. 45 p.

McIver, J. and McNeil, R., 2006. Soil disturbance and hill-slope sediment transport after logging of a severely burned site in northeastern Oregon. West. J. Appl. For. 21, 123–133. (PF Doc. HYDRO-R020)

McIver, J.D. and L. Starr. 2000. Environmental effects of postfire logging: literature review and annotated bibliography. General Technical Report. PNW-GTR-486. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 80p.

McIver, J.D., Ottmar R., 2007. Fuel mass and stand structure after post-fire logging of a severely burned ponderosa pine forest in northeastern Oregon. Fire Ecology and Management. Vol. 238. Pages 268-279.

Mech, L.D. 1995. The challenge and opportunity of recovering wolf populations. Conservation Biology. 9:270-278.

Megahan, W. 1972. Logging, Erosion, Sedimentation – Are they dirty words. Journal of Forestry. 403-407 (PF Doc. HYDRO-R011)

Megahan, W., W. Kidd. 1972. Effects of logging and logging roads on erosion and sediment deposition from steep terrain. Journal of Forestry. 70, 241-256. (PF Doc. HYDRO-R010)

Megahan, W.F., and J.G. King. 2004. Erosion, sedimentation, and cumulative effects in the northern Rocky Mountains. Pg. 201-222 in G.G. Ice and J.D. Stednick, eds. A century of forest and wildland watershed lessons. Soc. of Am. For., Bethesda, MD. 21 p.

Minnesota IMPLAN Group (MIG). 2003. IMPLAN Pro Version 2.0 User's Guide, Analysis Guide, Data Guide. 418 p. PF Doc. FIN-11

Monsanto, Philip G., Agee, James K., 2008. Long-term post-wildfire dynamics of coarse woody debris after salvage logging and implications for soil heaving in dry forests of the eastern Cascades, Washington. Forest Ecology and Management. Vol. 255. Pages 3952-3961

Montana Bald Eagle Working Group. 1991. Habitat management guide for bald eagles in northwestern Montana. 29 p.

Montana Partners in Flight. 2000. Montana bird conservation plan Version 1.1. American Bird Conservancy, Kalispell, Montana. 281 p.

Moody, J., D. Martin. 2009. Synthesis of sediment yields after wildland fire in different rainfall regimes in the western United States. International Journa of Wildland Fire, 18: 96-115. (PF Doc. HYDRO-R005)

National Council for Air and Stream Improvement, Inc. (NCASI). 2012. *Assessing the effectiveness of contemporary forestry best management practices (BMPs): Focus on roads*. Special Report No. 12-01. Research Triangle Park, NC: National Council for Air and Stream Improvement, Inc.

NatureServe. 2011. NatureServe explorer: An online encyclopedia of life (version 7.1) [Web Application]. Arlington, VA: NatureServe. Available from: http://www.natureserve.org/explorer. (26 July 2011).

Neary, D.G., K.C. Ryan, and L.F. DeBano, eds. 2005 (revised 2008). Wildland fire in ecosystems: effects of fire on soils and water. Gen. Tech. Rep. RMRS-GTR-42-vol.4. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 250 p.

Nussbaum, R.A, E.D. Brodie, Jr., and R.M. Storm. 1983. Amphibians and reptiles of the Pacific Northwest. University of Idaho Press, Moscow, ID. 332 p.

O'Farrell, M.J. and E. H. Studier. 1980. *Myotis thysanodes*. Mammalian Species 137:1-5.

Page-Dumroese, D. S., M. F. Jurgensen, A.E. Tiarks, F. Ponder Jr., F.G. Sanchez, R.L. Fleming, J.M Kranabetter, R.F. Powers, D.M. Stone, J.D. Elioff, and D.A. Scott. 2006b. Soil physical property changes at the North American Long-Term Soil Productivity study sites: 1 and 5 years after compaction. Can. J. For. Res. 36:551-564.

Page-Dumroese, D., M. Jurgensen, A. Abbot, T. Rice, J, Tirocke, S. Farley, and S. DeHart. 2006a. Monitoring Changes in Soil Quality from Post-fire Logging in the Inland Northwest. Forest Service Proceedings. RMRS-P-41. Moscow, ID: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station: 605-613.

Parker, J., J.D. Wulfhorst, and J. Kamm. 2002. Social Assessment for the Idaho Panhandle National Forests: Final Report. University of Idaho. PF DOC. FIN-01

Peterson, David W., Dodson, Erich K., Harrod, Richy J., 2015. Post-fire logging reduces surface woody fuels up to four decades following wildfire. Forest Ecology and Management. Volume 338. Pages 84-91.

Pierson, E.D., M.C. Wackenhut, J.S. Altenback, P. Bradley, P. Call, D.L. Genter, C.E. Harris, B.L. Keller, B. Lengus, L. Lewis, B. Luce, K.W. Navo, J.M. Perkins, S. Smith, and L. Welch. 1999. Species conservation assessment and conservation strategy for the Townsend's big-eared bat. Idaho Conservation Effort, Idaho Department of Fish and Game, Boise, ID. 67 p.

Powell, R.A. and W.J. Zielinski. 1994. Fisher. Pages 38-73 in L.F. Ruggiero, K.B. Aubry, S.W. Buskirk, and W.J. Zielinski, editors. The scientific basis for conserving forest carnivores: American marten, fisher, lynx, and wolverine. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, General Technical report RM-254, Fort Collins, Colorado, USA.

Powers, R.F. 1990. Are we maintaining the productivity of forest lands? Establishing guidelines through a network of long term studies. Paper presented at Symposium of Management and Productivity of Western Montane Forest Soils, Boise ID, April 10-12, 1990. 13p.

Rabe, M.J., T.E. Morrell, H. Green, J.C. deVos, Jr. and C.R. Miller. 1998. Characteristics of ponderosa pine snag roosts used by reproductive bats in northern Arizona. Journal of Wildlife Management 62:612-621.

Raley, C.M., E.C. Lofroth, R.L. Truex, J.S. Yaeger, and J.M. Higley. 2012. Habitat ecology of fishers in Western North America. Chapter 10 in Aubry, K.B., W.J. Zielinski, M.G. Raphael, G. Proulx, and S.W. Buskirk (eds.). Biology and Conservation of Martens, Sables, and Fishers – a new synthesis. Cornell University Press, Ithaca, NY. P. 231-254.

Rasheed, S.A., P.F.J. Garcia and S.L. Holroyd. 1995. Status of the fringed myotis in British Columbia. Wildlife Working Report. WR-73, Pages 1-17.

Reeves, D. D. Page-Dumroese and M. Coleman. 2011. Detrimental soil disturbance associated with timber harvest systems on National Forests in the Northern Region. Res. Pap. RMRS-RP-89 Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 12 p.

Reynolds, R.T., and B.D. Linkhart. 1992. Flammulated owls in ponderosa pine. Pages 166-169 in Old-growth forests in the southwest and Rocky Mountain regions; proceedings of a workshop. USDA Forest Service Gen. Tech. Report RM-GTR-213.

Robichaud, P. R., Wagenbrenner, J. W., Brown, R. E., Wohlgemuth, P. M., & Beyers, J. L. 2008. Evaluating the effectiveness of contour-felled log erosion barriers as a post-fire runoff and erosion mitigation treatment in the western United States. International Journal of Wildland Fire, 17(2): 255-273.

Robichaud, P.R., J.L. Beyers and D.G. Neary. 2000. Evaluating the effectiveness of postfire rehabilitation treatments. General Technical Report RMRS-GTR-63. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 85p.

Rone, G. 2011. Summary of soil monitoring on the Idaho Panhandle National Forest-1980s to 2012. 10p.

Ruediger, B., J. Claar, S. Gniadek, B. Holt, L. Lewis, S. Mighton, B. Naney, G. Patton, T. Rinaldi, J. Trick, A. Vandehey, F. Wahl, N. Warren, D. Wenger, and A. Williamson. 2000. Canada lynx conservation assessment and strategy. USDA Forest Service, USDI Bureau of Land Management, and USDI National Park Service. Forest Service Publication #R1-00-53, Missoula, MT. 142 pp.

Ruggiero, L.F., K.B. Aubry, S.W. Buskirk, L.J. Lyon, and W.J. Zielinski (tech. eds.). 1994. The scientific basis for conserving forest carnivores: American marten, fisher, lynx, and wolverine in the western United States. Gen. Tech. Rep. RM-GTR-254. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Ft. Collins CO. 184 p.

Russell, R.E., V.A. Saab, and J. Dudley. 2007. Habitat suitability models for cavity-nesting birds in a postfire landscape. Journal of Wildlife Management. Vol. 71 No. 8. pp. 2600-2611.

Saab, V.A., R. Brannon, J.G. Dudley, L. Donohoo, D. Vanderzanden, V. Johnson, and H. Lachowski. 2002. Selection of fire-created snags at two spatial scales by cavity-nesting birds. USDA Forest Service. Forest Service Gen. Tech. Rep. PSW-GTR-181. 14 p.

Sanchez, F.G., A.E. Tiarks, J.M. Kranabetter, D.S. Page-Dumroese, R.F. Powers, P.T. Sanborn, and W.K. Chapman. 2006. Effects of organic matter removal and soil compaction on fifth-year mineral soil carbon and nitrogen contents for sites across the United States and Canada. Can. J. For. Res 36:565-576.

Sauder, J.D. and Rachlow, J.L. 2014. Both forest composition and configuration influence landscape-scale habitat selection by fishers (Pekania pennanti) in mixed coniferous forests of the Northern Rocky Mountains. Forest Ecology and Management 314:75-84.

Shakesby, R., S. Doerr. 2006. Wildfire as a hydrological and geomorphological agent. Earth Science Review. 74, 269-307. (PF Doc. HYDRO-R013)

Silins, U., Stone, M., Emelko, M. [and others]. 2009. Sediment production following severe wildfire and post-fire salvage logging in the Rocky Mountain headwaters of the Oldman River Basin, Alberta. Catena 79: 189-197. (PF Doc. HYDRO-R009)

Slesak, R.A., S.H. Schoenholtz, and D. Evans. 2015. Hillslope erosion two and three years after wildfire, skyline salvage logging, and site preparation in southern Oregon, USA. Forest Ecology and Management 342: 1-7.

Smith, H., G. Sheridan, P. Lane, L. Bren, 2011. Wildfire and salvage harvesting effects on runoff generation and sediment exports for radiate pine and eucalypt forest catchments, south-eastern Australia. Forest Ecology Management. 261. 570-581. (PF Doc. HYDRO-R015)

Spencer, W.D., H. Rustigian-Romsos, J. Strittholt, R.M. Scheller, W. Zielinski and R. Truex. 2011. Using occupancy and population models to assess habitat conservation opportunities for an isolated carnivore population. Biological Conservation. 144:78-803.

Sperber TD, Wraith JM, Olson BE. 2003. Soil physical properties associated with the invasive spotted knapweed and native grasses are similar. Plant Soil 252:241-249.

Sporting Conservation Council. 2008. Strengthening America's hunting heritage and wildlife conservation in the 21st century: Challenges and opportunities. J. Nobile and M.D. Duda, White House Conference on North American Wildlife Policy. Oct 1–3, 2008, Washington, D.C. 128 p.

Stark, 1979. Nutrient losses from timber harvesting in a larch/Douglas fir forest. USDA Forest Service Research Paper. INT-231.

Streubel, D. 2000. *Synaptomys borealis* (northern bog lemming). Idaho Museum of Natural History. Idaho State Univ., Pocatello, ID. Website accessed at: http://imnh.isu.edu/digitalatlas/bio/mammal/Rod/Mice/nble/nble.htm

Sullivan, T. E. 1998. Monitoring soil physical conditions on a national forest in Eastern Oregon: A Case Study. 9 p.

Switalski, T.A., J.A. Bissonette, T.H. DeLuca, C.H. Luce, and M.A. Madej. 2004. Benefits and impacts of road removal. Front. Ecol. Environ. 2(1): 21-28

Tepp, J.S. 2002. Assessing visual soil disturbance on eight commercially thinned sites in northeastern Washington. Res. Note. PNW-RN-535. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, OR. 20p.

Thompson, Jonathon R., Spies, Thomas A., and Ganio, Lisa M. 2007. Reburn severity in managed and unmanaged vegetation in a large wildfire. Proceedings of the National Academy of Sciences. Volume 104. No. 25. Pages 10743-10748

US EPA 2013. Chapter 7. Land Use, Land-Use Change, and Forestry, in Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2011. The entire report is available online at: http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html

USDA Forest Service and USDI Fish and Wildlife Service. 2008. Memorandum of Understanding between the U.S. Department of Agriculture Forest Service and U.S. Fish and Wildlife Service to Promote the Conservation of Migratory Birds. FS Agreement # 08-MU-1113-2400-264. 13 p.

USDA, Forest Service. 1974. National Forest Landscape Management, Volume 2, Chapter: The Visual Management System. Agric. Handbook. 462. Washington, DC: U.S. Department of Agriculture, Forest Service. 47 p

USDA Forest Service. 1980d. Visual character types and variety class description. Northern Region Office, Missoula, MT. 59 p.

USDA, Forest Service, 1986. ROS Book.

USDA Forest Service. 1988. Soil and Water Conservation Practices Handbook. FSH 2509.22 R1/R4 5/88.

USDA Forest Service. 1989. Caring for our natural community. Northern Region, Missoula, Montana. P. 30-31.

USDA Forest Service. 1995. Landscape Aesthetics: A Handbook for Scenery Management. Agric. Handbook. 701. Washington, DC: U.S. Department of Agriculture, Forest Service. 264 p.

USDA Forest Service. 1999. Region 1 Soil Quality Standards. 2554.03-R1 Suppl. 2500-99-1. 6p.

USDA Forest Service. 2003. Analysis of the Management Situation for the Revised Forest Plan PF DOC. FIN-02

USDA Forest Service. 2005. National Forest System Briefing Paper. USDA Forest Service response to American Lands Alliance position paper: Logging After Fires.

USDA Forest Service. 2007. Record of Decision – Northern Rockies Lynx Management Direction. Missoula, MT. 69 p.

USDA Forest Service, 2009. Idaho Panhandle National Forests, Coeur d'Alene River Ranger District Travel Plan Project Decision Notice. April 2009.

USDA Forest Service. 2011. Region One Sensitive Species List – Wildlife (Final). 5 p.

USDA Forest Service. 2012. National Best Management Practices for Water Quality Management on National Forest System Lands. Volume 1: National Core BMP Technical Guide. FS-990a. 177 p.

USDA Forest Service. 2013. Final Environmental Impact Statement for the Revised Land Management Plan. Idaho Panhandle National Forests. Coeur d'Alene, ID. 715 p.

USDA Forest Service. 2013. IPNF land management plan final EIS. CR-049.

USDA Forest Service. 2014. KIPZ Management Indicator Species Selection Documentation. Unpublished report. 21 pp.

USDA Forest Service. 2015. Idaho Panhandle National Forests Land Management Plan 2015 Revision. Coeur d'Alene, Idaho. 187 p.

USDA Forest Service, 2015. Motor Vehicle Use Map, Coeur d'Alene River Ranger District.

USDA Forest Service. Forest Service Handbook, Title 2409.18 Timber Sale Preparation Handbook. Chapter 20 Timber Sale Project Development. Forest Service. Washington D.C. PF DOC. FIN-03

USDI Fish and Wildlife Service. 1986. Recovery plan for the Pacific Bald Eagle. U.S. Fish and Wildlife Service, Portland, OR. 160 p.

USDI Fish and Wildlife Service. 1987. Northern Rocky Mountain wolf recovery plan. US Fish and Wildlife Service, Denver, CO. 119 p.

USDI Fish and Wildlife Service. 2003. Endangered and Threatened Wildlife and Plants; Final Rule to Reclassify and Remove the Gray Wolf from the List of Endangered and Threatened Wildlife in Portions of the Conterminous United States; Establishment of Two Special regulations for Threatened gray Wolves; Final and Proposed Rules. April 1, 2003. Federal Register Vol. 68, No. 62: p. 15804-15875.

USDI Fish and Wildlife Service. 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. 87 p. [Online version available at <http://www.fws.gov/migratorybirds/>].

USDI Fish and Wildlife Service. 2009. Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Contiguous United States Distinct Population Segment of the Canada Lynx; Final Rule. Federal Register 74(36). 88 p.

USDI Fish and Wildlife Service. 2011. Endangered and Threatened Wildlife and Plants; Reissuance of Final Rule to Identify the Northern Rocky Mountain Population of Gray Wolf as a Distinct Population Segment and to Revise the List of Endangered and Threatened Wildlife, Federal Register Vol. 76, 87, Thursday, May 5, 2011 p. 25590.

USDI Fish and Wildlife Service. 2013. Endangered and Threatened Wildlife and Plants; Threatened Status for the Distinct Population Segment of the North American Wolverine Occurring in the Contiguous United States. Federal Register, Vol. 78, No. 23, February 4, 2013, p. 7864-7890.

USDI Fish and Wildlife Service. 2014. Endangered and Threatened Wildlife and Plants; Threatened Status for the Distinct Population Segment of the North American Wolverine Occurring in the Contiguous United States. Establishment of a Nonessential Experimental Population of the North American Wolverine in Colorado, Wyoming, and New Mexico; proposed Rule. Federal Register, Vol. 79, No. 156, August 13, 2014, p. 47522-47545.

USDI Fish and Wildlife Service. 2014a. Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Contiguous United States Distinct Population Segment of the Canada Lynx and Revised Distinct Population Segment Boundary; Final Rule. September 12, 2014. Federal Register Vol. 79, No. 177: p. 54782-54845.

Wagenbrenner, J.W., L.H. MacDonald, R.N. Coats, P.R. Robichaud, and R.E. Brown. 2014. Effects of post-fire salvage logging and a skid trail treatment on ground cover, soils, and sediment production in the interior western United States. Forest Ecology and Management 335: 176-193.

Weller, T.J. and C.J. Zabel. 2001. Characteristics of fringed myotis day roosts in northern California. Journal of Wildlife Management 65:489-497.

White, C. M., M.F. McLaren, N.J. Van Lanen, D.C. Pavlacky Jr., J.A. Blakesley, R.A. Sparks, J.J. Birek, and D.J. Hanni. 2014. Integrated Bird Monitoring in Bird Conservation Regions (IMBCR): 2013 Field Season Report. Rocky Mountain Bird Observatory. Brighton, Colorado, USA. 161 p.

Wiggins, D.A. 2004. Black swift (*Cypseloides niger*): a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. 44 p.

Wisdom, M.J., R.S. Holthausen, B.C. Wales, C.D. Hargis, V.A. Saab, D.C. Lee, W.J. Hann, T.D. Rich, M.M. Rowland, W.J. Murphy and M.R. Eames. 2000. Source habitats for terrestrial vertebrates in the interior Columbia Basin: Broad-scale Trends and Management Implications. Vols. 1-3. General Technical Report PNW-GTR-485. USDA Forest Service, Pacific Northwest Research Station. Portland, Oregon. 529 p.

Yunick, R.P. 1985. A review of recent irruptions of the black-backed woodpecker and three-toed woodpecker in eastern North America. Journal of Field Ornithology 56:138-152.

Zack, A.C. (1994). Early succession in western hemlock habitat types of northern Idaho. (Unpublished doctoral dissertation). University of Idaho, Moscow, ID. 311 p.

Zack, A.C. and P. Morgan. 1994. Fire History on the Idaho Panhandle National Forests. Unpublished report, on file with the Idaho Panhandle National Forests, 3815 Schreiber Way, Coeur d'Alene, ID, 83815. 44 p.

Zack, A., Lundberg, R. and Barry Bollenbacher. 2011. Green et. al. Error Correction Notes 2/25/05 with 3/4/07, 10/2008 and 12/11 additions. USDA, Forest Service. Region One, Missoula, MT.

Zielinski, W.J., J.R. Dunk, J.S. Yaeger and D.W. LaPlante. 2010. Developing and testing a landscape-scale habitat suitability model for fisher (*Martes pennanti*) in forests of interior northern California. Forest Ecology and Management 260:1579-1591.

Appendix A - Public Involvement

Introduction

A detailed analysis and response to comments heard from the public has been completed. As stated in the EA (Project Planning Process/Public Involvement), 69 of the 79 letters received (90 percent) voiced support for the proposed project based on the same reasons identified in the project purpose and need: safety, forest health, and economic benefits. Six letters did not indicate support for or opposition to the project, but had specific questions or recommendations for project design and implementation. Four comment letters indicated opposition to the proposal.

The following briefly discusses changes to the proposal as a result of public comments, and the key concerns most frequently raised by those who oppose the project.

All letters received are available for public viewing in the project's online reading room at http://www.fs.usda.gov/project/?project=48585 (on the right-hand tool bar, click on the Public Comment/Objection Reading Room link).

A list of those who were contacted or involved in the project development and planning process is also provided.

Changes Resulting From Public Comments

Public comments help to ensure that all affected resources and relevant issues are addressed during the analyses. In addition, public comments resulted in a number of changes to the project design, most notably:

- A new alternative to the proposed action. Alternative 3 was developed in response to comments from The Lands Council and Idaho Conservation League, concerned with potential impacts to stands that met the minimum criteria for old growth prior to the 2015 fires, and the potential effects of the proposed temporary road construction. Alternative 3 is described in detail in the EA (Alternative Descriptions).

- Changes to proposed vegetative management activities: Proposed activities were modified based in part on public concerns, along with additional field verification. For example, field surveys validated whether stands currently meet the minimum criteria for old growth, and dropped those meeting the criteria. For example, Lower Flat Units 2 and 19 were dropped from the proposed action after field reconnaissance showed that the stand did not burn extensively, and still had enough large and old trees to meet old growth criteria.

- Specific alternative design features: The project interdisciplinary team developed design features to minimize or avoid adverse effects which could occur as a result of implementing proposed activities in the area (Appendix C). Some design features (such as Best Management Practices, woody debris retention guidelines, white pine retention guidelines, etc.) were shaped by law or policy; others were in response to public comments or site-specific conditions. The project interdisciplinary team incorporated ideas presented by the public and other agencies into alternative design whenever

possible. Further description and information about the public involvement and collaboration process for the Grizzly Fire Salvage and Restoration Project is provided in supporting documents in the Public Involvement project files, as noted.

Key Public Concerns

Purpose and Need for Action

As stated earlier, 69 of the 79 letters received indicate support of this proposal; 58 of those 69 cited both environmental and economic reasons for their support. A letter was received from the Shoshone County (Idaho) Board of Commissioners, stating they were very supportive of the Grizzly proposal, and believe it is imperative that the salvage project be undertaken to protect the health and safety of the public, recover the remaining forest product economic value and benefit, restore portions of the landscape burned by the Grizzly Complex Fire, and prepare the area for safe and timely reforestation.

The Lands Council stated they believe that the Forest Service should offer a timber harvest project in the Grizzly Fire Salvage and Restoration Project Area, while taking special care to minimize the environmental effects of the project. Idaho Forest Group urged the agency to expedite the process to provide for rapid salvage opportunities, recovery of resources, and rapid rehabilitation of affected areas. The American Forest Resource Council indicated their support for the project for the same reasons as we described in our January 29, 2016 notice and comment letter to the public. Thompson River Lumber Company supported the proposal to remove burned timber to reduce future fire risks, for reforestation of the burned landscapes, and recovery of economic value.

Three of the four commenters who oppose the project (Kootenai Environmental Alliance and Alliance for the Wild Rockies, who submitted a joint comment letter, and two individuals) expressed the opinion that the overriding purpose for the proposal was not about public safety or forest restoration, but economic gain, to “log as many board feet as possible.”

However, if that were true, there are many additional acres that could have been proposed for salvage harvest. The Grizzly Complex Fire burned a total of over 25,000 acres. The proposed action includes activities in three of the six fires involved in the complex: Lower Flat, Grassy, and North Grizzly, which collectively account for about 14,480 acres, or 58% of the total acreage burned in the complex. The salvage and danger tree removal activities included in the proposed action would affect a total of about 3,025 acres, which is 21 percent of the total area burned by the three fires, and about 12 percent of the total area burned within the entire complex of fires. Therefore, the vast majority (88 percent) of the area burned within the Grizzly Complex would not be affected by the proposed salvage logging or danger tree removal activities, and would be left to recover naturally.

We did not pursue additional salvage treatment acres for a number of reasons. As described in the January 29, 2016 public notice and comment letter, a decision was made to focus proposed activities in areas where those activities would be most likely to produce results consistent with the desired conditions as described in the Forest Plan (such as forest restoration), and to minimize impacts to other resources. Stands that still meet the old growth definition were excluded from proposed salvage. Units were included if most of the trees were dead, dying, or expected to die in the near future due to the combined impacts of the fire itself (root kill, cambium kill on the tree bole and/or crown consumption) with other secondary agents such as bark beetles, insect attacks

or root disease pathogens. In addition, salvage harvest activities were primarily identified in areas that could be reached from existing roads and trail that are open to public motorized use and/or administrative use.

Idaho Forest Group supports the proposed activities, stating, "It appears that the agency has done adequate reconnaissance to assess the maximum acreage that is proposed for salvage on Grizzly…" and noted that while on a percentage basis the proposed salvage "appears light, in reality, to treat this many acres of fire salvage within the time frame in which the wood maintains economic viability will be a considerable challenge."

Under the Grizzly Fire Salvage and Restoration project, economic benefit is one of three interrelated objectives for proposed salvage activities. Removal of danger trees along roads and trails within the fire perimeter is essential for providing safe access to the area for the visiting public as well as Forest Service workers and contractors. These road systems are crucial to providing access for future land management and fire suppression activities in this area. Salvage activities would not only provide a positive economic effect to local communities and counties, but would also result in the long-term restoration of the forest by promoting growth of western white pine, western larch, ponderosa pine and western red cedar.

Effects of Post-fire Salvage on the Ecosystem

The topic of salvage logging is surrounded by a considerable amount of debate. Long-term health of the ecosystem was the primary concern for both those who supported the proposal, and those who opposed it.

Some individuals supported the activities because they were concerned with the length of time that would pass before the land recovered from the fires, that letting the timber deteriorate on site would be wasteful and would pose an increase future fire risk. In expressing their support of the proposal, Idaho Department of Fish and Game observed that burned forests have value to many wildlife species, and predicted that the proposed level of salvage would leave a reasonable mosaic of forest types on the landscape. They agreed that replanting the project area with white pine and western larch should help make the forest more resilient to future threats such as insect outbreaks and tree diseases. In terms of riparian habitat, they stated, "The proposed use of western red cedar and hardwoods in moist habitats will contribute to the mosaic of habitat types and is expected to provide long term benefits for fish and wildlife by contributing to properly functioning riparian zones."

The Idaho Conservation League and others stated that fires serve an important ecological role that may be undermined by post-fire salvage logging. A number of publications were cited as opposing science, the premise being that there are no ecological benefits to salvage logging (Hutto 2006, Noss et al. 2006). Primary concerns include the importance of biological legacies, in particular large snags and large live trees; effects to wildlife species specifically associated with recently burned forests, such as black-backed woodpeckers; effects to burned and exposed soils; and effects to riparian areas.

There are valid socio-economic reasons for conducting post-disturbance logging, such as economic recovery of potential lost value, providing economic activity for rural communities, and mitigating public safety hazards posed by dead and damaged trees along transportation corridors and in high use areas. National Forest lands are managed for multiple uses, and all of these values (social, ecological, and economic) must be considered. The challenge for post-disturbance management is to determine, based on established management objectives, where and when post-

disturbance logging is appropriate, and how to avoid, minimize, or mitigate the potential for undesirable ecological effects associated with proposed post-disturbance logging activities.

In order to understand the desired outcome of the proposed timber salvage and restoration activities, it is important to understand why the activities are proposed in the Grizzly project area. The proposed salvage units would occur on sites that historically supported stands with a high proportion of western white pine in them; larch was often intermixed with white pine on ridge top and mid-slope locations, while cedar was often intermixed with white pine on toe-slopes and in water drainage locations. However, primarily due to the effects of past selective harvesting and white pine blister rust-related mortality, the three species (white pine, larch and cedar) decreased over time and were generally missing from these stands prior to the 2015 fires.

In a study of post-fire regeneration on dry mixed conifer sites in the Northern Rockies, Kemp et al. (2016) found that the composition of the post-fire regeneration reflected the composition of the pre-fire stand composition. Because western white pine, western larch, and cedar were virtually absent at the time of the fires, there is no longer an adequate seed source by which they can naturally reproduce in the wake of the fire. The composition of the forest in the Grizzly project area, both at stand and landscape levels, is currently dominated by western hemlock, grand fir and Douglas-fir trees that are less resistant to drought, fire and insects, instead of the more resilient western white pine, ponderosa pine, and western larch species. As a result, it is reasonable to expect that the sites will naturally regenerate to a mixture of western hemlock and grand fir on the lower and mid-elevations, with mountain hemlock, lodgepole and subalpine fir on the upper elevations. Douglas-fir, spruce and larch will also occur in many stands but they will occur in low densities and are unlikely to compete well with the hemlock and grand fir on the most productive mid and lower elevation sites.

Since there is little to no likelihood of natural regeneration of the highly desirable western white pine, western larch, and cedar in the proposed activity areas, the proposed planting is intended to ensure adequate representation of these species during the early seral stand development stage. This would hasten and enhance the overall recovery process, meet restoration objectives, and trend the vegetation component toward desired future conditions in the treated areas.

There are many publications and references that have value and have been used during project development and analysis of effects of the proposed activities, including many of those cited in public comments. In addition to published literature, the analysis is guided by the Forest Plan and other legal requirements, and designed based on current on-site conditions. The Grizzly project team is comprised of resource specialists and professionals who have been on the ground and seen first-hand the condition of the forest, soils, streams, wildlife habitat, transportation routes, and other features within the area. In conducting their analysis and making recommendations for management of the area, the team has reviewed a variety of scientific references that address conditions similar to those in the area (such as forest health, stand species composition, fire severity, etc.).

Lindenmayer et al. (2008) present a wide-ranging summary of the documented ecological consequences associated with salvage logging after natural disturbances, and highlight the central components of the debate. They provide management recommendations for excluding areas from salvage, identifying situations where salvage may be appropriate, and planning salvage logging operations. The bulk of the published literature about the ecological effects of salvage logging considers large scale salvage that removes most, if not all, living and dead vegetation across large areas. There is limited research and monitoring data concerning smaller scale salvage projects

that are designed to minimize undesirable ecological effects while realizing other social or economic benefits.

There is also little empirical data about fire-damaged grand fir and western hemlock, species which occur with great frequency in all sizes throughout the IPNF and within the areas burned in the 2015 fires. District Silviculturist Jason Jerman contacted Sharon Hood, a renowned research ecologist at the Rocky Mountain Research Station - Missoula Fire Sciences Laboratory (see http://www.firelab.org/profile/hood-sharon), to see if she had any further data related to published findings on grand fir and western hemlock. Their conversation brought the realization that the 2015 fires on the IPNF provide an excellent opportunity to further our understanding of the fire resiliency of these two species and others in moist habitats of the Inland Northwest. They also agreed it would be useful to monitor conifer establishment over time in the burned areas.

In order to assess the potential effects of salvage harvesting on overstory tree survival and regeneration establishment, it was determined that plots would be established in both unsalvaged and salvaged stands. This methodology is expected to provide baseline data which will be useful for validating the criteria we have proposed for assessing mortality/survival by conifer species. The data collected will also be useful for refining assessment of and prediction of long-term effects of mixed severity fires, with and without post-fire management activities, on regeneration given the contemporary forest conditions, which are significantly different than historic conditions.

Old Growth

Prior to the wildfires, there were approximately 3,265 acres that met the definition for old growth (Green et al, 1992) in the North Grizzly, Grassy and Lower Flat fire perimeters. Based on observations of the burn severity and field reconnaissance, most of this acreage no longer meets the old growth definition. The burned stands or portions of stand no longer contain enough live trees per acre that are both old and large, and/or do not contain enough total live trees per acre to meet the stocking criteria.

The Lands Council and Idaho Conservation League both commented that any stands managed as old growth before the 2015 wildfires should not be included in the proposed salvage. As described earlier (Project Development and Alternative Descriptions), Alternative 3 was developed in response to these comments; no activities would occur in stands that met old-growth allocation criteria prior to the fires.

Under the proposed action (Alternative 2), salvage is not proposed in stands that currently meet old growth criteria. During project development, any pre-fire old growth found to still meet the old growth definition was removed from proposed salvage units. For example, Lower Flat Units 2 and 19 were dropped after field reconnaissance showed that the stand did not burn extensively, and still had enough large and old trees to meet old growth criteria. Salvage activities are proposed on a total of 533 acres (16 percent) of stands within the fire perimeters that met the old growth definition before the 2015 fires, but which have been examined and verified as no long meeting the definition due to fire-caused mortality. Because none of the stands within the proposed salvage areas meet the definition for old growth, the proposed action would not have a detrimental impact on the amount of old growth or the benefits provided by stands that meet old-growth criteria. Effects to old growth under the alternatives is described in the “Forest Vegetation” section of this document.

Wildlife

Kootenai Environmental Alliance/Alliance for the Wild Rockies expressed disbelief that the analysis would include an in-depth evaluation of all potentially affected wildlife and their habitat needs.

Idaho Conservation League stated their understanding of the need to mitigate hazards posed by standing dead trees, but pointed out the need for meaningful snag management and tree retention.

Idaho Fish and Game also provided recommendations to protect or improve wildlife habitat during project implementation. For example, they suggested that merchantable danger trees could be cut low enough to reduce the danger to the roadway but high enough to provide foraging habitat to bird species, retaining some of the value to wildlife.

A complete and thorough analysis of effects to wildlife has been completed. That includes the identification of which species may be present or have habitat in the area; and the direct, indirect and cumulative impacts to those species. There would be no significant effects to any species or their habitat as a result of the proposed activities. Under any alternative, there would be ample amounts of unlogged post-fire habitat (including snags) available for wildlife use in the project area. As stated earlier, the proposed action implement timber salvage and roadside danger tree removal on approximately 12% of the total acreage burned in the 2015 Grizzly Complex Fires. Therefore, the vast majority (88 percent) of the area burned within the Grizzly Complex would not be affected by the proposed salvage logging, danger tree removal or other associated planting/seeding activities, and would be left to recover naturally. Across the IPNF, approximately 47,500 acres burned on National Forest System lands in 2015; timber salvage and roadside danger tree removal is proposed on approximately 18 percent of the entire area burned.

We are also considering Idaho Fish and Game's suggestion to leave high stumps along roads as we design the project. Public, employee, and contractor safety, as well as economic and logistical considerations would affect where and how many high stumps would be created.

Opening Size

The Lands Council asked for clarification about opening sizes, concerned that the harvest opening sizes exceeding 40 acres would create negative impacts for wildlife, visuals, and hydrology. Kootenai Environmental Alliance/Alliance for the Wild Rockies were also concerned with the large openings.

As stated earlier, the proposed salvage units would occur in a landscape already opened up by the wildfires; analysis indicates the change in crown cover caused by the proposed salvage would not be discernable over the background (current) condition. Full effects analyses for wildlife, visuals and hydrology have been completed, and no significant effects would occur under any alternative.

Eligible Wild and Scenic River Corridor

Idaho Conservation League had questions about how many acres of salvage logging is proposed within the eligible wild and scenic river segment and questioned whether salvage logging activities are consistent with the management direction for eligible wild and scenic rivers.

The proposed salvage logging within the area designated as Management Area 2b (MA-2b, Eligible Wild and Scenic Rivers) meets Forest Plan guidelines because of the limited scope of the proposed salvage, the intended objectives of the activities proposed there, and the anticipated minimal impact. The segments of concern have a primary classification of "Recreational." A

total of 64 acres of salvage is proposed within MA-2b, nearly all within two units, Lower Flat Units LF07 (35 acres) and LF26 (25 acres). The proposed salvage would occur along the outside edge of the MA2b corridor, on a relatively flat bench immediate above and west of the paved road; therefore, the units would be very difficult to see from the main travel corridor or from the river in general. The objective and design of the salvage and subsequent tree planting are to reduce the amount of standing dead trees while maintaining large snags and live trees, to maintain structural diversity and minimize potential visual effects. The tree planting would include cedar, larch and rust-resistant white pine to enhance species diversity, visual appeal, and the quality of the wildlife habitat of the new, developing stands while providing valuable seed sources for each of these species in defense against future disturbances.

Potential Erosion and Flooding

There were concerns expressed about the potential for erosion and flooding to occur following proposed salvage activities; of particular interest to Kootenai Environmental Alliance (Mike Mihelich) was analysis of equivalent clearcut area (ECA) and effects during rain-on-snow events. Idaho Fish and Game, Idaho Conservation League and Kootenai Environmental Alliance/Alliance for the Wild Rockies were concerned that riparian habitat conservation area (RHCA) buffers would not be applied as guided by the Forest Plan. One individual expressed concern with potential effects to the Trail of the Coeur d'Alenes.

ECA is not used as a resource indicator in the analysis because that methodology is based on change in crown cover. The existing condition for the project area is dominated by the wildfire landscape and therefore already has a reduced crown cover; the change in crown cover caused by the proposed salvage would not be discernable over the background (current) condition. The estimated 1,700 acres of proposed salvage logging represents approximately 7% of the area burned by the 2015 wildfires on the Coeur d'Alene River Ranger District, and only 0.2% of total District acreage.

All modeling for the hydrology analysis is conducted with the assumption that the entire project area is within the rain-on-snow zone.

As directed by the Forest Plan, all streams or water bodies (Categories 1 through 4) would have standard RHCA widths applied. These widths are identified and marked during layout, and enforced through timber sale contract specification.

The effects analysis indicates that proposed activities would not have any measurable effect on water flows in the North Fork or main stem of the Coeur d'Alene River that would contribute to potential flood events on the Trail of the Coeur d'Alenes, some 50 miles south of the project area. With design features and best management practices that are incorporated into timber salvage contracts, the cumulative effects of salvage logging in terms of probability of risk of sediment delivery is not expected to increase over existing conditions.

Managing the Road System

Idaho Conservation League and Kootenai Environmental Alliance/Alliance for the Wild Rockies recommended no construction of any new or temporary roads in the post-fire environments, and recommended decommissioning existing roads where they are no longer needed for access or future management.

During project development, salvage harvest activities were identified in areas that could be reached from existing roads and trails that are open to public motorized use and/or administrative

use in order to avoid or minimize new road construction. No new system road construction is proposed; and no existing open roads would be decommissioned with this project.

Under Alternative 2, short segments of temporary (nonsystem) road are proposed in order to support economically feasible logging systems where existing roads are not available. Efforts were made to keep new construction of temporary roads as short as possible; the segments are located high in watersheds and would be designed to minimize the risk of sediment entering streams. At the completion of their intended use, the temporary roads would be decompacted, recontoured to the approximate shape of the surrounding terrain, and seeded or covered with debris to prevent erosion and accelerate hydrologic and vegetative recovery.

An estimated 46 miles of currently closed roads would be opened temporarily for administrative access to proposed salvage areas. Design features for maintenance of these roads would help reduce sediment production. After activities are completed, these roads would closed (with a gate, berm, or front-end obliteration) and, where appropriate, culverts and associated fill may be removed, the road surface out-sloped, water bars installed, the road prism revegetated with native species, and/or compacted surfaces scarified.

In regard to Alternative 2, Idaho Fish and Game noted that following the project, the proposed decommissioning, recontouring and seeding of temporary roads should keep impacts to wildlife at a minimum. As they recommended, front-end obliterations would be used to reduce the likelihood of unwanted (illegal) motorized use, as long as they would not inhibit access for administrative needs in the near future (the proposed reforestation activities require vehicle access for tree planting, stocking surveys, and early tending activities). Otherwise, gates, barriers or earthen berms would be used. As the need for frequent access diminishes on any particular route, front-end obliterations or other long-term storage methods would be used.

As described earlier, in response to specific recommendations from The Lands Council and Idaho Conservation League, Alternative 3 would not include any temporary road construction. In some cases, all or portions of units were dropped because they could not be accessed without the temporary road construction.

At the completion of the project, motorized access would remain unchanged under any alternative. No new system road construction is proposed; and no existing open roads would be decommissioned with this project.

Restoration and Protection of Trails

Idaho Department of Parks and Recreation (IDPR) expressed concerns related to the impact that timber salvage could have on recreation trails in the area, and recommended specific design features (for example, to control erosion).

Under the proposal, specific design features have been incorporated to address trails that were impacted by the 2015 fires and could potentially be affected by the proposed salvage and related activities. For example, drainage/erosion control features would be replaced, repaired, or constructed as necessary on affected trails, as recommended by IDPR. Improvement of trails impacted by fire activity but *not* potentially affected by proposed harvest or related activities is outside the scope of this project. These trails would be treated as appropriate through our normal trail maintenance program. Once conditions allow, trails affected by the fires of 2015 will be assessed for post-fire maintenance and repair needs and will be scheduled in the program of work.

Level of Analysis

Kootenai Environmental Alliance/Alliance for the Wild Rockies asserted that "the law requires [the Forest Service] must do a full EIS," and that the project should be withdrawn. "Moving ahead without full compliance to NEPA is irresponsible management of public lands and has the potential to cause extreme adverse ecological consequences in the project area…"

The emergency situation determination (ESD) does not determine the scope of analysis or whether to prepare an EA or environmental impact statement (EIS). Agencies may prepare an environmental assessment (EA) on any action at any time in order to assist agency planning and decisionmaking (40 CFR 1501.3(b)). The National Environmental Policy Act (NEPA) requires preparation of an EIS if significant impact is anticipated as a result of the action; an EA may be prepared first to provide sufficient evidence and analysis for determining whether to prepare an EIS or a finding of no significant impact (40 CFR 1508.9(a)).

Based on the location, scope and design of activities under the Grizzly Fire Salvage and Restoration Project, the preliminary analysis indicated that no significant impacts were anticipated. The thorough analyses of existing conditions, detailed design of proposed activities in each unit, and full consideration of all direct, indirect and cumulative effects has been completed, and supports the determination that there would be no significant impact to humans or any resource in the area, as documented in this EA.

Persons Consulted on the Proposal and Planning

The initial mail list for the project was developed by identifying those groups potentially interested in or affected by the proposal, as well as adjacent landowners, special use permit holders, and those with mining claims in the area. Contacts were added as interest was indicated through comment letters, telephone calls, etc.

The following tables identify the agencies, organizations, businesses and individuals who were contacted or commented on the project, throughout project development and planning, public notice and comment, the public meeting, field trip, etc., (over 400 in total).

Table A-1. List of agencies, tribes, organizations and businesses contacted/involved during project development, planning and analyses.

Organization/Agency Contact	City, State
Alliance for the Wild Rockies – Michael Garrity	Helena, MT
American Forest Resource Council – Tom Partin	Portland, OR
Avista Corp. – Robin Bekkedahl, Sharon Vore, Tim Vore	Spokane, WA
AW Adventures Institute – Sandy Podsaid	Kingston, ID
Backcountry ATV Association - Ken Chrisp	Spokane, WA
Backcountry ATV Association – Arnold Howe	Post Falls, ID
Backcountry ATV/UTV Club	Hayden, ID
Bicycle Sales and Service – Kent Eggleston	Coeur d'Alene, ID
Bonneville Power Administration - Tom Murphy	Mead, WA
Boy Scouts of America	Hayden, ID
Brush Bunch - Jeff Hildesheim	Rockford, WA
Bureau of Land Management – Kurt Paviat	Coeur d'Alene, ID
Chester Mining Company	Spokane, WA

Organization/Agency Contact	City, State
Coeur d'Alene Audubon – Carrie Hugo	Coeur d'Alene, ID
Coeur d'Alene Muzzleloaders – Jim Maupin	Spirit Lake, ID
Coeur d'Alene Natural Resources Committee - Tim Kastning	Coeur d'Alene, ID
Coeur d'Alene Placer Mining Co.	Wellesley Hills, MA
Coeur d'Alene Placer Mining Co. - Elizabeth Gardner	Wellesley Hills, MA
Coeur d'Alene River Big Game Outfitters, LLC – Gary and Jan Sylte	Athol, ID
Coeur d'Alene Snowmobile Club	Hayden, ID
Coeur d'Alene Tribe - Chairman Chief J. Allen	Plummer, ID
Coeur d'Alene Tribe - Cultural Resources Director Jill Wagner	Plummer, ID
Coeur d'Alene Tribe - Natural Resources Director Alfred Nomee	Plummer, ID
Coeur d'Alene Velo Riders – Ben Suttlemyer	Coeur d'Alene, ID
DMW Metal Holdings LLC	Delaplane, VA
Eagle City Mining Company	Rathdrum, ID
Eastside Highway District - John Pankratz	Coeur d'Alene, ID
Expedition Idaho/Adventure Sports Week – David Adlard	Athol, ID
Fernan Rod & Gun Club – Janet Brady	Post Falls, ID
Four Square Gold Mines Inc.	Coeur d'Alene, ID
GMRV – Alan and Malinda Gilda	Mullan, ID
H&J Pipeline Maintenance LTD	Wallace, ID
Hancock Forest Management	Coeur d'Alene, ID
Hayden Lake Water, Sewer & Recreation Board	Hayden Lake ID
HECLA Limited	Coeur d'Alene, ID
Hickey's Auto Body & Paint – Robert Hickey	Kellogg, ID
High Mountain ATV – Jack Rupp	Osburn, ID
High Mountain ATV Association	Wallace, ID
Historic Wallace Chamber of Commerce	Wallace, ID
Idaho Army National Guard – Lieutenant Kessler	Post Falls, ID
Idaho Conservation Data Center - Bill Bosworth	Boise, ID
Idaho Conservation League - Jonathan Oppenheimer	Boise, ID
Idaho Conservation League - Brad Smith	Sandpoint ID
Idaho Department of Environmental Quality – June Bergquist, Donna Harvey, Kajsa Stromberg	Coeur d'Alene, ID
Idaho Department of Fish and Game – Jeff Berend, Chip Corsi, Michael Lucid, Jim Teare, Laura Wolf	Coeur d'Alene, ID
Idaho Department of Lands	Coeur d'Alene, ID
Idaho Department of Lands	Kingston, ID
Idaho Department of Lands	Pinehurst, ID
Idaho Department of Parks and Recreation – Jeff Cook	Boise, ID
Idaho Department of Parks and Recreation	Coeur d'Alene, ID
Idaho Forest Group – Reid Ahlf	
Idaho Forest Group – Tim Dougherty	Moyie Springs, ID
Idaho Outdoor Experience – Jan Gilbert	Clark Fork, ID
Idaho State Preservation Office	Boise, ID

Organization/Agency Contact	City, State
Idaho State Snowmobile Association – Sandra Mitchell	Boise, ID
Inland NW Lutheran Outdoor Ministries Inc.	Coeur d'Alene, ID
Inspiration Lead Co. Inc.	Portland, OR
Intermountain Forest Association - Serena Carlson	Coeur d'Alene, ID
International Basic Res/Mine	Spokane Valley, WA
Iron-Core Racing – Toby Reynolds	Coeur d'Alene, ID
Kootenai County Natural Resources Advisory Group – Tom DuHamel	Harrison, ID
Kootenai County Noxious Weed Control	Hayden, ID
Kootenai County Snow Groomer Board - Dave Bonasera	Hayden, ID
Kootenai County Commissioners	Coeur d'Alene, ID
Kootenai Environmental Alliance – Addrienne Cronebaugh	Coeur d'Alene, ID
Kootenai Environmental Alliance - Mike Mihelich	Coeur d'Alene, ID
Kootenai Environmental Alliance – Janet Torline	Harrison, ID
Lake Charters, Inc. – Don and Susan Houk	Coeur d'Alene, ID
Lakes Highway District	Hayden, ID
Lookout Associates LLC	Wallace, ID
Lookout Mountain Sky Riders	Wallace, ID
Louisiana Pacific Corp.	Hayden Lake, ID
Mine Ventures LLC	Dalton Gardens, ID
Missouri Improvement Company - Property Tax Dept.	Omaha, NE
Montana Radio Company/Trail Rail Run – Jennifer Straughan	Missoula, MT
Mt. Spokane Adventure Sports – Yogi Naresh	Spokane, WA
Mullan School District #392 - Robin Stanley	Mulllan, ID
Natural Resources Conservation Service	Boise, ID
Natural Resources Conservation Service – Aubrey Woodcock	Coeur d'Alene, ID
New Vista Development/Silver Valley Rock – Charlotte Wardrop	Pinehurst, ID
North Fork Coeur d'Alene River Watershed Advisory Group – Kajsa Stromberg	Coeur d'Alene, ID
North Idaho ATV - Frank Axtell	Hayden, ID
North Idaho College – Paul Chivvis	Coeur d'Alene, ID
North Idaho College – Jon Totten	Coeur d'Alene, ID
North Idaho Flycasters - Bob Bevins	Coeur d'Alene, ID
North Idaho Flycasters – Dave Londeree	Coeur d'Alene, ID
North Idaho Jammers	Cataldo, ID
North Idaho Mountain Outfitting, LLC – Travis Clemenson	Nordman, ID
North Idaho Trailblazers - Hans Archer	Cheney, WA
Northwest Access Alliance - Don Hull	Coeur d'Alene, ID
Northwest Access Alliance - Dave Vig	Athol, ID
Northwest Outfitters	Coeur d'Alene, ID
Office of Raul Labrador	Coeur d'Alene, ID
Office of Senator Crapo	Coeur d'Alene, ID
Office of Senator Risch	Coeur d'Alene, ID
Panhandle Nordic Ski & Snowshoe – Geoff Harvey	Hayden, ID

Organization/Agency Contact	City, State
PANTRA	Post Falls, ID
Polaris Resources Inc.	Hilton Head, SC
Prichard-Murray Fire Department	Wallace, ID
R & G Mining Co.	Kellogg, ID
R.E. Mining Co - Duane Little	Kellogg, ID
Red Horse Mountain Ranch – Cory Inouye	Harrison, ID
Righteous LLC	Silverton, ID
River Investments LLC	Coeur d'Alene, ID
Riverstop Enterprises LLC	Wallace, ID
Rock Of Ages LLC	Silverton, ID
Rocky Mountain Elk Foundation	Missoula, MT
SFCC Life Sciences Dept. - Dr. Albert Wilson	Spokane, WA
Shoshone County Noxious Weed Control Board	Wallace, ID
Shoshone County Commissioners	Wallace, ID
Shoshone County Forest Health Collaborative	Wallace, ID
Shoshone County Public Works	Wallace, ID
Shoshone County Sheriff's Department	Wallace, ID
Shoshone News-Press – Chanse Watson	Smelterville, ID
Shoshone Silver & Gold Mining Company – John Ryan	Coeur d'Alene, ID
Shoshone Silver Mining Company	Coeur d'Alene, ID
Silver Aurora Mining Co	Cataldo, ID
Silver Horizon Mining	Kellogg, ID
Silver Valley Rentals LLC	Kellogg, ID
Silver Valley Snowmobile – Chris Pfahl	Wallace, ID
Silverore Mines	Portland, OR
Snake Pit – Tom Richards	Enaville, ID
Society for Creative Anachronism, Inc. – Jennifer Jensen	Coeur d'Alene, ID
Somewhere in Time Tours	Kingston, ID
Special Olympics Idaho	Garden City, ID
Spokane Mountaineers – Andrew Ashmore, Eric Ryan	Spokane, WA
State of Idaho – Outfitters & Guides – Jake Howard	Boise, ID
Stimson Lumber – Barry Dexter	Coeur d'Alene, ID
Sunshine Mining Company	Kellogg, ID
Sustainable Northwest	Portland, OR
The Lands Council – Mike Petersen	Spokane, WA
Thompson River Lumber Company – Shawn Morgan	Thompson Falls, MT
Trail Maniacs, LLC – Dave Dutro	Hayden, ID
Tricon Timber, LLC – Mike Lilly	St. Regis, MT
Union Pacific Land Res. Corp.	Omaha, NE
University of Idaho - Tammi Laninga	Moscow, ID
US Environmental Protection Agency – BEIPC, Ed Moreen	Coeur d'Alene, ID
US Environmental Protection Agency – Region 10	Seattle, WA

Organization/Agency Contact	City, State
US Fish & Wildlife Service	Spokane, WA
Vertical Earth - Mike Gaertner	Coeur d'Alene, ID
Wayne Hill Outfitting Inc.	Noxon, MT
WCT – Ed Lider	Coeur d'Alene, ID
WildWest Institute	Missoula, MT

Table A-2. List of individuals contacted/involved during project development, planning and analyses.

Individual Contact	City, State
Nanette Adams	Coeur d'Alene, ID
Clyde C. Adcox, Jr.	Murray, ID
Dale Adickes	Athol, ID
James Ahlman	Athol, ID
James and Deanna Anderson	North Bend, WA
Michael Andrewson	St Maries, ID
Amy Arave-Eixenberger	Kellogg, ID
Dustin Armstrong	
Dick Artley	Grangeville, ID
Terry Auten	Athol, ID
Gregory and Randal Babin	Spokane, WA
Harold and Joanne Babin	Spokane, WA
Kenneth and Sandra Babin	Sandpoint, ID
Bob Baker	Hayden, ID
Fred, Guido, and John Bardelli	Osburn, ID
Kaitlin Barnhart	Sandpoint, ID
Nancy Bass	Lacrosse, WA
Jennifer Beathe	Albany, OR
Al Beauchene	Hayden, ID
Dennis Bebensee	Shingletown, CA
John Bentley	Post Falls, ID
Casey Berg	Spirit Lake ID
Jim Best	Wallace, ID
Jim C. Best	Kellogg, ID
Michael, Sean and Brian Biotti	Pinehurst ID
Mike Biotti	Pinehurst, ID
Andy Boggs	Coeur d'Alene, ID
Raeanne Bohn	Kingston, ID
James Boisseranc	Athol, ID
Dave Bonasera	Coeur d'Alene, ID
Rowene Bond	Kingston, ID
James Bonham	Rathdrum, ID
James and Laurie Bonham	St. Maries, ID

Individual Contact	City, State
Norris J. Boothe	Coeur d'Alene, ID
Fred Brackebusch	Kellogg, ID
Michael and Nancy Branstetter	Osburn, ID
Dave Breitkreutz	Coeur d'Alene, ID
Steve Bristow	Kellogg, ID
Allen and Lonnie Brown	Wallace, ID
Leon Brown	Clark Fork, ID
Wayne Brown	Kingston, ID
Bob Burke	Kingston, ID
Alice Burnell	Eagle, ID
Edwin and Gertrude Bush	Coeur d'Alene, ID
Jeff Cantamessa	Wallace, ID
Jon Cantamessa	Wallace, ID
Jami Carlson	Osburn, ID
Jerry and Jackie Carlson	Hayden, ID
Chapin Residence	Wallace, ID
Randy and Claudia Childress	Wallace, ID
Luther Church, Jr.	Osburn, ID
Dolores Clancy	Athol, ID
Bob Clark	Coeur d'Alene, ID
Dave Clark	Bellevue, WA
Karen Clark	Wallace, ID
William and Tamara Clark	Coeur d'Alene, ID
Bonnie Clouse	Wallace, ID
Clif Collins	Post Falls, ID
Nanette Colombo	Kellogg, ID
Stephen Coyle	Wallace, ID
Jeanine Crain	Athol, ID
Tom Crimmins	Hayden Lake, ID
Summer Crosby	St. Maries, ID
Alan Curtis	Eugene, OR
Martha Daniel	Bonners Ferry, ID
Michael and Mary Decker	Wallace, ID
Ronda Detmers	Athol, ID
Conor Devaney	Spokane, WA
Forrest Dexter	Veradale, WA
Joyce Dexter	Coeur d'Alene, ID
Robert Dittner	Smelterville, ID
Garry Dodge	Osburn, ID
Lynda Dolan	Athol, ID
Larry Domingo	Spokane, WA
Marie Doughty	Coeur d'Alene, ID

Individual Contact	City, State
Bill Douglas	Bellevue, WA
Bill Drewien	Medford, OR
Brian Dunham	Ponderay, ID
Logan Dyckhoff	Rathdrum, ID
Tammy and Ray Eberhard	Pinehurst, ID
Douglas and Bonnie England	Osburn, ID
Roy Faler	Kingston, ID
James Fenley	Athol, ID
Jim Finlay	Kingston, ID
Michael Flory	Coeur d'Alene, ID
Debra Frank	Coeur d'Alene, ID
Dan Frigard	Wallace, ID
Jamie Fulton	Bonners Ferry, ID
Frank and Sarah Garci	Post Falls, ID
Nichelle Gau	Bonners Ferry, ID
Ken Gimbel	Coeur d'Alene, ID
Richard and Laura Good	Hayden, ID
Louise Graffenberger	Osburn, ID
Dave Griffiths	Liberty Lake, WA
Steve Grimmett	Pinehurst, ID
Calee Guy	Coeur d'Alene, ID
Dan Guy	Kingston, ID
Brent Hadfield	Athol, ID
Vicki Hahn c/o Melanie Sanchez	Coeur d'Alene, ID
William and Ingrid Hale	Wallace, ID
Melvin Harbison, Jr.	Athol, ID
Tarita Harjy	Kingston, ID
Annette and Steve Hart	Rathdrum, ID
Gregory Hart	Post Falls, ID
Mark Hartmann	Wallace, ID
Geoff Harvey	Hayden, ID
Cecil Hathaway	Coeur d'Alene, ID
George and Vicki Hemphill	Wallace, ID
William Henderson	Rathdrum, ID
John & Claire Hendrix	Tumtum, WA
John Hern	Coeur d'Alene, ID
Patrick Herndon	Coeur d'Alene, ID
Tom Herron	Coeur d'Alene, ID
Ron Heyn	Wallace, ID
Jann Higdem	
Matt Hill	Coeur d'Alene, ID
Eldon Hindberg	Athol, ID

Individual Contact	City, State
G.A. (Nick) Hogamier	Wallace, ID
Mark Hogen	Coeur d'Alene, ID
Frank Holzer	Athol, ID
Art and Joan Hostetler	Coeur d'Alene, ID
Mark Howard	Athol, ID
Jay Hubert	Wallace, ID
Don Hughes	Athol, ID
Jack Hull	Wallace, ID
Pamela and John Hull	Wallace, ID
Steve and Vonnie Hutchison	Coeur d'Alene, ID
Larry Isenberg	Coeur d'Alene, ID
Katie James	Kingston, ID
Larry Jamison	Coeur d'Alene, ID
David Jefferson	Ione, WA
Kathy Jenkins	Libby, MT
Jake Jenkins	Wallace, ID
Kevin and Sandee Jennings	Post Falls, ID
Scott Jobb	Hope, ID
Alfred Johnson	Wallace, ID
Dennis Johnson	Coeur d'Alene, ID
Georgia Johnson	Nine Mile Falls, WA
Jonathan Jolley	Rathdrum, ID
William and Barbara Jones	Post Falls, ID
Jeff Juel	Spokane, WA
Kristin Keith	Coeur d'Alene, ID
Kendrick Family Trust	Hayden Lake, ID
Sherry Klaus	Plummer, ID
John Lane	Bellevue, WA
Carol LaPan	Coeur d'Alene, ID
Daniel Laudeman	San Marcos, CA
Lucky and Patricia Lawrence	Wallace, ID
Forry LeDue	Wallace, ID
Harold and Shirley Lee	Coeur d'Alene, ID
Jeri A. Lee	Coeur d'Alene, ID
Larry Lightner	Kellogg, ID
Pam Lisenbe	Rathdrum, ID
Duane E. Little	Kellogg, ID
Douglas and Roberta Loper	Hayden Lake, ID
Bob Lowe	Rathdrum, ID
Ingrid Madsen	Coeur d'Alene, ID
Melo Maiolie	Coeur d'Alene, ID
Bruce Many	Eckert, CO

Individual Contact	City, State
Don Martin	Coeur d'Alene, ID
Dan Martinson	Wallace, ID
Elmer Matilla/Perry Family Trust	Wallace, ID
Ashley McFarland	St. Maries, ID
Kelly McFarlane	Athol, ID
William McPeak	San Jose, CA
Cindy and Bill Metlow	Chewelah, WA
John Miller	Spokane, WA
Wayne Miller	St Maries, ID
Wendy C. Miller	Silverton, ID
Gary Mohler	Moyie Springs, ID
Eric Molter	Athol, ID
Peggy Morris	Kingston, ID
Dennis L. Murphy	
Brad Musch	Post Falls, ID
Cameron Neely	Athol, ID
John Nichols	Post Falls, ID
Michael and Joan Nicholson	Wallace, ID
Stacy Nickerson and Richard Dechand	Kingston, ID
Olivia Nordgaarden	Coeur d'Alene, ID
Dick Nordstrom	Kingston, ID
Jay Nordstrom	Coeur d'Alene, ID
Erick O'Bannon	Coeur d'Alene, ID
Jack O'Brien	Hayden, ID
Linda Ogren	Medford, OR
Oliver Family Trust	Sagle, ID
Terry Orr	Coeur d'Alene, ID
Ron Park	Santa Cruz, CA
Joe Peak	Kingston, ID
John Pickard	Cataldo, ID
Cora Powers	Coeur d'Alene, ID
Jean Public	Flemington, NJ
Bob Quinn	Hayden, ID
Joe Reed	Naples, ID
Jack and Geneva Riddle	Wallace, ID
Joseph Roach	Usk, WA
Charles Robnett	Athol, ID
Willis and Elaine Rogers	Lake Almanor, CA
Larry and Linda Runkle	Coeur d'Alene, ID
Davis and Christine Rust	Wallace, ID
W.C. (Bill) Rust	Wallace, ID
Gordon Sanders	Cataldo, ID

Individual Contact	City, State
Don Schaffier	Dalton Gardens, ID
Kelly Schilke	Coeur d'Alene, ID
Sandy Schlepp	Cataldo, ID
Cynthia Schneider	Coeur d'Alene, ID
Charles Schwartz and Francene King	Wallace, ID
Leroy Scott	Wallace, ID
Neil Seerley	Athol, ID
Eric Shanley	Hayden, ID
Bill Sharp	Murray, ID
Elnora Sharp, Heidi Hill, and Michael Hill	North Pole, AK
Chris Shawver	Athol, ID
Ben and Monica Sheppard	Cataldo, ID
Dennis and Judy Sheppard	Wallace, ID
George and Louise Sheppard	Pinehurst, ID
Jim Shields	Wallace, ID
John Sint	Pinehurst, ID
Don Smart	Libby, MT
Louise Smith	Osburn, ID
Lynn Smith	Hayden, ID
Terry E. Smith	Pinehurst, ID
Dennis Sobotka	East Amherst, NY
Leslee Stanley	Silverton, ID
Bob Steed	Coeur d'Alene, ID
Ron Streeter	Dalton Gardens, ID
Dwight, Mabel and Eric Suitter	Smelterville, ID
Mark Sverdsten	Cataldo ID
John Thomas	Wallace, ID
Guy, Jacob, Joni, and Cortney Thompson	Rathdrum, ID
Kay Thompson	Wallace, ID
Robert Thompson	Coeur d'Alene, ID
Tim Thompson	Wallace, ID
Von Thompson	Prineville, OR
Mark Tihonovich	Coeur d'Alene, ID
Tim Trout and Wendy Carpenter	Coeur d'Alene, ID
Julie Trudeau	Coeur d'Alene, ID
Glenn Truscott	Coeur d'Alene, ID
Paul Turcott	Bartlesville, OK
Steve Turner	Sandpoint, ID
Rob Uithof	Libby, MT
Rita Vannoy	Bonners Ferry, ID
Daniel Vasquez	Libby, MT
Robert A. and Vicky A. Velin	Missoula, MT

Individual Contact	City, State
Gay Warner	Oldtown, ID
Zac Watson	Cataldo, ID
Pat Way	Coeur d'Alene, ID
Timothy and Sandra Wheeler	Post Falls, ID
Brian White	Coeur d'Alene, ID
James White	Sagle, ID
Becki Witherow	Coeur d'Alene, ID
Woody Woodford	Kellogg, ID
Andrew Wright	Post Falls, ID
Leonard Wright and Judith Lane	Kennewick, WA
Tom Wuest	Dalton Gardens, ID
Paul A. Yelk	Spokane, WA
Larry Yergler	Pinehurst, ID
Carol Young	Kellogg, ID
Dale A. Zook	Coeur d’Alene, ID

Appendix B - Past, Ongoing and Reasonably Foreseeable Activities

Introduction

NEPA requires analysis and disclosure of potential cumulative effects – the impact on the environment which results from the incremental impact of the action when added to other past, present (ongoing) and reasonably foreseeable actions, regardless of what agency or person undertakes such actions (40 CFR § 1508.7). Cumulative effects analysis is carried out in accordance with 40 CFR 1508.7 and in accordance with the Council on Environmental Quality Guidance Memorandum on Consideration of Past Actions in Cumulative Effects Analysis dated June 24, 2005. This appendix provides information of relevant past, present and reasonably foreseeable projects and/or activities within the project area.

Past Activities

Past activities on National Forest System lands in the Grizzly Fire Salvage and Restoration Project Area were queried from the District's Timber Stand Management Record System (TSMRS) database and the Forest Service Activity Tracking System (FACTS) database. The database contains information about past harvest and management in the area from as early as the 1900s to the present. FACTS activity acres represent acres of the specific activity, not necessarily stand acres. Some stands may have had multiple activities or harvests.

A summary of past management activities in the entire project area is provided in Table B-1. Within proposed treatment units, past harvest has occurred on a total of less than 700 acres. Based on GIS analysis, approximately 95 acres within the proposed treatment units were previously harvested using ground-based equipment, 422 acres using skyline or cable systems, and 41 acres using animal logging (the remainder do not have harvest method listed).

Table B-1. Summary of past activities/events in and adjacent to the project area.

Decade and Activities/Events	Acres
1900s	
Timber harvest (salvage cut - intermediate treatment, not regeneration)	64
1910s	0
1920s	
Timber harvest (salvage cut - intermediate treatment, not regeneration)	458
Fire (wildfire - natural ignition)	1,791
1930s	
Timber harvest (salvage cut - intermediate treatment, not regeneration)	45
Silviculture (site preparation for planting by burning)	220
Fire (wildfire - natural ignition)	616
1940s	
Timber harvest	
Salvage cut (intermediate treatment, not regeneration)	620
Seed tree (final cut)	67
Silviculture (site preparation for planting by burning)	
Site preparation for planting by burning	18
Tree planting	238
Fire (chipping of fuels)	220

Decade and Activities/Events	Acres
1950s	
Timber harvest	
Stand clearcut	753
Shelterwood preparatory cut	166
Shelterwood establishment cut (with or without leave trees)	286
Seed tree seed cut (with and without leave trees)	484
Shelterwood removal cut	21
Seed tree final cut	245
Liberation cut	118
Salvage cut (intermediate treatment, not regeneration)	3,624
Silviculture	
Site preparation for planting by burning	483
Site preparation for planting (mechanical)	15
Tree planting	38
Fire	
Broadcast burning of activity fuels	530
Piling of fuels (hand or machine)	1,012
Burning of piled material (hand piles)	1,012
Natural abatement (activity fuels)	9
1960s	
Timber harvest	
Stand clearcut	3,400
Stand clearcut (with leave trees)	56
Shelterwood preparatory cut	12
Shelterwood establishment cut (with or without leave trees)	145
Seed tree seed cut (with and without leave trees)	83
Seed tree final cut	270
Shelterwood staged removal cut	110
Liberation cut	546
Salvage cut (intermediate treatment, not regeneration)	1,714
Silviculture	
Site preparation for planting (burning)	1,831
Site preparation for planting (chemical)	92
Site preparation for planting (mechanical)	140
Site preparation for natural regeneration (broadcast burning)	227
Site preparation for natural regeneration (mechanical)	209
Control of understory vegetation	2
Seed (trees)	27
Tree planting	1,548
Fill-in or replant trees	169
Reforestation enhancement (mulching)	4
Fire	
Broadcast burning of activity fuels	2,064
Rearrangement of activity fuels	627
Piling of fuels (hand or machine)	264
Burning of piled material (dozer and hand piles)	139
Chipping of fuels	191
1970s	
Timber harvest	
Stand clearcut	2,473
Shelterwood preparatory cut	19
Shelterwood establishment cut (with or without leave trees)	201
Seed tree preparatory cut	22
Shelterwood removal cut	155
Liberation cut	1,067
Salvage cut (intermediate treatment, not regeneration)	7,309
Silviculture	
Slashing (pre-site preparation for planting)	147
Site preparation for planting (burning)	1,676
Site preparation for planting (mechanical)	551

Decade and Activities/Events	Acres
Site preparation for natural regeneration (broadcast burning)	706
Site preparation for natural regeneration (chemical)	158
Site preparation for natural regeneration (mechanical)	331
Tree release and weed	42
Precommercial thin	584
Tree planting	3,162
Fill-in or replant trees	892
Fire	
Broadcast burning of activity fuels	2,363
Rearrangement of activity fuels	512
Piling of fuels (hand or machine)	3,360
Burning of piled material (dozer and hand piles)	685
Chipping of fuels	21
Wildfire (human ignition)	14
Natural changes (excludes fire)	14
1980s	
Timber harvest	
Stand clearcut	2,195
Shelterwood preparatory cut	17
Shelterwood establishment cut (with or without leave trees)	193
Seed tree seed cut (with and without leave trees)	119
Shelterwood removal cut	69
Shelterwood staged removal cut	28
Liberation cut	765
Salvage cut (intermediate treatment, not regeneration)	3,150
Silviculture	
Slashing (pre-site preparation for planting)	61
Site preparation for planting (burning)	1,400
Site preparation for planting (mechanical)	711
Site preparation for natural regeneration (broadcast burning)	30
Site preparation for natural regeneration (mechanical)	293
Tree planting	1,958
Fill-in or replant trees	960
Tree release and weed	413
Precommercial thin	1,031
Prune	280
Seed production area establishment	15
Other tree improvement area	22
Fire	
Broadcast burning of activity fuels	1,477
Rearrangement of activity fuels	189
Piling of fuels (hand or machine)	962
Burning of piled material (landings, machine piles, and hand piles)	1,213
Fuel break construction	12
Natural abatement of activity fuels	387
Wildfire (natural fuels benefit)	4
Wildfire (human ignition)	13
1990s	
Timber harvest	
Stand clearcut	946
Seed tree seed cut (with and without leave trees)	41
Group selection cut	81
Liberation cut	29
Salvage cut (intermediate treatment, not regeneration)	243
Silviculture	
Slashing (pre-site preparation for planting)	12
Site preparation for planting (burning)	987
Site preparation for planting (mechanical)	142
Site preparation for natural regeneration (burning)	20

Decade and Activities/Events	Acres
Seed (trees)	7
Tree planting	1,532
Fill-in or replant trees	1,109
Tree release and weed	136
Precommercial thin	1,365
Prune	1,664
Control of understory vegetation	8
Fire	
Broadcast burning of activity fuels	977
Underburning of activity fuels	13
Piling of fuels (hand or machine)	184
Burning of piled material (landings, machine piles, and hand piles)	198
Compacting/crushing of fuels	5
Miscellaneous treatment of natural fuels	156
Wildfire (activity fuels benefit)	7
Wildfire (human ignition)	19
Other – Inland Fisheries Habitat Improvement activities	33
2000s	
Timber harvest	
Group selection cut	47
Commercial thin	66
Silviculture	
Slashing (pre-site preparation for planting)	71
Site preparation for planting (burning)	124
Tree planting	164
Fill-in or replant trees	356
Tree release and weed	263
Precommercial thin	837
Prune	1,066
Other stand tending	38
Fire	
Broadcast burning of activity fuels	8
Underburn activity fuels	116
Underburn for wildlife habitat	20
Piling of fuels (hand or machine)	107
Burning of piled material (landings, machine piles, and hand piles)	43
Chipping of fuels	2
Wildfire (fuels benefit)	1
Wildfire (natural ignition)	8
Wildlife habitat prescribed fire	60
2010 to present	
Silviculture	
Tree planting	6
Fill-in or replant trees	5
Precommercial thin	211
Prune	397
Fire	
Burning of piled material (machine piles)	66
Wildfire (natural ignition)	14,283

Post-fire Actions

During fire suppression, the majority of ground-disturbing suppression effort focused on using existing road prisms; a few fire lines were constructed using heavy equipment and hand crews. Danger trees felled during fire suppression and fire line construction were decked along roads; five of these log decks were sold in the fall of 2015, totaling approximately a half of a million board feet.

When no longer needed for fire suppression, all fire lines were deconstructed by scarifying compacted soil, scattering brush and timber over disturbed soil, and seeding. Monitoring of the fire showed some erosion of the forest floor in small isolated areas of high severity fire, and little erosion of road surfaces. All roads used during suppression efforts received or will receive maintenance to return the road to pre-fire condition. Maintenance included blading, brushing and, where needed, establishing or re-establishing drainage features to reduce risk of road surface erosion. These actions, combined with a heavy post-burn needle cast, reduced the risk of erosion.

An evaluation of values at risk, considering imminent threats to human life and property did not warrant a Burned Area Emergency Response funding request and the agency continued to monitor those risks.

Given the short window of opportunity for treatments in 2015, as the fires burned late into the year and a season ending event shut down all operations, only a portion of the treatments needed to address danger trees and road work was accomplished through these post-fire activities.

Ongoing/Reasonably Foreseeable Activities

In addition to past activities, the analysis of cumulative effects includes effects of activities that are currently ongoing or have a reasonable probability of occurring in the area (that is, the proposed location, time frame, and scope have at least been tentatively identified). The following activities are ongoing and/or reasonably foreseeable; this list does not include any activities proposed under the Grizzly Fire Salvage and Restoration proposal. Effects of these activities have been considered and are discussed as appropriate by resource in this assessment.

Ongoing/Reasonably Foreseeable Vegetation Management

Vegetation management activities are reasonably foreseeable to occur on National Forest System lands under the Potter's Wheel project area, which overlaps the portion of the Grassy Fire that occurs on the western side of Forest Road 265 and the ridgeline immediately above Road 265, including a portion of Trail 32 (PF Doc. PD-003), within the headwaters of Little Elk Creek. Currently there is no formal proposed action for the Potter's Wheel project, therefore a quantitative or detailed qualitative analysis of cumulative effects is not possible. Further development of the Potter's Wheel proposal would take into consideration treatments approved for implementation under this salvage project (if any).

In addition, some reforestation activities are likely to occur within the foreseeable future, as are precommercial thinning activities. It is possible that the owners of the Ferguson Ranch, a 116-acre private inholding within the area burned by the Lower Flat fire, may elect to salvage fire-killed timber on their property. In order to consider the maximum potential effects, the cumulative effects analyses assumed that the salvage on private lands would occur.

Other Ongoing/Reasonably Foreseeable Activities

Road maintenance activities, such as brushing, blading, graveling, reshaping, installing rolling dips, etc., are expected to occur on roads as needed and as funding is available. All maintenance will be appropriate with the current maintenance level designation of the affected road.

Wildfire response will occur across the project area as guided by the 2015 Forest Plan and individual assessment of each wildfire.

Recreation activities will continue in the area, including such activities as dispersed camping, hunting, hiking, use of motorized vehicles, snowmobiling, hunting, mountain biking, fishing, and berry picking.

Christmas tree cutting (removal of small understory trees less than 12 inches diameter) for personal use will still continue.

Fuelwood gathering will continue to occur along roads in the project area.

Motor vehicle use will occur on designated routes in the area. Implementation of the District Motor Vehicle Use Map (MVUM) will continue. Illegal motor vehicle use will be monitored and regulations enforced across the area.

Noxious weed treatment will continue to occur as necessary, consistent with the Coeur d'Alene Noxious Weeds EIS and Record of Decision.

Appendix C - Design Features and Specific Activities

Design Features

As described earlier in this EA (pages 29-30), the project interdisciplinary team developed design features to minimize or avoid adverse effects which could occur as a result of implementing proposed activities under the Grizzly Fire Salvage and Restoration Project. The design features are based on Forest Plan direction and policy, best available science, site-specific evaluations, and public concerns; and would be applied to both action alternatives (except where specifically stated) during project implementation.

Project implementation includes the physical on-the-ground design of the project completed by layout crews; timber sale contract administration; and reforestation activities such as site preparation and planting. Design features are applied on the ground through physical design as instructed in silvicultural prescriptions, marking guides, and cruise plans. Some features address conditions found on-the-ground during project activities, and are applied through the timber sale contract, which includes both standard and site-specific provisions.

All applicable BMPs would be applied to activities proposed in the Grizzly project area. Contract provisions that are requirements in timber sales are the mechanism by which BMPs are implemented during activities. Additionally, monitoring of BMPs occurs during and after harvest in order to ensure correct implementation and effectiveness.

The following table identifies each design feature and whether it would be implemented through contract provision, by the Forest Service, and/or other means. For example, there may be KV funding (through the Knutson-Vandenberg Act) that would cover costs of specific activities related to design features. Some design features would be implemented through specific unit prescriptions and/or marking guidelines.

Table C-1. Design feature descriptions and implementation information applicable to the project.

Design Feature Description	Implementation - Contract Provision or Forest Service (FS)
Fuels	
A post-harvest assessment of fuel conditions within harvest units would be made by a fuels specialist and/or silviculturist to determine if any additional fuel treatment is necessary to meet the objectives in the silvicultural prescription. Additional fuel treatments could include slashing of small trees and shrubs, piling, jackpot burning, leave tree protection, etc.	FS (Fire/Fuels)
Woody material yarded to landings would be evaluated for potential biomass use for fuels for schools programs and other similar efforts. Landing piles would be burned if no other feasible use is found.	FS (Fire/Fuels)
Vegetation	
Woody debris retention guidelines would be followed (FW-GDL-VEG-03; FW-GDL-VEG-06; USDA, 1994; PF Doc. VEG-R61, PF Doc. VEG-21).	Contract (C6.406# and/or C6.7)
White pine retention guidelines would be followed (USDA, 1994; PF Doc. VEG-R58).	FS (unit prescriptions) and Contract (C2.38# Species Designation)
All regeneration areas would be planted with site-adapted species/seed source.	KV Plan (KV Other)
Harvest unit layout would consider suitability limitations on a site-by-site basis on the ground. Harvest and site preparation treatments will consider the short and long-term potential negative effects (including blow down, fire mortality, etc.) of proposed activities on adjacent trees and stands with site-by-site prescription modifications, such as change in unit boundary, modification of prescribed burning prescriptions, etc.	FS (marking and prescriptions)
All vegetation management activities would have silvicultural prescriptions approved by a Certified Silviculturist prior to treatment.	FS (standard practice)
Where feasible, no slash pile would be created within 20 feet of any overstory leave trees, with an emphasis on keeping slash piles far away from white pine leave trees.	Contract (C6.7 Hazard Reduction and Site Preparation)
Gopher abatement may be required to ensure successful regeneration establishment in some portions of the proposed regeneration harvest units. Treatments are anticipated to be through use of poison grain; however, other treatments such as trapping may be used. Gopher abatement treatments would consist of an initial treatment and up to two follow up treatments. Pocket gopher control would only be utilized if pre-planting inspection or first, third- or fifth- year regeneration surveys indicate that gopher related herbivory has caused a need. It is anticipated that pocket gopher control would be needed on less than 10% of the acreage proposed for regeneration harvest.	KV Plan (KV Other)

Design Feature Description	Implementation - Contract Provision or Forest Service (FS)
Low application rates of pesticide would be applied. Under current application methods, pesticide is delivered in a highly targeted fashion by probing for gopher tunnels and delivering measured amounts of bait underground directly into pocket gopher tunnels in order to reduce and/or eliminate effects to non-target species. Application of pesticides would be completed after snowmelt and runoff are completed between mid-spring and early summer. There would be no above ground, broadcast applications of pesticide for the purpose of gopher abatement. White pine and western larch appear to be the species most affected by pocket gopher activity and controlling gopher activity when and where necessary would mitigate the potential that seedlings would need to be replanted and would facilitate successful restoration of these species.	KV Plan (KV Other)
TES Plants	
Botanical field surveys would be completed in all planned activity areas within suitable TES plant habitat.	FS (surveys have been completed)
TES plant occurrences in activity areas would have protection measures designed and implemented by the project Botanist to ensure that activities do not contribute to the decline of the species or the need for federal listing. One or more of the following protective measures would be implemented: 1) drop the proposed unit from activity; 2) modify the proposed unit or activity, 3) implement appropriately designed buffers, and/or 4) implement Timber Sale Contract provisions for Protection of Threatened and Endangered Species, and Settlement for Environmental Cancellation.	Contract (B6.24 Protection Measures Needed for Plants, Animals, Cultural Resources, and Cave Resources)
Invasive Species (Noxious Weeds)	
To help reduce the spread of noxious weeds and prevent the introduction of new invader species, a contract provision for equipment washing would be used in all construction and timber sale contracts.	Contract (C6.351# Washing Equipment)
A contract provision for herbicide spraying of existing weeds on roads used during the timber sale prior to log hauling would be used in the timber sale contract. Post haul spraying on roads used during the timber sale will be completed by the USFS as necessary.	Contract (C6.27# Noxious Weed Treatment) and FS (post-haul road spraying)
Measures to protect TES plant population viability and habitat capability during noxious weed treatment would be implemented following guidelines provided in the Noxious Weeds Final Environmental Impact Statement and Record of Decision (USDA Forest Service, 2000; PF Doc. CR-028 and CR-029).	Contract (C6.24# Site Specific Special Protection Measures)
Provisions in the contract would require soil disturbance to be mulched or seeded where deemed appropriate by the timber sale administrator and district botanist.	Contract (C6.601# Erosion Control Seeding)
All plant materials used in the project, including grass seed and mulch, would be certified noxious-weed free. Grass seed would be certified, blue-tagged seed.	Contract (C6.601# Erosion Control Seeding)
Native plant materials are required to be used in restoration projects (FSM 2070.3, Amendment 2008). Locally-obtained materials are preferred, but if unavailable or economically unfeasible, appropriate materials may be substituted that meet Region 1 guidelines (Northern Region Native Plant Handbook, 1995; PF Doc. TES-62).	FS (if needed)

Design Feature Description	Implementation - Contract Provision or Forest Service (FS)
Soils	
Coarse woody debris would be retained in accordance with Forest Plan Guideline FW-GDL-VEG-03 (FW-GDL-SOIL-02). Where soil burn severity is moderate to high, leave coarse woody debris at high end of recommended range for the site where possible. (7-17 tons/acre for dry sites and 17-33 tons/acre for moist sites	Contract (C6.406# Site Condition)
Fines (material less than three inches in diameter) would be left on site (FW-GDL-SOIL-03). When combined with required coarse woody debris retention, the units should have a minimum of 60 to 70 percent ground cover where feasible. Amounts of coarse woody debris and fines on trails and landings should be higher. Exceptions to this would be places that do not currently contain enough material to attain 60 to 70 percent ground cover.	Contract (C6.4# Conduct of Logging); all units would be whole-tree yarded
All units would be evaluated prior to implementation to determine detrimental soil disturbance levels. Appropriate design features would be implemented in order to ensure units are at or below 15% detrimental soil disturbance per Forest Plan and Regional Standards. Such actions could include scarifying/decompacting soils and placement of slash, woody material and/or duff over exposed soil. Equipment would remain on designated skid trails; if the equipment leaves the skid trail, the additional soil disturbance would be rehabilitated if 15% detrimental soil disturbance standard has been exceeded.	Contract (C6.4# Conduct of Logging) and FS (monitor soil disturbance)
Soil disturbance monitoring would occur in up to ten percent of the salvage units in order to assure Forest Plan and Regional Standards are met. Units would be identified after analysis and field verification is completed.	FS (monitor soil disturbance)
Ground-based equipment would only operate on slopes less than 40 percent (FW-GDL-SOIL-01). Where slopes within an activity area contain short pitches greater than 40 percent, but less than 150 feet in length, ground-based equipment may be allowed, as designated by the timber sale administrator.	FS (unit layout, timber sale administrator notes)
All ground based operation activities in harvest units would occur when the soil profile is dry (top 2 to 4 inches) to reduce the effects from compaction. In general, these conditions occur during summer and into fall prior to fire season ending rains. The exception to this is winter harvest operations which are covered below.	Contract (B6.6 Erosion Prevention and Control)
Pivoting of machinery should be avoided in order to prevent soil displacement.	FS (timber sale administrator notes)
No yarding across designated riparian habitat conservation areas would occur with this project, unless full suspension of logging can be achieved.	FS (achieved through layout; RHCA's were avoided/buffered)
The leading end of logs would be suspended during cable yarding.	Contract (C6.4# Conduct of Logging)
All skid trails would be designated and laid out to take advantage of topography and minimize disruption of natural drainage patterns. Where terrain is conducive, trails would be spaced at least 100 feet or more apart. Mechanized felling and skidding would allow skid patterns to be closer, provided slash mats are used. Reuse existing skid trails where possible.	Contract (C6.4# Conduct of Logging)

Design Feature Description	Implementation - Contract Provision or Forest Service (FS)
Post-harvest, ground disturbance associated with skid trails would be covered with randomly placed logs (on the contour) where possible and may be seeded with the latest seed mix recommended at time of implementation to help increase the micro topography needed to reduce runoff.	Contract (B6.6 Erosion Prevention and Control, C6.601# Erosion Control Seeding and C6.632# Temporary Road and Tractor Road Obliteration)
If skid trails are to be decompacted or scarified following ground based harvest and fuel reduction activities in order to reduce compaction and potential for erosion. An excavator should be utilized in order to reduce impacts. Decompaction activities should go no deeper than 14 inches and should avoid mixing the soil layers or disrupting their orientation. These activities would be conducted when the soil is dry. In general, operations during the dry period typically occur July 1 to October 15, but may vary by year, depending on local weather conditions. As much slash as possible should be left on the skid trails following decompaction. The timber sale administrator, in conjunction with a Forest Service soil scientist would determine those areas that need to be decompacted.	Contract (C6.633# Temporary Road Skid Trail/Skid Road and Landing Scarification)
Placement of landings and skid trails should avoid, where possible, high severity burn areas within units.	FS (timber sale administrator notes)
All landings other than skyline landings adjacent to existing system roads utilized would be decompacted preferably with an excavator and covered with some residual slash (within guidelines provided by FW-GDL-VEG-03), and seeded upon completion of the sale.	Contract (C6.633# Temporary Road Skid Trail/Skid Road and Landing Scarification and Control, C6.601# Erosion Control Seeding)
All temporary roads would be rehabilitated (all new construction would be recontoured; existing prisms would be placed in a stable condition through recontouring and/or decompaction). Cut/fill slopes and crossings would be reshaped to natural contours. Available slash and large wood material (>3 inches) would be applied to the recontour surface (slash is considered “available” where the equipment can reach it from the working area where the rehabilitation is occurring).	Contract (C6.632# Temporary Road and Tractor Road Obliteration)
For any units harvested in the winter, equipment would operate on soil that is frozen to a minimum depth of four inches, or on 12 inches of settled snow and a slash mat. Snow may be removed, prior to operations, from trails to facilitate freezing into the soil profile.	Contract (C6.316# Limited Operating Period)
Cease operations under wet or thawing conditions. Harvesting during winter conditions requires extra vigilance in monitoring ground conditions in order to recognize the appropriate time to cease operations. Conditions can change rapidly throughout the day, especially in early and late winter.	FS (timber sale administrator notes) and Contract (B6.6 Erosion Prevention and Control)

Design Feature Description	Implementation - Contract Provision or Forest Service (FS)
Operations utilizing the winter harvest design features are still bound by contract provision timber sale contract provision, B6.6 Erosion Protection and Control.	Contract (B6.6 is a standard provision in all timber sale contracts)
Aquatics and Fisheries	
Inland Native Fish Strategy (INFS) buffers would be applied as described in the Forest Plan. Within the INFS riparian habitat conservation area (RHCA) buffers, there would be no commercial timber harvest, no new roads or lands, and no side-casting of material.	FS (unit layout) and Contract (B6.5 Streamcourse protection)
Trees felled within buffers would be left on site.	FS (timber sale administrator notes) and Contract (B6.4 Conduct of Logging)
No fuels or other toxicants would be stored within buffers; refueling of equipment would not occur within buffers.	Contract (B6.34 Sanitation and Servicing B6.341 Prevention of oil spills)
New stream crossing structures would be designed to meet 100-year flood criteria.	FS (road package)
Where appropriate and feasible, aquatic organism passage concepts would be included in stream crossing designs.	FS (road package)
No inchannel activities are proposed, however; if a need for instream work is identified notify the district fish biologist and utilize the following timing restrictions: In the spring spawning season, there would be no instream activities prior to July 15. In the fall spawning season, there would be no instream activities from September 1 through March 15. Dates can be modified when site-specific information on staging and spawning of native fishes supports the change in dates.	FS (road package and timber sale administrator notes)
Snags	
Vegetation management activities should generally retain snags greater than 20 inches DBH and at least the minimum number of snags and live trees (for future snags) that are displayed in Table 4 of the Forest Plan (FW-GDL-VEG-04; USDA 2015). Where snag numbers do not exist to meet the recommended ranges, the difference would be made up with live replacement trees. Exceptions occur for issues such as human safety and instances where the minimum numbers are not present prior to the management activities.	FS (project design and layout, prescriptions/ marking guides) and Contract (Species Des C2.38#)
Where vegetation management activities occur and snags (or live trees for future snags) are retained, the following direction should be followed (FW-GDL-VEG-05): Group snags where possible; retain snags far enough away from roads or other areas open to public access to reduce the potential for removal (generally more than 150 feet); emphasize retention of the largest snags and live trees as well as those species that tend to be the most persistent, such as ponderosa pine, larch, and cedar; and favor snags or live trees with existing cavities or evidence of use by woodpeckers or other wildlife.	FS (project design and layout, prescriptions/ marking guides) and Contract (Species Des C2.38#)

Design Feature Description	Implementation - Contract Provision or Forest Service (FS)
Wildlife	
Contract provisions for protection of Threatened, Endangered, Proposed, and Sensitive (TEPS) species, and settlement for environmental cancellation would be included under all alternatives. If TEPS species and/or significant habitat are discovered before or during project implementation, the sale administrator and the district wildlife biologist would be notified so that if needed, measures could be taken to avoid impacts and meet Forest Plan Standards. Measures could include altering or dropping proposed units, modifying the proposed activity, or implementing buffers. The estimated effectiveness for this design feature is high. Contract provisions for protection of TES habitats and locations are utilized in all contracts and have been effective in protecting these resources (USDA 2013).	FS (timber sale administrator notes) and Contract (B6.24 Protection Measures Needed for Plants, Animals, Cultural Resources and Cave Resources)
Archaeology	
Avoidance of cultural resources would require the retention of such properties in place and their protection from effects resulting from the proposed activities. Effects would be avoided by implementing the following specific actions: All cultural resource sites will be avoided with a buffer of 30 meters regardless of status of eligibility for listing on the National Register of Historic Places, unless the cultural resource site was previously recorded and determined not eligible with SHPO concurrence; temporary roads would be routed away from archaeological sites; road re-alignments would be routed to avoid archaeological sites; and archaeological sites and sensitive areas would be avoided during road closure and/or decommissioning.	FS (unit layout) and Contract (B6.24 Protection Measures Needed for Plants, Animals, Cultural Resources, and Cave Resources)
Where existing system roads are scheduled for maintenance only (not for reconstruction) and pass through archaeological sites, road work would be confined to the existing roadway and ditches.	FS (road package) and Contract (B6.24 Protection Measures Needed for Plants, Animals, Cultural Resources, and Cave Resources)
Although the cultural resources surveys completed for this project are designed to locate all archaeological sites that might be eligible for the National Register, such sites may go undetected for a variety of reasons. Pursuant to the provisions found in 36 CFR 800.13, should any previously unrecorded cultural resources be discovered during project implementation, activities that may be affecting that resource would be halted immediately; the resource would be evaluated by a professional archaeologist; and consultation would be initiated with the State Historic Preservation Officer (SHPO), as well as with the Advisory Council on Historic Preservation, if required, to determine appropriate actions for protecting the resource and for mitigating any adverse effects on the resource. Project activities would not be resumed until the resource is adequately protected and until agreed-upon mitigation measures are implemented with SHPO approval.	Contract (B6.24 Protection Measures Needed for Plants, Animals, Cultural Resources, and Cave Resources)
Recreation	
The public would be notified through the media and communication with user groups of any temporary closures of trails or roads resulting from road reconstruction, harvest operations, and other proposed activities. ROW, outfitter/guide permit holder in the salvage area, would be notified in advance of operations affecting use of roads and trails.	FS (press release, timber sale administrator notes)

Design Feature Description	Implementation - Contract Provision or Forest Service (FS)
To protect public safety, the upper trailhead and top 0.3 mile of Trail 32, and Trails 807 and 807A would be temporarily closed during road reconstruction, harvest operations, and log hauling on, across, or alongside the trails.	FS (closure order/press release, timber sale administrator notes)
During project activities alongside or across MVUM roads open to public travel, public safety would be protected by use of signing and traffic control as necessary. The purchaser would be responsible for all signing and flaggers, or other means of traffic control. Signs would be posted on active haul routes to alert travelers to log truck traffic within and outside the project area. During hauling on portions of Roads 260, 400, 513, 959, 6923 and 6924, the purchaser may need to use flaggers to prevent hazards of log trucks meeting recreation vehicles on rough, narrow roads with few turnouts. All traffic control signs would adhere to standards set forth in the current edition of the Manual on Uniform Traffic Control Devices.	Contract (B6.33 Safety Attachment)
Project activities on or alongside open roads and trails would be conducted with minimal disruption to recreation access and all log haul would be prohibited on weekends and holidays. Unrestricted open roads would be kept open during project activities with limited delays. Signs notifying forest visitors of possible delays due to harvest activities along open roads would be placed at junctions providing alternate routes to avoid traffic disruptions.	FS (recreation signing, timber sale administrator notes) and Contract (C5.12# Use of Roads by Purchaser)
Whenever possible, buffers, or retention areas would be created along recreation corridors to provide some shading, screening, and physical distance to lessen the short- to mid-term impacts of proposed activities on recreation use and quality.	FS (project design and layout)
Designated trails within the project area would be identified as protected improvements and be returned to a condition meeting trail management objectives to the extent possible. Once harvest and subsequent activities are completed, Trail 32 would be rebuilt to foot trail specifications and Trails 807 and 807A would be rebuilt to pre-haul conditions. Trail infrastructure such as trail-friendly barriers, signs and markers, and drainage features would be replaced, repaired, or constructed as necessary.	Contract (B6.22 Protection of Improvements and Road Package)
All danger tree removal activities along designated trail corridors (outside individual harvest units) would follow Region 1 specifications and guidelines for Level 1 maintenance for usability and user safety according to trail management objectives. Trees would be felled away from the trail and selected for harvest according to height and width clearing limits for recreation trail corridors.	FS and/or service contracts (only applies to non-merchantable tree felling)
To reduce long-term adverse effects to non-motorized Trail 32 where it occurs within or adjacent to a harvest unit, trees would be directionally felled away from the trail and whole tree yarded. Stumps would be cut as low to the ground as practicable for a distance of 25 feet from the trail. Non-merchantable trees felled alongside the trail for safety and not removed, would be cut directionally away from the trail and an effort made to arrange them to create an appearance of naturally-occurring downfall. Unless posing a safety hazard, cut only those trees capable of reaching the trail corridor if they fall. Where present, retain pockets of understory vegetation and scattered groups of sound trees alongside the trail to lessen impacts to the semi-primitive trail character. Where possible, leave groups of snags outside the reach of the trail corridor. Chip, burn, or otherwise dispose of landing piles within view of the trail. When project activities are complete, re-establish the trail corridor and return the trail tread to a 24-inch width. Seed the trail shoulders with a certified weed-free native seed mixture including grasses, forbs, and wildflowers.	FS (unit layout)

Design Feature Description	Implementation - Contract Provision or Forest Service (FS)
To reduce long-term adverse effects to motorized Trails 807 and 807A, minimize brush clearing from road shoulders where road maintenance/reconstruction occurs on the trail corridor to open it for proposed activities. Where danger trees are felled and not removed, fall them directionally away from the trail, keeping the trail corridor clear. Where possible, retain pockets of vegetation along the trail (for a distance of 25-50 feet on either side of the trail) to provide visual screening and to buffer dust and noise. Where danger tree removal outside of harvest units occurs alongside the trails, remove only trees capable of reaching the trail corridor if they fall. At the conclusion of activities, motorized Trails 807 and 807A would have rolling dips installed where necessary and ATV-friendly barriers constructed at the trailheads. Seed the trail shoulders with a certified weed-free native seed mixture including grasses, forbs, and wildflowers.	FS (unit layout, road package)
To avoid adverse effects to groomed snowmobile trails, project activities would be prohibited between December 15 and March 31, unless otherwise agreed.	Contract (C6.316# Limited Operating Period)
Danger trees felled and not removed in riparian areas along the lower stretch of Road 400 would be bucked and limbed as necessary so they do not block access to established dispersed sites along Flat Creek.	FS (Fire/Fuels and/or Recreation)
Visuals	
To the extent possible, avoid long, straight edges along unit boundaries. Strive for curvilinear edges and gradual changes in tree heights along the edges of openings. This can be accomplished by leaving irregularly sized and spaced individual or groups of trees scattered along the edge, or by using a variable density cutting technique (feathering) to create a more natural edge that blends into adjacent vegetative cover. Where a unit interfaces with an opening, harvest could be progressively increased toward the outside edge of the unit. Where a unit interfaces with denser forest, harvest could be decreased toward the outside edge. This transition zone should not be uniform in size and should vary in width. Techniques to reduce adverse visual effects are most important in the Grassy Mountain units and Lower Flat units viewed from Road 208, the North Fork Coeur d'Alene River, Trail 81, and Little Guard Lookout. Grassy Mountain and Lower Flat units (except LF unit 23) all occur within sensitive viewsheds and should have some softening of the vertical linear edges where feasible. Most critical are Lower Flat units 6, 7, 22, and 25-28.	FS (project design and layout)
Where possible, soften hard edges of skyline corridors by harvesting edge trees in an irregular pattern that creates variability in both height and spacing of residuals.	FS (project design and layout)
Treatment boundaries should extend up and over ridgelines to avoid a row of remnant trees along ridgelines that draw attention to management activities and are inconsistent with patterns created by fire or other natural disturbances. This is especially important along ridgelines silhouetted against the sky.	FS (project design and layout)
Strive to retain vertical structure and irregularly arranged groups of reserve trees to emulate natural retention patterns, particularly in units viewed as foreground and middle ground, or for an extended viewing period. This design feature is most importantly applied to the Grassy Mountain units and Lower Flat units 6A/B, 7, 22, 25A/B, 26, 27, and 28.	FS (project design and layout)

Design Feature Description	Implementation - Contract Provision or Forest Service (FS)
Where harvest units and danger tree removal areas are adjacent to heavily used motorized recreation corridors, retain vegetation within a 25-50 foot buffer, where feasible, to screen harvest activity from the recreating public. This would apply to portions of the following recreation corridors that occur within the fire perimeter: Roads 208, 260, and 265, and motorized trails 807, and 807A.	FS (project design and layout)
Residual slash concentrations, root wads, and other debris would be kept to a minimum for a distance of 25 feet from roads 208, 260 (within the Grassy Mountain area) and 265, except where the terrain drops off sharply below the road. Within these areas maximum stump height should be 12 inches or less.	Contract (C6.7 Hazard Reduction and Site Preparation; B6.412 Stump Heights)
Where feasible, retain screening trees one tree-height below new temporary roads and landings (including cable landings) when viewed from below. Avoid creating a straight edge of trees by saving clumps of trees and single trees with varied spacing. Screening would reduce visual effects of temporary roads T02, T03, T07, T08, T10, T11, and T16	FS (project design and layout) and Contract (B5.1 Authorization)
Where possible, landings in units alongside roads 260 and 265 should be placed on secondary haul routes rather than next to the primary recreation corridor.	FS (timber sale administrator notes) and Contract (B6.422 Landings and Skid Trails)
Keep landings 50-100 feet away from Trail 32.	FS (timber sale administrator notes) and Contract (B6.422 Landings and Skid Trails)
Where new access roads and skid trails meet a primary travel route, they should (where feasible) intersect at a right angle and curve after the junction to minimize the length of route seen from the primary travel route.	FS (timber sale administrator notes) and Contract (B6.422 Landings and Skid Trails)

Specific Activity Information

The following tables provide specific unit information under the action alternatives.

Roadside danger tree removal would occur as needed along specified routes as described in "Alternative Descriptions."

No salvage is proposed under Alternative 1; therefore there is no information provided here regarding that alternative. All vegetation treatments would be regeneration salvage harvests; the logging system would vary based on site-specific conditions, as indicated. Units are identified by the area in which they are located (Grassy, North Grizzly, or Lower Flat).

Please refer to the "Alternative Descriptions" section for more information.

Table C-2. Alternative 2 unit information.

Unit ID	Area	Acres	Logging System
G01A	Grassy Salvage	78	Ground Based
G01B	Grassy Salvage	5	Skyline
G02	Grassy Salvage	13	Ground Based
G03A	Grassy Salvage	6	Ground Based
G03A	Grassy Salvage	22	Ground Based
G03B	Grassy Salvage	129	Skyline
G03B	Grassy Salvage	11	Skyline
G04	Grassy Salvage	41	Skyline
LF01	Lower Flat Salvage	46	Skyline
LF03	Lower Flat Salvage	18	Skyline
LF04	Lower Flat Salvage	40	Skyline
LF05	Lower Flat Salvage	39	Skyline
LF06A	Lower Flat Salvage	127	Ground Based
LF06B	Lower Flat Salvage	64	Skyline
LF07	Lower Flat Salvage	89	Ground Based
LF08	Lower Flat Salvage	71	Ground Based w/Escaliner
LF09	Lower Flat Salvage	11	Ground Based
LF10	Lower Flat Salvage	53	Skyline
LF11	Lower Flat Salvage	19	Skyline
LF12	Lower Flat Salvage	26	Skyline
LF13	Lower Flat Salvage	14	Skyline
LF14A	Lower Flat Salvage	26	Ground Based
LF14B	Lower Flat Salvage	18	Skyline
LF16	Lower Flat Salvage	22	Skyline
LF17	Lower Flat Salvage	23	Skyline
LF18	Lower Flat Salvage	12	Skyline
LF22	Lower Flat Salvage	15	Skyline
LF23A	Lower Flat Salvage	9	Skyline

Unit ID	Area	Acres	Logging System
LF23B	Lower Flat Salvage	53	Skyline
LF24	Lower Flat Salvage	37	Skyline
LF25A	Lower Flat Salvage	6	Skyline
LF25B	Lower Flat Salvage	25	Skyline
LF26	Lower Flat Salvage	27	Ground Based
LF27	Lower Flat Salvage	13	Ground Based
LF28	Lower Flat Salvage	11	Ground Based
NG01	North Grizzly Salvage	8	Ground Based
NG02A	North Grizzly Salvage	10	Skyline
NG02B	North Grizzly Salvage	9	Ground Based
NG03	North Grizzly Salvage	11	Skyline
NG04	North Grizzly Salvage	40	Skyline
NG05	North Grizzly Salvage	63	Skyline
NG06	North Grizzly Salvage	36	Ground Based
NG07	North Grizzly Salvage	22	Skyline
NG08	North Grizzly Salvage	3	Skyline
NG09A	North Grizzly Salvage	11	Skyline
NG09B	North Grizzly Salvage	6	Skyline
NG10	North Grizzly Salvage	9	Skyline
NG11	North Grizzly Salvage	6	Skyline
NG12A	North Grizzly Salvage	9	Escaliner
NG12B	North Grizzly Salvage	18	Ground Based
NG13A	North Grizzly Salvage	4	Skyline
NG13B	North Grizzly Salvage	85	Skyline
NG14	North Grizzly Salvage	44	Skyline
NG16	North Grizzly Salvage	37	Ground Based
NG17	North Grizzly Salvage	6	Skyline
NG18	North Grizzly Salvage	4	Skyline
NG19A	North Grizzly Salvage	25	Ground Based
NG19B	North Grizzly Salvage	16	Skyline
	Total acres	1,700	

Table C-3. Alternative 3 unit information.

Unit ID	Area	Acres	Logging System
G01A	Grassy Salvage	41	Ground Based
G02	Grassy Salvage	13	Ground Based
G03A	Grassy Salvage	6	Ground Based
G03A	Grassy Salvage	20	Ground Based
G03B	Grassy Salvage	85	Skyline
G03B	Grassy Salvage	11	Skyline
G04	Grassy Salvage	5	Skyline
LF05	Lower Flat Salvage	34	Skyline
LF06A	Lower Flat Salvage	75	Ground Based
LF06B	Lower Flat Salvage	31	Skyline
LF06B	Lower Flat Salvage	11	Skyline
LF07	Lower Flat Salvage	59	Ground Based
LF13	Lower Flat Salvage	13	Skyline
LF18	Lower Flat Salvage	12	Skyline
LF22	Lower Flat Salvage	15	Escaliner
LF23A	Lower Flat Salvage	9	Ground Based
LF23B	Lower Flat Salvage	53	Skyline
LF26	Lower Flat Salvage	27	Ground Based
LF27	Lower Flat Salvage	13	Ground Based
LF28	Lower Flat Salvage	11	Ground Based
NG01	North Grizzly Salvage	8	Ground Based
NG02B	North Grizzly Salvage	9	Ground Based
NG03	North Grizzly Salvage	11	Skyline
NG04	North Grizzly Salvage	40	Skyline
NG05	North Grizzly Salvage	63	Skyline
NG06	North Grizzly Salvage	36	Ground Based
NG07	North Grizzly Salvage	22	Skyline
NG08	North Grizzly Salvage	3	Skyline
NG09A	North Grizzly Salvage	11	Skyline
NG09B	North Grizzly Salvage	6	Skyline
NG10	North Grizzly Salvage	9	Skyline
NG11	North Grizzly Salvage	6	Skyline
NG12A	North Grizzly Salvage	9	Escaliner
NG12B	North Grizzly Salvage	18	Ground Based
NG16	North Grizzly Salvage	24	Ground Based
NG18	North Grizzly Salvage	4	Skyline
NG19A	North Grizzly Salvage	25	Ground Based
NG19B	North Grizzly Salvage	16	Skyline
	Total acres	865	

Appendix D - Consistency with Legal Requirements

Introduction

The proposed activities were designed to be consistent with applicable federal, state and local laws that protect the environment, including the 2015 IPNF Land Management Plan. The analyses of effects confirms that activity design, implementation and effects would be consistent with all legal requirements under the alternatives, described in the specialists' reports as and documented in the project files as noted.

Federal Pollution Control Act (Clean Water Act) and Idaho State Water Quality Standards

The Clean Water Act (CWA) directs Federal agencies (e.g. the Forest Service) to meet federal, state, interstate and local substantive as well as procedural requirements respecting control and abatement of pollution in the same manner and to the same extent as any nongovernmental entity. The Idaho Department of Environmental Quality (IDEQ) is delegated authority for control of water pollution under the CWA and administers that authority through the Idaho Environmental Protection and Health Act (Title 39, Ch. 1, Idaho Code), the Idaho Water Quality Act (Title 39, Ch. 36, Idaho Code), and water quality standards under the authority of the Idaho Administrative Procedures Act (Hydro-R018, IDAPA 58.01.02).

Sections 208 and 319 of the CWA recognized the need for control strategies for nonpoint source pollution. DEQ is the lead agency for implementation of its Idaho Nonpoint Source Management Plan under the authority of Section 319 of the CWA, and Idaho Department of Lands has the authority to administer the Idaho Forest Practices Act (Title 38, Chapter 13, Idaho Code) and the responsibility to ensure compliance with best management practices (BMPs) to control nonpoint sources of pollutants. Rules pertaining to the Idaho Forest Practices Act and application of BMPs are found at IDAPA 20.02.01. BMPs are practices, techniques, or measures that are determined to be a cost effective and practicable means of preventing or reducing pollutants generated from nonpoint sources to a level compatible with water quality goals (Idaho Code 39-3602.(3)).

The Forest Service has the statutory authority to regulate, permit, and enforce land use activities on its lands that affect water quality and is responsible for implementing nonpoint source pollution controls and meet Idaho Water Quality Standards. To comply with State Water Quality Standards, the Forest Service is required to apply water quality practices in State Forest Practices Regulations, where applicable, reasonable land, soil, and water conservation practices, or specialized BMPs. These practices are designed with consideration of geology, land type, soil type, erosion hazard, climate, cumulative effects, and other factors in order to fully protect and maintain soil, water, and water-related beneficial uses, and to prevent or reduce nonpoint source pollution. To provide environmental protection and improvement emphasis for water and soil resources and water-related beneficial uses, the National Nonpoint Source Policy (EPA 1984), the Forest Service Nonpoint Water Quality Strategy (USFS 1985), and the USDA nonpoint source water conservation practices were recognized as the primary control mechanisms for nonpoint sources of pollution on National Forest System lands. This perspective is supported by the EPA in their guidance Nonpoint Source Controls and Water Quality Standards (EPA 1987). The Idaho Panhandle National Forest utilizes direction in the Region 1/Region 4 Soil and Water Conservation Handbook (Forest Service Manual 2509.22; Hydro-R019) to apply its nonpoint

source strategy and BMPs for ground disturbing activities. Following these BMPs would meet the water quality protection elements of the Idaho Forest Practices Act.

Title IV of the CWA also directs entities to obtain the appropriate permits for activities which may result in any discharge of pollutants into navigable waters. Further direction is described at 40 CFR 1502.25(b), where "the draft environmental impact statement shall list all Federal permits, licenses, and other entitlements which must be obtained in implementing the proposal. If it is uncertain whether a Federal permit, license, or other entitlement is necessary, the draft environmental impact statement shall so indicate."

The Grizzly Fire Salvage and Restoration Project is meeting the Clean Water Act and Idaho State water quality standards by utilizing applicable BMP's and adhering to the relevant TMDLs by maintaining or reducing sediment delivery to project area streams and by maintaining or increasing riparian shading.

Executive Order 11988 (Protection of Floodplains)

This executive order directs federal agencies to take action on Federal lands to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains. Agencies are required to avoid the direct or indirect support of development on floodplains whenever there are reasonable alternatives, and to evaluate the potential effects of any proposed action on floodplains.

This project meets EO 11988 because no actions would occupy or adversely modify floodplains.

Executive Order 11990 (Protection of Wetlands)

This executive order directs federal agencies to provide leadership and shall take no action to minimize the destructions, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.

This project meets EO 11990 because no actions would occupy or adversely modify wetlands.

Endangered Species Act

Section 7 of the Endangered Species Act (ESA) requires Federal agencies to consult with the U.S. Fish and Wildlife Service to ensure that any action authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of listed species or destroy or adversely modify their critical habitat.

This project meets the ESA because no listed plant, fish or wildlife species or their habitat is present within the project area. Biological Assessments have been conducted and concluded there would be "No Effect" to ESA species and their habitat due to the larger effects of the wildfires, the location and design of activities, and the application of best management practices (BMPs).

Executive Order 12898(Environmental Justice)

This executive order orders federal agencies to identify and address the issue of environmental justice; i.e. adverse human health and environmental effects that disproportionally impact minority or low-income populations.

Based on the composition of the affected communities and the cultural economic factors, this project would have no adverse effects to human health and environmental effects of minority, low-income, or any other segments of the population.

Executive Order 13112 (Invasive Species)

Executive Order 13112 of February 3, 1999 was enacted to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause.

The alternatives align with this executive order both by identifying the existing condition of invasive species in the project area and assessing the risks and effects of invasive plant introduction (PF Doc. PD-007). Design features have been incorporated into my decision to help prevent invasive species introduction and control species where feasible (see Appendix C).

2005 Travel Rule

This project meets all requirements of the various components included in the 2005 Travel Rule (36 CFR 212, 251 and 261) because no changes are being proposed to the District's previous travel management decision.

National Forest Management Act

The National Forest Management Act (NFMA) requires that all projects must be consistent with the governing Forest Plan (16 USC 1604[i]). The alternatives are consistent with applicable standards and guidelines of the Forest Plan and would trend toward the desired conditions that would allow attainment of Forest Plan goals as described later in this appendix. In addition, the alternatives are consistent with other specific applicable NFMA requirements (requirements not applicable to this project are not addressed):

<u>Maintaining diversity (16 USC 1604[g][3][B])</u>: The alternatives are designed to be implemented to have no significant impact to any species, and would maintain the diversity of populations or species of fish (Botany, Fisheries and Wildlife Reports).

<u>Soil, slope or other watershed conditions (16 USC 1604[g][3][E][i] and protection for streams and other bodies of water (16 USC 1604[g][3][E][iii])</u>: The design of activities under the action alternatives include features designed specifically to protect water, soils, and fisheries (Appendix C), including use of best management practices and other criteria for road reconstruction and maintenance. There would be no irreversible damage to soil, slope, or other watershed conditions. Danger trees within RHCAs along transportation routes would be felled and left on site to ensure trending toward future woody debris requirements. All appropriate BMPs would be used to protect soil, slope and watershed conditions (Hydrology and Soils Reports).

<u>Restocking and vegetation manipulation (16 USC 1604[g][3][E][ii])</u>: Technology and professional knowledge does exist to ensure that lands are adequately restocked within five years after final harvest. Site-specific silvicultural prescriptions use locally-adapted methods that have proven to regenerate trees within five years. All harvest units are in areas capable of regeneration success and timber production based on an on-the-ground, site-by-site assessment as part of the diagnosis process. Effects on residual trees and adjacent stands have been considered (Forest Vegetation section and Forest Vegetation Report.

Economic factors (16 USC 1604[g][3][E][iv]): Economic factors of the Grizzly Fire Salvage and Restoration Project were considered, and the action alternatives would have economic value associated with timber volume (Alternative Descriptions). The level of timber harvest is important not only in providing jobs in the timber industry, but also through indirect and induced impacts on other business sectors as well. The action alternatives may bring the local economy some increased relative stability during the life of the project, and contribute to the gross receipts to the counties. However, selection of an alternative for implementation will be based not only for the economic benefits, but also because of the progress that would be made in ecosystem restoration and increasing forest resiliency.

Clearcutting and even-aged management (16 USC 1604[g][3][F]): All treatments are silviculturally appropriate and are within the timber and vegetation practices outlined in the Forest Plan; all proposed salvage would be regeneration harvests, with trees retained in all units. Although the minimum number of snags and snag recruitment trees specified for retention varies according to a number of different factors (see Table 4 associated with FW-GDL-VEG-04, p. 20 of the Forest Plan), a minimum of five to seven snags per acre and one to six live trees per acre (where live trees are available) for snag recruitment would be left in most of the salvage units. In units with more live trees per acre, those trees would also be left if it is determined that they are not likely to succumb to secondary agents. Forest Service policy directs land managers to normally limit the size of areas treated by even-aged silvicultural methods to 40 acres or less. In regard to the Grizzly Fire Salvage and Restoration Project, openings are not limited to 40 acres because all of the salvage harvesting is proposed in response to a large wildfire event. The proposed salvage units would occur in a landscape already opened up by the wildfires; analysis indicates the change in crown cover caused by the proposed salvage would not be discernable over the background (current) condition.

Temporary roadways (16 USC 1608[b]) and standards of roadway construction (16 USC 1608[c]): All new road construction would be completed using best management practices to protect soil and aquatic resources (Appendix C, Design Features). At the completion of their intended use, temporary roads would be decompacted, recontoured to the approximately shape of the surrounding terrain, and seeded or covered with debris to prevent erosion and accelerate hydrologic and vegetative recovery (Alternative Descriptions).

IPNF Land Management Plan

The Forest Plan provides direction for the management of the IPNF by guiding programs, practices, uses, and projects (2015, pages 2-4). As required by NFMA and the planning rule, subject to valid existing rights, all projects and activities authorized by the Forest Service must be consistent with the applicable plan components (16 USC 1604(i)) as described at 36 CFR 219.15 of the 2012 Planning Rule.

Elements of the plan are Goals, Desired Conditions, Objectives, Guidelines, and Standards.

Goals and Desired Conditions

Because of the many types of projects and activities that can occur over the life of the Plan, it is not likely that a project or activity can maintain or contribute to the attainment of all goals and desired conditions, nor are all desired conditions relevant to every activity. The Grizzly Fire Salvage and Restoration project was developed to respond to specific conditions in the burned area that deviate from the desired future condition as described by the Forest Plan. As described in the Purpose and Need for Action section of this EA (pages 6-7), the differences exist in a variety of resource areas, but are most pronounced in the areas of public safety (Access and Recreation), forest resiliency (Vegetation), and contribution to local economies from forest products (Timber).

Table D-1 and Table D-2 address how the alternatives would respond to these Goals and Desired Conditions.

Table D-1. Consistency with Forest Plan Goals.

Goal	Forest Plan Page	Description
GOAL-VEG-01	11	Plant communities are trending toward the desired conditions for composition, structure, patterns, and processes. The ecological integrity of the communities is high and they exhibit resistance and resiliency to natural and man-caused disturbances and stressors, including climate change. *Response: The action alternatives would make progress towards helping to achieve this goal. By planting tree species that are resistant and resilient towards disturbances and stressors, the action alternatives would help to trend the vegetation towards the desired conditions that are articulated in the Forest Plan. For more detail, see the Forest Vegetation Report and the Forest Vegetation section of the EA.*
GOAL-TBR-01	39	Provide a sustainable level of timber products for current and future generations. Production of timber from NFS lands contributes to an economically viable forest products industry. *Response: The action alternatives would make progress towards helping to achieve this goal. See the response to FW-OBJ-TBR-01 and FW-OBJ-SES-01 for more detail as well as the Economics Report.*
GOAL-SES-01	41	Contribute to the social and economic well-being of local communities by promoting sustainable use of renewable natural resources. Provide timber for commercial harvest, forage for livestock grazing, opportunities for gathering firewood and other special forest products, permitted recreation residences, and settings for recreation consistent with goals for watershed health, sustainable ecosystems, biodiversity, and scenic/recreation opportunities. *Response: The action alternatives would make progress towards helping to achieve this goal. See the response to FW-OBJ-TBR-01 and FW-OBJ-SES-01 for more detail as well as the Economics Report.*

Table D-2. Consistency with Forest Plan Desired Conditions.

Desired Condition	Forest Plan Page	Description
FW-DC-AR-07	34	A transportation system is in place that provides safe and efficient public and administrative access to the Forest for recreation, special uses, forest resource management, and fire management activities. It is efficiently maintained, environmentally compatible, and responsive to public needs and desires. The transportation system and its use have minimal impacts

Desired Condition	Forest Plan Page	Description
		on resources including threatened and endangered species, sensitive species, heritage and cultural sites, watersheds, and aquatic species. Newly constructed or reconstructed roads do not encroach into streams and riparian areas in ways that impact channel function, geometry, or sediment delivery. Roads in intermittent stored service pose minimal risks to water quality and aquatic ecosystems. Drainage structures have a minimal risk of failure and provide adequate drainage that prevents accelerated runoff, erosion, and sediment delivery to streams. In addition, stream crossings provide for passage of aquatic organisms. Unauthorized roads and trails are no longer created. *Response: The action alternatives would make progress towards helping to achieve the desired condition. Under either action alternative, roadside danger tree removal would improve public safety by providing a safe and dependable transportation system free of unstable fire-affected trees or other hazards in areas of public and administrative use (see Purpose and Need for Action and Effects to Public Safety in the EA).*
FW-DC-VEG-01	11	The composition of the forest is within the desired ranges for the dominance groups (Forest Plan Figure 2). More of the forest is dominated by western white pine, ponderosa pine, western larch, and whitebark pine. Conversely, less of the forest is dominated by grand fir, western hemlock, western redcedar, Douglas-fir, lodgepole pine, and subalpine fir. Although they are not depicted in figure 2, more hardwood trees occur in the forest such as quaking aspen, black cottonwood, and paper birch. *Response: The action alternatives would make progress towards this desired condition. The action alternatives would increase the amount of long-lived seral species on the landscape and reduce the amounts grand fir, western hemlock, western redcedar, Douglas-fir, lodgepole pine, and subalpine fir. For more details, see the responses to the following plan elements: FW-DC-VEG-06, FW-OBJ-VEG-01, MA6-DC-VEG-01 and GA-DC-VEG-PR-03. In addition, see the Forest Vegetation section of this EA, and the Forest Vegetation Report.*
FW-DC-VEG-06	13	Root disease fungi, such as Armillaria and Phellinus, are killing fewer trees as the composition of the forests trends toward less susceptible tree species such as western larch, ponderosa pine, and western white pine. Forest insects, such as Douglas-fir bark beetle, mountain and western pine beetles, fir engraver beetle, and the western spruce budworm, are generally causing less tree mortality. Impacts from the non-native fungus that causes the white pine blister rust disease are reduced as the abundance of rust-resistant western white pine and whitebark pine increases. *Response: The action alternatives would make progress towards this desired condition while the no-action alternative would not. The action alternatives would increase the amount of trees in the project area that are of a species that is less susceptible to root disease fungi, the blister rust disease as well as some forest insects. The action alternatives would increase the amount of long-lived seral species on the landscape. The percentage of grand fir, Douglas-fir, and subalpine fir would be reduced, which would reduce the susceptibility to root diseases and some bark beetles. The Forest Vegetation Report contains more details as do the responses to FW-OBJ-VEG-01 and GA-DC-VEG-PR-03.*
FW-DC-TBR-01	39	Production of timber contributes to ecological, social, and/or economic sustainability, and associated desired conditions. A sustainable mix of timber products (including both sawtimber and non-sawtimber) is offered under a variety of harvest and contract methods in response to market demand. Salvage of dead and dying trees captures as much of the

Desired Condition	Forest Plan Page	Description
		economic value of the wood as possible while retaining the amount needed for wildlife habitat, soil productivity, and ecosystem functions. *Response: Both action alternatives would contribute toward meeting the desired condition, since both would offer commercial timber sales, road contracts, and other employment. The jobs and income associated with the action alternatives would contribute to the local economy during the life of the project. The no-action alternative would be neutral toward meeting this desired condition, since it does not offer any commercial timber sales or other employment.*

Objectives

A project or activity is consistent with the objectives of the Forest Plan (pages 18-42) if it contributes to or does not prevent the attainment of any other applicable objectives.

Table D-3. Consistency with Forest Plan Objectives.

Resource	Attainment of Objectives
Vegetation	The action alternatives would contribute toward objectives through the proposed salvage and planting activities. The no-action alternative would be neutral toward objectives, because of the lack of activities to change current post-fire vegetation conditions.
Fire	Although not specifically proposed for fuels reduction, the action alternatives would be consistent with objectives. Research and modeling suggest, over the long term, fuel loadings in the large woody surface fuels would be reduced in the treated areas because salvage harvesting remove many of the dead and dying trees that would otherwise fall and build-up on the forest floor. The no-action would be neutral toward objectives, because of the lack of activities to treat fuels. Implementation of any alternative would not preclude a decision to manage fire across the IPNF.
Watershed, Aquatic Habitat and Aquatic Species	This project is neutral but it is not anticipated to prevent the attainment of the objectives. Road improvements activities could potentially reduce the amount of sediment delivered to the stream network in the Middle North Fork Coeur d'Alene River; water bodies that are not meeting beneficial uses and one of the causes of impairment is sediment. Although the amount of sediment may be reduced, no roads are actually being removed from the landscape so the condition ratings for these subwatersheds would remain the same. No activities are proposed that involve enhancing or restoring habitat and therefore this project remains neutral towards this objective.
Soils	This project is not designed as a soil restoration project. By implementing the soil-related design features, the project would meet the Region 1 Soil Quality Standards and therefore be consistent with the Forest Plan.
Wildlife	There are no applicable objectives for wildlife. The 2015 wildfires resulted in an increase in ungulate forage across the area, and the burned area would provide prey for carnivores. The proposed activities would not reduce any foraging habitat. No activities are proposed under any alternative for the maintenance or restoration of wildlife habitat.
Access and Recreation	The action alternatives would contribute toward meeting objectives for National Forest System Road maintenance, and roadside danger tree removal would help ensure access to snowmobile routes. The project would not contribute toward meeting other access and recreation objectives, but would not prevent attainment either. The alternatives do not propose trail maintenance activities or development of loop opportunities, although it would not preclude such opportunities in the future.
Timber, Social and Economic	The no-action alternative would not contribute toward meeting these objective for annual sale of timber. The action alternatives would contribute towards meeting this objective as a result of salvage sales.

Guidelines

A project or activity must be consistent with all guidelines applicable to the type of project or activity and its location in the Plan area. A project or activity is consistent with a guideline in either of two ways:

1. The project or activity is designed in accordance with the guideline, or;
2. A project or activity design varies from the guideline but is as effective in meeting the intent or achieving the purpose of that guideline.

Table D-4 describes how the Grizzly project is consistent with the relevant Forest Plan guidelines (pages 19-40).

Table D-4. Consistency with Forest Plan Guidelines.

Resource	Attainment of Guidelines
Vegetation	Alternative development, field validation, unit location and layout, and application of design features (Appendix C) have culminated in action alternatives that meet all applicable vegetation guidelines.
Watershed, Riparian, Aquatic Species	As a result of design features (Appendix C) and especially best management practices, the alternatives are consistent with all applicable guidelines for watershed.
Soils	By implementing the soil-related design features (Appendix C), the project would meet the Region 1 Soil Quality Standards and therefore be consistent with Forest Plan soil guidelines.
Wildlife	Based on current conditions, unit location and layout, and application of design features such as buffers and timing of activities (Appendix C), the action alternatives would meet all applicable wildlife guidelines. There are no Threatened or Endangered wildlife populations or habitat in the project area. There are currently no known active nesting or denning sites for sensitive, threatened or endangered species in the project area. Any such sites that are discovered during project implementation would be spatially and/or temporally buffered as appropriate (Appendix C, Design Features). Approximately 78-94% of the burned area would remain unlogged (depending on the alternative); the unlogged areas are well-distributed and would provide habitat for species that utilize burned forests.
Air Quality	Because the IPNF strictly complies with the recommendations provided by air quality regulating agencies in regards to prescribed burning activities, the project would be consistent with the air quality guideline.
Access and Recreation	With the implementation of design features (Appendix C), the project would meet this Access and Recreation guideline, which addresses Scenic Integrity Objectives.
Cultural Resources, American Indian Rights and Interests	The project would meet guidelines for cultural resources, because all contracts of work in relation to this project would include language for the protection of National Register-listed or eligible properties, either known or located through inadvertent discovery, and would include language protection and preservation protocols for any inadvertent discover of human remains (Appendix C, Design Features). Proposed activities would not impact treaty rights and/or cultural sites or cultural use.
Timber	This guideline addresses harvest on other than suitable lands. This is a salvage project and may occur on lands other than suitable lands; therefore, the action alternatives are designed to meet this guideline.

Standards

A project or activity is consistent with a standard if the project or activity is designed in exact accordance with the standard.

Table D-5. Consistency with Forest Plan Standards.

Resource	Consistency with Standards
Vegetation	The action alternatives do not propose salvage harvesting in stands that meet the definition of old growth. Therefore, the action alternatives are in exact accordance with the only applicable standard for vegetation.
Watershed, Riparian	As a result of design features (Appendix C) and especially best management practices, the alternatives are consistent with applicable watershed and riparian guidelines. Source water areas would be protected through the delineation of RHCA boundaries. Any other source waters identified during implementation, that fall outside of RHCAs, would be protected using site-specific BMPs. The existing condition of the RHCAs would be maintained. The majority of RHCAs in the project are fragmented or affected by road/stream crossings and roads within the floodplain. Road maintenance and danger tree felling are proposed within RHCAs. Road maintenance may reduce the amount of road-derived sediment over the long-term (>10 years), but measuring this effect is unlikely. Danger trees felled in the RHCA would be left, thus adequate sources are available for both long and short-term recruitment. See also the discussion of consistency with the Inland Native Fish Strategy in this appendix.
Timber	The action alternatives would meet applicable timber standards. The site-specific silvicultural prescriptions use locally adapted methods that have proven to regenerate trees within five years. The harvest systems selected for the action alternatives were not chosen strictly on the bases of providing the greatest dollar return, rather they were primarily based upon trending the forest vegetation towards the desired conditions that are articulated in the Forest Plan.

Inland Native Fish Strategy

Table D-6. Consistency with the Inland Native Fish Strategy.

Component	Consistency with the INFS
Standard widths defining interim RHCAs	All categories of streams and other aquatic features in the project area have been protected accordingly, as part of the design features. Any features identified during implementation that were not identified would also be protected as appropriate.
Timber management	Danger trees within RHCAs along transportation routes would be felled and left on site to ensure future woody debris requirements are met.
Roads management	No new roads or landings are within an RHCA. A transportation analysis plan was conducted. Road maintenance and other road activities are subject to best management practices (Appendix C – Design Features). No changes in road maintenance responsibilities are proposed. The opening of existing roads for temporary use will not affect RMOs at the reach or watershed scale. Temporary roads will be decommissioned or closed upon completion of proposed activities. Maintenance activities on existing roads are anticipated to improve overall watershed conditions. No culverts, bridges, or stream crossings are included in the proposed action. Should a need for this activity arise, the structure would be designed to meet guidelines.
Fire/Fuels Management	No fuel treatments are proposed and site preparation outside of RHCAs would not prevent attainment of RMOs.
General Riparian Area Management	Danger trees within RHCAs are proposed for felling, and would be left on site. Storage of fuels and other toxicants and refueling would be prohibited in RHCAs (BMP Practice 11.11 and 15.11). Drafting of water will be done in such a manner as to protect fish to the extent possible (BMP Practice 15.20).

Management Area 2-b – Eligible Wild and Scenic Rivers (Recreational)

The Forest Plan (page 59) describes Desired Conditions, Guidelines and Standards for Management Area 2b (MA2-b). This MA applies to river segments that have been identified as eligible (but not designated) for inclusion as part of the Wild and Scenic Rivers System under the authority granted by the Wild and Scenic Rivers Act of 1968, as amended. The segments within the project area are designated for their recreational values.

Table D-7. Consistency with the Management Area-2b designation.

Resource	Consistency with MA2-b
Access and Recreation	This project would not change the status or preliminary classification of river segments. The outstandingly remarkable values would be conserved. Recreation opportunities and experiences within the river corridor would be consistent with the ROS classification. All known cultural resource sites within this designation would be protected under any alternative. Any future discovery of cultural resource sites would be inventoried and protected if found to be of cultural significance. Upon project completion, there would be no change to public motorized access or mechanized uses. No temporary road construction would occur within MA2-b. With the implementation of design features (Appendix C), the project would meet the Scenic Integrity Objectives of High and Moderate in MA2-b.
Timber	The proposed roadside danger tree removal and salvage activities within MA2-b are designed to provide protection for recreationists and to both maintain where possible and restore where necessary the recreational resource values on a few small portions of the burned lands within MA2-b.
Special Forest Products and Firewood	The project should not have any effect on the potential for special forest products use, other than potentially aiding in danger tree abatement near roads within a portion of the fire area. As such, the project is either neutral or somewhat beneficial in meeting this guideline.

Management Area 6 – General Forest

The Forest Plan (pages 71-72) describes Desired Conditions, Guidelines and Standards for Management Area 6 (MA6). Most of this MA consists of relatively large areas with roads, trails and structures, as well as sign of past and ongoing activities designed to manage the forest vegetation. Vegetation and watershed restoration is accomplished predominantly through active management.

Table D-8. Consistency with the Management Area 6 designation.

Resource	Consistency with MA6
Access and Recreation	This project would not change the status or preliminary classification of river segments. The outstandingly remarkable values would be conserved. Recreation opportunities and experiences within the river corridor would be consistent with the ROS classification. All known cultural resource sites within this designation would be protected under any alternative. Any future discovery of cultural resource sites would be inventoried and protected if found to be of cultural significance. Upon project completion, there would be no change to public motorized access or mechanized uses. No temporary road construction would occur within MA2-b. With the implementation of design features (Appendix C), the project would meet the Scenic Integrity Objectives of High and Moderate in MA2-b.
Timber	The roadside danger tree removal and salvage activities that are proposed within MA2-b are designed to provide protection for recreationists and to both maintain where possible and restore where necessary the recreational resource values on a few small portions of the burned lands within MA2-b.
Special Forest Products and Firewood	The project should not have any effect on the potential for special forest products use, other than potentially aiding in danger tree abatement near roads within a portion of the fire area. As such, the project is either neutral or somewhat beneficial in meeting this guideline.