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Glacier Loon Fuels Reduction and Forest Health Project

Supplemental Environmental Assessment

Swan Lake Ranger District, Flathead National Forest
Missoula County, Montana



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FOREWORD

CHANGES TO THE ENVIRONMENTAL ASSESSMENT

In response to findings of the District Court's orders in September and December 2014, in *Swan View Coalition et al. v Weber (D. Mont. 2014)*, the Forest Service has prepared this Supplemental Environmental Assessment (SEA) for the Glacier Loon Fuels Reduction and Forest Health Project.

The original Environmental Assessment (EA) from 2012 has been supplemented to assure the Court and the public that the Forest Service has provided the hard look that is required; more specifically, to reanalyze the effects of the project on grizzly bears, bull trout, bull trout critical habitat, lynx and lynx critical habitat, and water howellia. This Supplemental EA also considers any new information that may have been identified since the previous EA and considers the potential cumulative effects of the reasonably foreseeable Beaver Creek Landscape Restoration Project.

The following changes have been made to the 2012 Environmental Assessment:

FORWARD

A Foreword has been added to the EA to provide a summary of the project's development and timeline, including appeals and litigation.

CHAPTER 1

This chapter has been updated to describe the status of the two grizzly bear subunits affected by project activities via the Swan Valley Grizzly Bear Conservation Agreement. In addition, the brief description of the proposed action has been updated to indicate that no vegetation management activities would occur within 300 feet of occupied or unoccupied water howellia ponds and at the end of the chapter is the reference that project falls under the 36 CFR 218 administrative objection regulations (the 2012 EA was under the 36 CFR 215 administrative appeal regulations).

CHAPTER 2

This chapter has been updated to include additional information about the public involvement process and activities that have occurred or have been proposed since the August 2012 EA was released to the public. Additionally, this chapter has been updated to include additional design criteria to mitigate or reduce impacts to water howellia. This chapter reflects modifications made to the timing of the project due to delays from litigation and includes a statement about the need to have Regional Forester approval to create an opening that exceeds 40 acres in size.

CHAPTER 3

This introduction to this chapter has been updated to include any past, present, and reasonably foreseeable activities that may have occurred since the original analysis was conducted.

Each resource section includes a description of the changes that were made. The Threatened and Endangered Wildlife Section, the fisheries section, and the Threatened and Endangered Plant sections have the most updates, but all resource analysis reflect updated information and consideration of potential cumulative impacts.

PROJECT FILE

The project record has been amended to include additional documents needed to support the analysis completed for this Supplemental Environmental Assessment.

Changes made from the 2012 EA are displayed in red type in this Supplemental Environmental

Assessment.

PROJECT HISTORY

The Glacier Loon Fuels Reduction and Forest Health Project was initiated in 2011 to reduce the risk of a high-severity landscape within the Wildland Urban Interface (WUI) as identified in the community wildfire protection plan, improve forest health and resistance to insect epidemics, and provide wood products to local timber industry. Letters, news releases, and field trips to the project area were means to garner public interest in the project. Following the scoping period, the Forest Service received 47 responses.

An environmental assessment (EA) was prepared to analyze the effects of three action alternatives designed to address the objectives mentioned above in different ways and the no action alternative. The EA was released to the public in August 2012 for a 30-day comment period and a total of thirty one comments were received on the EA and helped the decision maker shape the Selected Alternative. The Decision Notice and Finding of No Significant Impact was signed by the Forest Supervisor on February 13, 2013, and the selected alternative was a modification of Alternative D. The Forest Service's 45-day administrative appeal period was initiated at the time the Decision Notice was published in The Daily Inter Lake (newspaper of legal record).

Five appeals were received on the Glacier Loon Fuels Reduction and Forest Health Project between March 7 and 28, 2013 (Project File Exhibit W-1 through W-10). These appeals raised a myriad of issues including lynx, lynx critical habitat, big game thermal cover, water howellia, grizzly bears, and sensitive species.

On May 22 and 23, 2016, the Glacier Loon Decision was affirmed by the Appeal Deciding Officer (Project File Exhibit W-16 through W-25) with instructions to increase buffered distances between vegetation management treatment units and unoccupied water howellia ponds to 300 feet (occupied water howellia ponds were already buffered by 300 feet in the original EA). Vegetation management treatment units were resurveyed to assure they met this instruction before they were implemented. The supplemental EA has been updated with this instruction.

In March 2013, four of the five people/organizations who filed administrative appeals then filed a 60-day Notice of Intent (NOI) to sue under the Endangered Species Act; in June they filed an amended NOI. In response to the second NOI, the Flathead National Forest gave notice to plaintiffs that the forest was re-evaluating the Glacier Loon Project's compliance with the Endangered Species Act and was in the process of preparing an amended biological assessment to be submitted to the USFWS.

Plaintiffs filed an initial complaint in the United States District Court on June 24, 2013 and amended their complaint on September 12, 2013 (CV- 13-129-M-DLC). The Plaintiffs challenged the U.S. Forest Service and the U.S. Fish and Wildlife Service on two separate aspects:

- Authorization of the Glacier Loon Fuels Reduction and Forest Health Project on the Flathead National Forest, and
- Failure to conduct environmental analysis and Endangered Species Act (ESA) consultation for decisions regarding the "Legacy lands" acquisition, agreed operating procedures, and subsequent logging projects on these lands by The Nature Conservancy (TNC).

After briefing was completed, two stewardship sales began operation in the summer of 2014. However, on September 25, 2014, the Court granted summary judgement in favor of the government on all of Plaintiffs' claims except four, two of which relate to the Glacier Loon Project. The other two claims are related to the land acquisition by The Nature Conservancy within the project area as well as other places in the Swan Valley. However, on January 5, 2016, the U.S. Forest Service received a letter announcing that the fiber supply agreement between TNC and Plum Creek had been terminated and that there were no plans for future harvest on Legacy

Lands (Project File Exhibit AA-1). The court's ruling that NEPA analysis and ESA consultation is required for the agreed operating procedures (AOP) is not associated with the Glacier Loon Project and therefore will not be analyzed in this SEA.

Regarding the Glacier Loon Project, the Court held the Forest Service improperly reached a "no effect" determination for water howellia and bull trout and erroneously determined that numerical objectives under Amendment 19, which provides protections for grizzly bears, did not apply to certain subunits in the Project area. As a result, the Glacier Loon Project was enjoined and the two stewardship sales were suspended. The court specifically concluded that the "matter is remanded to the agencies to perform the necessary analysis and follow the necessary procedures under the ESA for water howellia, bull trout, ...and to reassess its Section 7 analysis regarding the grizzly bear in light of the application of the correct access objective under Amendment 19."

Following the summary judgement, the Forest Service prepared amended biological assessments for bull trout/bull trout critical habitat (January 29, 2015), water howellia (February 12, 2015) and grizzly bears (February 4, 2015) and re-consulted with the U.S. Fish and Wildlife Service (USFWS). The determinations to these species were modified to a "not likely to adversely affect" for bull trout/bull trout critical habitat and water howellia and a "likely to adversely affect" for grizzly bears. The USFWS provided concurrence letters for bull trout/bull trout critical habitat and water howellia and a biological opinion for effects to grizzly bears (June 15, 2015). After these amended biological assessments were completed, a review was undertaken to consider whether these updated biological assessments raised any new circumstances or information requiring a supplement to the environmental assessment. In this new information review the Forest Service determined there were no "significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts" that warrant corrections, supplementation, or revision to the Glacier Loon EA.

After completing the ESA consultations, the federal government prepared a motion to the court to dissolve the injunction and while the court agreed in its January 13, 2016 order that the agencies met their Section 7 ESA obligations they indicated that NEPA's statutory obligations require the preparation of a supplemental EA due to the application of the incorrect Forest Plan Amendment 19 access objectives in the original EA. The project remains enjoined.

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CHAPTER 1

PURPOSE AND NEED FOR ACTION

PROJECT AREA

The Glacier Loon Fuels Reduction and Forest Health Project Area lies within the boundaries of the Glacier Loon and Buck Holland Grizzly Bear Subunits. It extends south and west of Condon on the west side of MT Highway 83 to the south end of Lindbergh Lake. The project area is located in Missoula County in Sections 2-6 T18N, R17W, Sections 1-3, 5-9, and 16-17 T18N, R18W; Sections 01-4, 7-23, 26-35 T19N, R17W; Sections 2-4, 9-15, 22-27, and 33-36 T19N, R18W; Sections 18-19 and 29-32 T20N R16W; and Sections 1-2, 11-15, 22-27, and 33-36 T20N R17W; Swan Lake Ranger District, Flathead National Forest (Map 1-1. Vicinity Map).

HISTORIC CONDITION

Fires were frequent in the Upper Swan Valley until the early 1900s, with the earliest fire evidence dating from about 1241 AD. On average, a fire occurred about every 8 years (range of 3 to 23 years) between 1586 and 1929 in the Upper Swan Valley. The last major fire occurred in 1929 (Barrett 2002). Barrett (1998) reported that 1768, 1814, 1850, 1889, 1919, and 1929 were important fire years in the Swan Valley. One study included two sampling locations within the analysis area, both in the vicinity of Lindbergh Lake. In this area, fire occurred about every 20 years (range of 6 to 50 years) between 1687 and 1919, with the last major fire occurring in 1919. The 1919 fires burned approximately 25,000 acres near Lindbergh Lake and to the north. Map 3-1 displays the approximate locations of some of the major fires in those years within the project area.

Fires were a result of natural causes, such as lightning and traditional burning by Indians (Arno et al. 1997; Ayres 1899; Barrett 1998, 2002; Barrett et al. 1982). Most Indian fires occurred in the valley grasslands and lower-elevation forests dominated by ponderosa pine, Douglas-fir, and western larch. These fires were likely ignited to improve big game browse, berry production, food gathering and hunting, improved travel, communication and horse grazing (Barrett 1981).

Within the project area, several fires burned in the relatively recent past. In 1953, the Herrick Run Fire burned approximately 780 acres on the western shore of Lindbergh Lake. This fire started near the shore and burned upslope and was primarily a high severity fire. In the summer of 2003, the Crazy Horse Fire burned approximately 11,000 acres total with approximately 3,200 acres occurring within the project area. The Holland Peak Fire burned roughly 1600 acres on the east side of the Swan Valley four miles from the Glacier Loon Project Area in the summer of 2005. **In 2012, the Condon Mountain Fire burned approximately 5,200 acres north of the project area on the east side of Highway 83 (this fire is not in any of the analysis areas used by Glacier Loon).** These fires are the most recent large fires in the Upper Swan Valley. In 2008, the smaller Lindbergh Lake Fire burned upslope on the west side of the lake with 45 acres occurring at the south end of the project area. These most recent fires burned mosaically, yet had considerable areas of high severity.

Historical accounts indicate the epidemic insect outbreaks have occurred in the area in the past. The most well-documented epidemic was an outbreak of spruce bark beetles in the Swan Valley following a large scale wind event in 1949 (Project File Exhibit R-3). Mountain pine beetle outbreaks also occurred in the Swan Valley throughout the 1980s. It should be noted that two

major diseases currently affecting forest trees are non-native and were not historically present within the analysis area. Larch casebearer was introduced from Europe and arrived in the Swan Valley in 1968. This defoliator's population peaked in the 1970s and is declining. White pine blister rust was introduced in 1910 and has since had a dramatic effect on the forest composition within the Swan Valley. Western white pine populations in the mid to lower elevations and whitebark pine in the upper elevations have been significantly degraded by this disease.

H. B. Ayers reported observation of the Swan Valley in 1899 during his mission to survey the timber of the then Lewis and Clark Forest Reserve. His journals describe large expanses of the Swan Valley dominated by large trees of ponderosa pine, Douglas-fir, and western larch grown in an open canopy on the valley, benches, and foothills and denser stands of shade-tolerant species on the stream bottoms and high elevations.

"The lands of the upper valley, where the rather scant covering of larch and lodgepole pine at first gives the impression of very poor soil, but upon close examination it is found that the sparseness of tree growth is largely due to frequently occurring fires which have thinned the forest." (Ayers 1899)

Many other natural and human-induced disturbance factors have influenced forest vegetation in and around the project area, including wind, floods, invasive species, residential and commercial development, transportation systems, grazing, and timber harvest.

EXISTING CONDITION

The Upper Swan Valley Landscape Assessment (SEC 2004) described the general forest conditions at a landscape scale by grouping the project area into what was termed "Ecosystems." The assessment identified five "Ecosystems" in the Upper Swan Valley. Three of those forested "Ecosystems" are represented in the Glacier Loon Project Area. The following are summary descriptions of those "Ecosystems" and are described as they would be encountered traveling from east to west, or upslope.

The warm/cool-moist valley bottoms include the undulating flat lands of the valley floor with its many wetlands. This area is forested with a large diversity of conifer and deciduous tree species. Openings in the forest are numerous, largely due to human settlement. These areas contain a mix of western larch, western white pine, lodgepole pine, Douglas-fir, ponderosa pine, Engelmann spruce, grand fir and subalpine fir on the more well drained sites. The neighboring riparian zones are bordered with cottonwood, birch and aspen. Disturbances in this area included primarily low and mixed severity fire, and occasionally high severity fire. High intensity winds have also occurred at intervals and caused extensive blowdown.

The cool-moist midslopes include a transition between the warm-moist valley bottoms to the east and the cold-steep forested uplands to the west. Tree species in this area include Douglas-fir, lodgepole pine, western larch, western white pine, Engelmann spruce, grand fir, western red cedar and subalpine fir. Disturbances in this area included a combination of low, mixed, and high severity fires. High severity winds causing blowdown have also occurred in the area.

The cold-steep uplands form a narrow band between the barren rocky ridges and peaks on the Mission Mountains and the more heavily forested areas on the lower slopes. Vegetation is scattered and clumped across the landscape. Trees and shrubs develop in areas where there is soil. Tree species include whitebark pine, Engelmann spruce, lodgepole pine, mountain hemlock, and subalpine fir. Disturbances in this area include a combination of mixed and high severity fires. Fires tended to be less frequent, and usually occurred during dry periods.

DESIRED CONDITIONS

The desired future conditions described for the Flathead National Forest Land and Resource Management Plan (Forest Plan) in conjunction with other Forest Plan goals, standards, objectives, and Regional direction provide the parameters for identifying and defining project-specific desired future conditions. The desired future conditions help guide management of the project consistent with the Forest Plan, the key issues, and the current ecological conditions of the Glacier Loon Project Area.

FOREST PLAN DIRECTION

The Forest Plan embodies the provisions of the National Forest Management Act (NFMA), its implementing regulations, and other guiding documents. The Forest Plan sets forth in detail the direction for managing the land and resources of the Flathead National Forest. Forest Service Manuals (FSM) and Handbooks (FSH) and provide direction and were applied to the development of this project.

The majority of the project area lies within MA 22 (Mission Mountain Wilderness - 12,321 acres) where no activities are planned, followed by MA 15C (7,108 acres) and MA 15 (4,098 acres) where cost-efficient production of timber while protecting the productive capacity of the land and timber resource is the emphasis. Treatments are planned within Management Areas 5, 9, 15, 15C, and 17 which are within the suitable timber base of the Flathead National Forest. Please refer to Chapters 2 and 3 for more detailed discussion of management areas.

ECOLOGICAL RESTORATION

Recently adopted national and regional mandates of the U.S. Forest Service stipulate that ecological restoration will be the central driver of wildland and forest stewardship (USDA Forest Service 2012). This is of strategic importance because national forests are the backdrop and neighbor to many rural and urban communities, providing a broad range of value and benefits, including clean drinking water for millions of people across the U.S., vital wildlife habitat and a variety of recreation opportunities, all of which are basic to the health of our communities. Our job is to sustain the ability of America's forests and to deliver the full range of ecosystem services for generations to come. This ability is increasingly at risk. Approximately 65 million acres of national forest system (NFS) lands are at high or very high risk of catastrophic wildfires. A changing climate, invasive species, and other stressors are affecting large areas of National Forests and Grasslands. Mortality of conifer trees caused by the bark beetle has escalated in the last decade, resulting in nearly 18 million acres on the national forests incurring damage.

To address these needs, the Forest Service has recently adopted a series of actions allowing for increases in the pace of restoration efforts, including:

- Expanding collaborative landscape partnerships;
- Implementing a new forest planning rule;
- Implementing the Watershed Condition Framework;
- Improving efficiency of the NEPA planning process;
- Implementing the Forest Service bark beetle strategy;
- Expanding stewardship contracting; and
- Expanding markets for forest products generated by restoration projects.

The Forest Service definition of ecological restoration is broad in scope. As stated in FSH 1909.12 ecological restoration is:

The process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed. Ecological restoration focuses on reestablishing the composition, structure, pattern, and ecological processes necessary to facilitate terrestrial and aquatic ecosystems sustainability, resilience, and health under current and future conditions.

Ecological resilience is normally defined as the capacity of a system to cope with stress and to bounce back when the stress diminishes. It is measured by the rate at which a system returns to equilibrium following perturbation. Stressed ecosystems are less resilient than unstressed ecosystems.

Inherent goals of Forest Service Restoration Policy include ecosystem health, ecosystem services, and sustainability. Ecosystem health, in addition to resilience, has two other major criteria: vigor and organization. Vigor is measured in terms of energy flow in terms of nutrient cycling and productivity. Organization refers to ecosystem complexity, which tends to increase with secondary succession in terms of number of species and the variety and intricacy of interactions. Stressed ecosystems typically display reduced species richness, fewer symbiotic relationships, and more opportunistic species.

Ecosystem services refer to functions that benefit the human community, such as detoxification of chemicals, water purification, production of game species, and reduced soil erosion. They include: (a) Provisioning Services –food, fresh water, fuel, and timber; (b) Regulating Services – climate, water, pollination, and disease regulation; (c) Supporting Services –soil formation and nutrient cycling; and (d) Cultural Services –educational, aesthetic, cultural heritage values, recreation, and tourism. Stress generally reduces both the quality and quantity of these services.

In the face of climate change and population pressures there has now developed a complex matrix of natural and anthropogenic disturbance within which management regimes must be superimposed to meet National Forest and National Policy objectives. Restoration of degraded lands means rebuilding functional ecosystems, but not necessarily restoring sites to resemble their original conditions in all aspects. Forest Service goals are less concerned with establishing historically functioning ecosystems as establishing ecosystems that are resilient in the face of current and projected disturbance regimes.

PURPOSE AND NEED

Based upon the existing condition of the project area and consistent with Forest Plan direction and the goals of Forest Service Restoration Policy presented above, the Swan Lake Ranger District's ID Team identified the following Purpose and Needs.

- **HAZARDOUS FUELS REDUCTION**
 - Reduce the associated risk of high-severity landscape wildfire risk within the Wildland Urban Interface (WUI) as identified in the Seeley Swan Fire Plan.
 - Provide for a safer environment for the public and firefighters should a wildfire occur within the proposed treatment areas.
 - Increase the probability of stopping wildfires on NFS lands before they burn onto private lands.
- **IMPROVE FOREST HEALTH**
 - Improve and/or maintain the general health, resiliency, and sustainability of forested stands.

- Reduce the risk of insect epidemics and severe disease infestations within the project area.
- **PROVIDE WOOD PRODUCTS FOR LOCAL ECONOMIES**
 - Provide forest products to the local timber industry – contributing to short-term forest products and providing for long-term sustainability of timber on NFS lands.

PROPOSED ACTION

The Swan Lake Ranger District's ID Team has identified the following management activities to move toward desired future conditions in the Glacier Loon Project Area.

- Vegetative treatments on approximately 2102 acres of NFS lands within the project area (See enclosed Maps 2 and 3); an estimated 1710 acres of proposed activities are located within the WUI.
- Harvest activities implemented using tractor and cable logging systems. Fuel reduction activities implemented using mechanical and hand treatments.
- Slash treated through a combination of the following; whole tree yarding (or possibly yarding of tops), lop and scatter, masticating, and/or excavator piling. Fuel accumulations at landings addressed through burning, chipping/masticating, and/or removal from NFS lands. Prescribed fire treatments include broadcast burning, pile burning and/or jackpot burning.
- Treatment units accessed through an estimated 11.5 miles of temporary road construction. National Forest System roads used for road haul. Road decommissioning proposed on an estimated 4.1 miles of NFS roads.
- Best Management Practices (BMPs) implemented on an estimated 37.7 miles of haul routes to meet Timber Sale Requirements.
- All activities comply with the Swan Valley Grizzly Bear Conservation Agreement (SVGBCA).
- Minimal harvest activity within Riparian Habitat Conservation Areas (RHCAs) in upland areas. Some temporary road locations to occur within RHCAs and cross streams.
- **No vegetation management activities to occur within 300 feet from occupied or unoccupied water howellia ponds.**
- Resource Enhancement Projects to improve fish habitat and riparian conditions.

PROJECT SCOPE

SCOPE OF THE PROPOSED ACTION

The Glacier Loon Subunit, where the Glacier Loon Project is proposed, is currently "Inactive" and becomes "Active" again in 2021 through 2023 under the Swan Valley Grizzly Bear Conservation Agreement (SVGBCA). The Buck Holland Subunit is "Active" from 2018 through 2020, and becomes "Inactive" again in 2021. When project activities are scheduled to occur in a time when a subunit is "Inactive", then standards and guidelines for an Inactive grizzly bear subunit would be followed, as per the SVGBCA. All roads used would be managed consistent with the requirements of the SVGBCA.

Post-harvest activities, such as burning and planting, should be completed 1 year following harvest activities. Reforestation activities would be completed no more than 5 years after logging is completed in each unit.

SCOPE OF THE ANALYSIS

The Council on Environmental Quality (CEQ) regulations implementing the NEPA require that all Federal agencies consider the following three types of actions to determine the scope of the analysis (40 CFR 1508.25).

CONNECTED ACTIONS

Connected actions include closely-related actions that automatically trigger other actions that may require NEPA analysis; cannot or would not proceed unless other actions taken previously or simultaneously, or are interdependent parts of a larger action and depend on the larger action for their justification. These actions are part of the proposed action and include all activities needed to complete the proposed project and provide for resource protection during and after project completion.

Project Design Criteria described in Table 2- 16 are associated with the action alternatives.

SIMILAR ACTIONS

Similar actions are actions with similarities to other actions that provide a basis for evaluating their environmental consequences, such as similar timing or geography. A number of these actions have been identified and evaluated in the analysis of environmental consequences (EA, Chapter 3). These are current and reasonably foreseeable actions described in the following section on cumulative actions.

CUMULATIVE ACTIONS

Cumulative actions are past, present, and reasonably foreseeable actions that may have cumulatively significant impacts when considered with the Proposed Action. The effects of these actions on NFS lands have been evaluated in the environmental analysis of the Proposed Action and its alternatives. Actions considered in the cumulative effects analysis are presented in more detail in Chapter 3.

APPLICABLE LAWS AND EXECUTIVE ORDERS

A partial list of Federal laws and Executive Orders (EO) pertaining to project specific planning and environmental analysis on Federal lands follows. While most pertain to all Federal lands, some of the laws are specific to Montana. Disclosures and findings required by these laws and orders are contained in Chapter 3 of the EA.

- Multiple-Use Sustained Yield Act of 1960.
- National Historic Preservation Act of 1966 (as amended).
- National Environmental Policy Act of 1969 (as amended).
- Clean Air Act of 1970 (as amended).
- Endangered Species Act of 1973 (as amended).
- Forest and Rangeland Renewable Resources Planning Act of 1974 (as amended).
- National Forest Management Act of 1976 (as amended).
- Clean Water Act of 1977 (as amended).
- American Indian Religious Freedom Act of 1980.

- Archeological Resource Protection Act of 1980.
- Cave Resource Protection Act of 1988.
- Executive Order 11593 (cultural resources).
- Executive Order 11988 (floodplains).
- Executive Order 11990 (wetlands).
- Executive Order 12898 (environmental justice).
- Executive Order 12962 (aquatic systems and recreational fisheries).

PERMITS

The following permits may be required prior to project implementation in order to ensure Federal and State laws are met:

MONTANA STREAMSIDE PROTECTION ACT (SPA 124 PERMIT)

Any project including the construction of new facilities or the modification, operation, and maintenance of an existing facility that may affect the natural existing shape and form of any stream or its banks or tributaries (Montana Department of Fish, Wildlife, and Parks).

FEDERAL CLEAN WATER ACT (SECTION 404 PERMIT)

Any activity that will result in the discharge or placement of dredged or fill material into waters of the United States, including wetlands (U.S Army Corp of Engineers).

SHORT-TERM WATER QUALITY STANDARD FOR TURBIDITY (318 AUTHORIZATION)

Any activity in any State water that will cause unavoidable short-term violations of water quality standards. "State water" includes any body of water, irrigation system, or drainage system, either surface or underground, including wetlands, except for irrigation water where the water is used up within the irrigation system and the water is not returned to other state water (Montana Department of Environmental Quality).

STORM WATER DISCHARGE GENERAL PERMITS

Any person, agency, or entity, either public or private, proposing a construction, industrial, mining, or other defined activity that has a discharge of storm water into surface waters. Under the authority of the Montana Water Quality Act, permit authorization is typically obtained under a Montana Pollutant Discharge Elimination System (MPDES) "General Permit" (Montana Department of Environmental Quality).

INFORMATION SOURCES

The analysis and decision processes for this project are based on the consideration of the best available science. The manner in which best available science is addressed can be found within the disclosure rationale throughout the SEA, biological assessments (BA), biological opinions (BO), and the project file.

OBJECTION REGULATIONS

This project contains actions which would implement the Flathead National Forest Plan and are subject to subparts A and B of 36 CFR 218, administrative objection regulations.

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CHAPTER 2

ALTERNATIVES CONSIDERED

INTRODUCTION

This chapter describes and compares the alternatives considered for the Glacier Loon Fuels Reduction and Forest Health Project. The alternatives for the Glacier Loon Project were developed from the issues identified by the ID Team, the public, and other agencies. The ID Team grouped the alternatives into one of two categories depending upon how they met the Purpose and Need for the project and their feasibility. These categories are:

1. Alternatives considered in detail and
2. Alternatives not considered in detail.

Rationale is given for those alternatives not studied in detail.

This chapter also includes a description and maps of the alternatives considered, activities common to all alternatives, and a comparison of these alternatives focusing on the major issues. This comparison of alternatives provides a basis for choice among the options for the decision maker and the public (40 CFR 1502.14).

PUBLIC INVOLVEMENT AND SCOPING PROCESS

The CEQ defines scoping as:

“... an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action.” (40 CFR 1501.7)

Among other things, the scoping process is used to invite public participation, to help identify public issues, and to obtain public comment during the EA process. Scoping should begin early and continue until a decision is made. To date, the public has been invited to participate in the following ways.

PUBLIC MAILING

On September 16, 2011, information on the Glacier Loon Fuels Reduction and Forest Health Project, including a map of the proposal, was mailed out to approximately 100 individuals, agencies, and groups (Project File Exhibit B-2).

Because of the interest generated by the initial mailing, information on the Glacier Loon Fuels Reduction and Forest Health Project including a map of the proposal was mailed out to an expanded mailing list on October 13, 2011.

PUBLIC INVOLVEMENT IN ALTERNATIVE DEVELOPMENT

On September 8, 2011, a Field Trip to the Glacier Loon Project Area was conducted. Nine Forest Service employees and 7 members of the public attended.

A “Request for Comments” on the Glacier Loon Fuels Reduction and Forest Health Project was mailed out on September 16, 2011, to approximately 188 members of the public, organizations,

or special interest groups. A “Request for Comments” on the Glacier Loon Fuels Reduction and Forest Health Project was published in *The Daily Inter Lake* on September 21, 2011 (Project File Exhibit B-2). Based upon the public interest in this project, another public meeting was held on October 7, 2011. In addition to Forest Service personnel, 10 members of the public were in attendance. On October 13, 2011, a postcard was mailed out to over 270 individuals notifying the public about a second Field Trip on October 31, 2011 and extending the public comment period to November 7, 2011. A subsequent Field Trip was held to the Glacier Loon Project Area on October 31, 2011; 31 members of the public, as well as 5 Forest Service employees attended.

Notification of this project proposal appeared in the USDA Forest Service’s Schedule of Proposed Actions (SOPA) on October 1, 2011, and quarterly since that time (Project File Exhibits B-5).

PUBLIC INVOLVEMENT ON THE 2012 EA

The Swan Lake Ranger District received 31 comments on the Glacier Loon Environmental Assessment, either in the form of letters, e-mails, telephone contacts, or comment sheets. These comments were responded to in the 2013 Glacier Loon Decision Notice. For further discussion on the administrative appeal process following the 2013 decision notice and then subsequent litigation, please see the forward section of this supplemental EA.

ISSUES

The ID Team reviewed and compiled a list of potential issues based upon comments from the public, organizations, and government agencies. These issues were then evaluated against the following criteria to determine the appropriate method for resolution:

- Is the issue relevant to and within the scope of the Purpose and Need, the decisions being made, and does it pertain directly to the Proposed Action?
- Is the issue already decided by law, regulation, or existing plans? Is it supported by scientific or factual evidence?
- Could the issue be resolved through design and location of activities in the Proposed Action or mitigated by avoiding the impact of not taking action, minimizing the impact by limiting the action, rectifying the impact by rehabilitation, reducing the impact by maintenance, or compensating for the impact by replacement?

Issues representing an unresolved conflict with the Proposed Action have been brought forward as “major issues” and were used to help formulate the alternatives to the Proposed Action. Project File Exhibit D-1 provides a detailed description of the issues identified during the scoping process and describes how those issues were accounted for during the analysis process.

KEY ISSUES FOR ALTERNATIVE DEVELOPMENT

During the issues content analysis and disposition process, the ID Team and District Ranger identified the following “key” issues, for which action alternatives were developed.

SCENIC VALUES AND WATER QUALITY

The statements below are examples of comments received during scoping, which articulated issues or concerns relative to Scenic Values and Water Quality (Project File Exhibit D-1).

- As a full time resident of Lindbergh Lake, and having spent many years working with our Congressional Delegation, The Trust of Public Lands, and many others, we were

successful in securing money from the Land and Water Conservation Fund to purchase 2,542 acres around Lindbergh Lake from Plum Creek Timber Company. The specific objective was to protect this land, more specifically: water quality, endangered and threatened species, and the visual plane (Project File Exhibit C-5).

- While I know there will be more specific testing with the environmental assessment after the first of the year, I have major concern about maintaining the high integrity of our water quality. Additionally, I am concerned about what erosion of the logged areas might do to lake water quality, as well as the cutting and use of new/temporary roads. Additionally, I am concerned about what erosion of the logged areas might do to lake water quality, as well as the cutting and use of new/temporary roads (Project File Exhibit C-21).
- I was an active participant in the effort to protect Lindbergh Lake from development by Plum Creek Timber in the early 1990's and also strongly oppose the proposed logging and road construction on the western slope of Lindbergh Lake. Our past efforts is very accurate and I feel it is imperative you adhere to a thorough review of the effects this will have on our water quality and on one of the most pristine habitats left in this country (Project File Exhibit C-23).
- We are also extremely concerned about your proposed logging to within 150 feet from the shores of Lindbergh Lake. In the process of logging so close to the shoreline, you will destroy many old growth Ponderosa and could cause erosion that would be dangerous to the water quality of the lake. Lindbergh Lake is a pristine lake from which we draw our drinking water. We are concerned that aggressive logging and building of roads in this area would be detrimental to the drinking water (Project File Exhibit C-29).
- I also have grave concerns about the threat to the quality of our drinking water from the project as it affects the entire lake (Project File Exhibit C-43).
- In 1996 portions of Sections 22, 27, 26, and 35 were acquired after much effort on the part of The Lindbergh Lake Community with 15 million dollars in Land and Water Conservation Funds and with the aid of our congressional delegation. The purpose was to preserve what is a unique ecosystem within the lower 48, from development, and logging activities planned by Plum Creek Timber. The water in Lindbergh Lake is our source of drinking water where it is consumed untreated and unfiltered by the lake residents. It represents one of the last remaining sources of natural potable water in the United States. This great effort and subsequent public expenditure was with the intent of protecting the views and watershed from precisely the activities proposed in The Glacier Loon Project.
- We specifically will vigorously oppose by whatever means necessary the planned activities in action areas 71, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, and further discussions will be necessary for the planned actions for areas 66-70. We find the clear cut plans for 84-87 on the western shore shocking and unacceptable (Project File Exhibits C-2 and C-15)
- I am opposed to the proposed treatments for Sections 84 – 87 as well as potentially Sections 80/81 (I apologize for my uncertainty). At any rate, it is the part of these sections that 'spills over' the top of the ridge and shows up as a section of intensively logged forest on the high visual impact west side of the lake. I would additionally wish to exempt the visual section of 80/81 – rather, keep any logging of these sections behind the FS road so it cannot be seen from the Lake (Project File Exhibit C- 21).
- I think that the suggested treatments in areas 84-87 and 89 should be completely reassessed. I do not support the proposals in these areas. These areas are a major part of the public view at Lindbergh Lake. Campground users and the general public enjoy the beauty of these spots as do the residents of the lake. Area residents in the Seeley Swan Valley count Lindbergh as one of their favorite recreational lakes, largely due to the immense beauty. Roads added in this area to accomplish the logging will not improve the

overall environment, be a great expense and a visual impairment (Project File Exhibit C-31).

- The proposed work in these areas would, first and foremost, have a dramatic effect on the Lindbergh Lake viewshed. This is a concern not only for Lindbergh Lake residents such as myself, but for the many non-residents who use the lake. One of the most important qualities of the lake is the sense of wilderness one gets when paddling or boating on the lake – of an ‘untouched’ lake, particularly the entire west side and south end beyond the few residences. I can think of few lakes where such an experience is available to people who may not be able to hike into, much less get out in a boat onto, a true wilderness lake. Based on the visual simulations provided, the proposed Glacier Loon project work would essentially destroy this quasi-wilderness experience for everyone who lives on or visits the lake (Project File Exhibit C-33).
- It is quite clear that proposed roads and logging units on the slopes above Lindbergh Lake are not acceptable from a visual quality perspective, especially to those who recreate on or have homes on the lake (Project File Exhibit C-34).
- I wonder whether you have given enough consideration to value of scenic qualities of the hillsides that border Lindbergh Lake. Many people use the campground and go boating on the lake. The lake is also used to get to the trailhead at the head of the lake to get into the Mission Mountains Wilderness. The people who have cabins enjoy the beauty of the forest on the west side of the lake. Logging on those slopes will definitely detract from their beauty. The logging done on Herrick still shows the scar after all those years. Great consideration should be given to the esthetic values of a scenic forest on lands facing the lake. I hope you will change your plan and leave the viewshed slopes as beautiful as possible (Project File Exhibit C-45).

WILDLIFE SECURITY

The statements below are examples of comments received during scoping, which articulated issues or concerns relative to Wildlife Security (Project File Exhibit D-1).

Alternative D is an alternative which responds to the Purpose and Need and focuses on wildlife security, retention of hiding cover and habitat connectivity, riparian habitat protection, and retention and recruitment of old growth habitat and lynx forage. Alternative D proposes the treatment of stands that would not continue to provide wildlife habitat in the short-term (5-10 year) without management intervention. Forested stands that would likely continue to provide habitat for longer than 5-10 years, without management intervention, were deferred from treatment at this time, in order to maintain hiding cover, connectivity of habitat, and wildlife security.

- Again, having hiked all through the area and many years ago seeing a grizzly bear up close in one of the actual places in which there will be cutting, I am deeply concerned that this will be injurious to those whose lives actually depend on the flora and undisturbed topography of the proposed treatment area (Project File Exhibit C-30).
- We are concerned about maintaining minimum threshold habitat and connectivity for wildlife, especially as this relates to forest carnivores. Through our work and experience, we recognize the Glacier Loon project area as one of the few functioning forest carnivore habitats left in the Swan River watershed (Project File Exhibit C-24).
- Please examine how this project will affect all ESA listed, MIS, and sensitive species (Project File Exhibit C-1).
- All the wildlife species in the project area require corridors to move for foraging, denning, nesting and seasonal habitats. Where are these corridors? What is the habitat quality in them? What size are they? Are they wide enough to protect from edge effects and provide security? Are they fragmented by roads or past logging units? How much canopy cover, thermal cover or hiding cover is in them? How much down woody debris

and snags are in them? What type of habitat is considered suitable? Where is the current lynx foraging and denning habitat located? How will it be maintained, how will it be improved, how is it connected or how will it be impacted by this project? What are the effects to critical habitat for lynx? Will it be adversely modified? Lynx avoid clearcuts. This project will expand clearcuts and negatively impact lynx (Project File Exhibit C-3).

- In addition, we support liberal buffers around all wetlands, which we know to provide hiding cover; structural complexity; unique vegetative and bird communities; and small rodent diversity occurring within the mixed conifer terrestrial and riparian wetland ecotone (Project File Exhibit C-24).

OTHER CONCERNS EVALUATED

The ID Team evaluated other concerns that helped frame the scope of the analysis during the scoping process. These concerns were not considered major issues because they were resolved through project design and, therefore, were not used to develop alternatives analyzed in detail. These concerns are also addressed within the effects analysis by resource in Chapter 3 of this document.

SOILS

Commenters also expressed concern over how the proposed activity would affect soil quality and productivity (Project File Exhibits C-1, C-3, and C-19). Design Criteria are incorporated into the EA to address these concerns. In addition, all applicable laws and regulations would be met in the design and implementation of the project.

FISHERIES

Comments were received regarding how the proposed activity would affect fisheries (bull trout spawning and rearing habitat) and affects to wetlands and Riparian Habitat Conservation Areas within the Glacier Loon Project Area (Project File Exhibits C-1, C-3, C-11, C-28, and C-34). Design Criteria are incorporated into the EA to address these concerns.

NOXIOUS WEEDS

Commenters expressed concern over the spread of noxious weeds associated with project activities (Project File Exhibits C-1, C-19, C-22, and C-31). Again, Design Criteria are incorporated into the EA to address these concerns. In addition, the activities associated with the Glacier Loon Project would adhere to direction contained in the Flathead National Forest's Noxious and Invasive Weed EA and Decision Notice (DN).

SNAGS AND COARSE WOODY DEBRIS

Comments were received on insuring that adequate amounts of snags and coarse woody debris are maintained in units (Project File Exhibits C-1, C-3, and C-19). Design Criteria have been incorporated into the EA to address these concerns. In addition, all applicable laws and regulations would be met in the design and implementation of this project.

OLD GROWTH

Commenters expressed concern over how proposed activities would affect old growth stands and old growth dependent wildlife species (Project File Exhibits C-1, C-3, C-11, C-21, and C-34). No activities would occur in old growth stands with this project. However, The EA describes the old

growth stand conditions in the Old Growth Section of Chapter 3. Habitat conditions for old growth associated species and snag dependent species in the analysis area are also analyzed and discussed in the EA. The Glacier Loon Project is consistent with the National Forest Management Act and with Forest Plan Amendment 21 – Old Growth Management.

ECONOMICS OF HARVEST

Commenters expressed concern over the economic feasibility of the project relative to reduced product value and local markets for the timber. Commenters also requested analysis of public revenue that would be generated by the project and requested a cost-benefit study (Project File Exhibits C-1, C-3, C-19, C-24, and C-27). These concerns are addressed in the Economics Section in Chapter 3 of this document.

RESTORATION

Comments were received regarding how the individual treatments and Project as a whole are consistent with the Southwestern Crown Collaborative CFLRP proposal, Landscape Strategy, and prioritization; how the treatments proposed will restore more natural forest conditions outside the wildland-urban interface, and how the proposed treatments will maximize the retention of large trees, as appropriate for the forest type, consistent with the requirements of FLRA, especially to the extent that the trees promote fire-resilient stands (Project File Exhibits C-3 and C-22). These concerns are addressed in the Vegetation Section in Chapter 3 of this document.

RANGE OF ALTERNATIVES

Section 102(2)(3) of the NEPA states that all Federal agencies shall “study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources.”

An EA must also “rigorously explore and objectively evaluate all reasonable alternatives.” The courts have established that this direction does not mean that every conceivable alternative must be considered, but all selection and discussion of alternatives must permit a reasoned choice and foster informed decision making and informed public participation.

The range of alternatives may extend beyond the limits set by Forest Plan goals and objectives under the NEPA; however, the NFMA requires that the selected alternative fully comply with the Forest Plan, unless the plan is amended in accordance with 36 CFR 219.10(F).

The range of alternatives presented in this chapter was determined by evaluating public and internal comments and the Purpose and Need for the project. This project is intended to meet the Purpose and Need while maintaining resource conditions that are within the range of natural (historical) variability (HRV). Other influences include Forest Plan goals, objectives, existing and desired conditions, standards and guidelines; Federal laws, regulations, and policies; and economic variability. Within these parameters, the alternatives developed by the ID Team display a reasonable range of outputs, treatments, costs, management requirements, Design Criteria, and effects of resources.

In addition to the alternatives considered in detail, the ID team examined other alternatives during the analysis process. Although these alternatives contributed to a reasonable range, they were eliminated from further consideration for the reasons listed below.

ALTERNATIVES NOT CONSIDERED IN DETAIL

This section discusses additional alternatives that were considered, but not given detailed study.

These alternatives were initially proposed to address issues identified during the public scoping and ID Team process, but were not considered in further detail for the reasons explained in the following narratives.

INCREASED ACREAGE OF FOREST HEALTH AND HAZARDOUS FUELS REDUCTION TREATMENTS

Based on both public and internal input, an alternative was considered that increased and/or intensified the acreage treated for forest health and hazardous fuel reduction. Both within and outside the WUI, additional treatments were considered in a number of forest stands. However, based on preliminary public input and interdisciplinary team field reconnaissance and analysis, the proposed action deferred treatment in areas totaling approximately 4,500 acres.

These areas were dropped from further consideration for a variety of reasons including: access and economic issues, riparian areas, old growth stands, lynx habitat, visual impacts, and areas where the existing stand conditions met the project objectives. In addition some areas were deferred primarily due to their proximity to the Crazy Horse Fire which occurred in 2003. This led to a recommendation to defer treatment in this area until more time for recovery from the effects of the fire had occurred.

One area specifically identified for consideration through public input included stands in the southwest portion of Section 14, of T19N, R17W. The need for active vegetation management was suggested in this area based on the presence of large diameter mature ponderosa pine. Field reconnaissance identified significant access and logging systems constraints in this area and it was also determined that many of the stands in this area are old growth.

For these reasons, an alternative to treat more extensively and intensively within the project area was not considered in detail.

NO TEMPORARY ROAD CONSTRUCTION

Some input was received from the public that, in the opinion of the commenters, no temporary roads should be built. These commenters felt that building roads, even temporary ones within RHCAs and streams within Section 12 would have significant effects on the watershed. The commenters also felt that the impacts of building temporary roads are the same as building permanent roads and that the temporary roads proposed with this project would increase road densities and decrease habitat security in violation of the Forest Plan and the Swan Valley Grizzly Bear Conservation Agreement. Commenters also expressed concern that building temporary road poses water, soils, other wildlife, fish, and noxious weed concerns also requested if there may be opportunities to avoid road construction by requiring cut to length and forwarding logging practices as opposed to tractor logging and whole tree yarding systems (Project File Exhibit D-1).

In project development, I asked the ID team to design the proposed action to limit temporary road construction. In response to public comment, I further asked the ID team to limit temporary road construction in designing the other action alternatives. These alternatives reduce temporary roads by requiring skidding longer distances that would normally be used under Forest Service guidelines for timber sales. The extra logging cost entailed impairs the economic viability of the alternative with little environmental gain in this situation. Due to the economic infeasibility of the alternative in current and reasonably foreseeable future market conditions, such an alternative was not considered in detail.

We realize that forest vegetation treatments and road building have the potential to produce impacts to water resources. We also believe that effects to water resources can be minimized with appropriate, site specific application of project Design Criteria and Best Management Practices (BMPs). Best Management Practices prevent most management activities from impacting water quality by minimizing sediment-producing disturbance and minimizing the potential for any sediment that is generated to reach a water body. Specific Design Criteria and

Best Management Practices to address your concern are included in this document.

Montana has laws and regulations, included in timber sale contracts whose intent is to protect the environment in and around the potholes and wetlands. Further protection is exercised by project design, both in unit layout and in implementation. INFISH and the Streamside Management Zone Law are two examples of regulations whose focus is to protect water quality and aquatic habitat.

When the project is scheduled for implementation, the appropriate 404 permitting and approval from the US Army Corps of Engineers would be obtained. Montana Streamside Protection Act (SPA) 124 permits would be obtained for any activity that would disturb stream channels.

Temporary roads would be constructed to the minimum standards necessary for log hauling. No public wheeled motorized access would be allowed on them. All temporary roads would be reclaimed following use (See Design Criteria, Appendix 2). The goal of reclaiming the temporary roads would be to discourage motorized use. Temporary roads will not increase the total road density (TRD) in the bear subunit. Open road densities (ORD) would temporarily increase during sale activities. The proposed activities in the Glacier Loon Project are outside of areas that would be expected to provide potential denning habitat for grizzly bear. There is no proposed activity in known or potential grizzly bear denning habitat. There is no proposed activity in known or potential grizzly bear denning habitat

All temporary roads and skid roads would be reclaimed by removing any installed culverts or temporary bridges (or, where they are less impactful, through the use of log crossings to be placed without excavation and removed prior to the wet season), by placing large woody material on the template, and by seeding with the native plant mix as specified by the Forest Botanist. In addition, all newly constructed temporary and skid roads would include re-contouring the entire road template to the natural ground contour, and to the extent feasible, placing the top soil back on the soil surface. However, on this gentle terrain, it is anticipated that little top soil would need to be moved, for the most part, during temporary road construction. Resource specific analyses of the effects to temporary roads on Fisheries, Invasive Plants, and Water Resources are disclosed in the EA.

KRAFT CREEK FISH BARRIER

Westslope cutthroat trout have greatly declined in number and distribution throughout the Swan River Valley. In 2008, a collaborative group, called the "Swan Native Fish Committee," reviewed all available data regarding cutthroat trout in the Swan River Valley. Available data indicated that only 17 tributary streams still had genetically pure or nearly pure populations and this represented just 20 percent of the historic distribution. The Kraft Creek population was the largest remaining population in the Swan River Valley. This population consisted of several tributaries (Red Butte, Upper Kraft, Middle Kraft, Hemlock, and Frenchy Creeks) that all co-mingled and formed a stronghold population. Available information for the Kraft Creek population was largely based on Forest Service surveys in 2004. The 2004 surveys found 100 percent genetically pure populations in the Red Butte and Upper Kraft Creeks. Middle Kraft Creek was 95 percent pure with slight introgression from rainbow trout alleles. Several migratory rainbow trout were captured in an upstream weir (fish trap) in the spring of 2004. Brook trout had invaded the area but their numbers were relatively low.

Based on this information, the Swan Native Fish Committee recommended investigating if it would be desirable to install a barrier on Kraft Creek. The concept was to install a barrier that blocks any further invasion of both rainbow trout and brook trout. There were several factors about Kraft Creek that made it appealing to conserve cutthroat trout by isolation. Kraft Creek was the largest remnant population in the Swan River Valley and unlikely to experience a loss of genetic fitness over time ("inbreeding"). The 2004 fish weir determined the cutthroat trout do not migrate and isolating them would be benign. Kraft Creek also has excellent habitat conditions. The watershed is entirely on National Forest System lands. Bull trout do not spawn in this system and installing the barrier would not have significant impacts to them. However, it was also understood that the Kraft Creek population would not be 100 percent pure (some rainbow alleles

had already been detected in Middle Kraft Area) but still at least 95 percent pure. There was also some concern that brook trout had already invaded the system, although they had remained at low numbers and were not depressing cutthroat trout abundance.

The Forest Service identified a possible location for a barrier in Kraft Creek, not far downstream from the Hemlock Creek confluence. The Glacier Loon proposed action included the barrier in public scoping. Comments received were supportive although concern was raised about the impact of a short, temporary road needed to install the barrier. An engineering firm was contracted to prepare a design concept for the barrier to aid environmental analysis. Meanwhile, the Swan Native Fish Committee collected more fisheries data in 2011 and also took advantage of recent advancements in conservation genetics. Unfortunately, the 2011 surveys found Kraft Creek had changed a lot since 2004. The area that previously was considered 95 percent pure was now about 88 percent pure. Most of the fish collected here had non-native alleles, indicating hybridization was rapidly increasing and widespread. Upper Kraft Creek and Hemlock Creek were also slightly hybridized. Only Red Butte Creek was still 100 percent pure. The 2011 Surveys also discovered that brook trout had substantially increased in numbers. Brook trout were now 50 percent of the biomass in Middle Kraft and Lower Hemlock Creeks. Brook trout numbers were also beginning to increase in Upper Kraft Creek. **Only Red Butte Creek was largely un-invaded by brook trout.**

Based on this information, the Swan Native Fish Committee withdrew support for installing a barrier on Kraft Creek as initially proposed. The group recommended investigating Red Butte Creek as a more suitable location for a barrier. Therefore, the Forest Service removed the Kraft Creek barrier from consideration with this project. In a separate decision, the Forest Service approved a barrier on Red Butte Creek instead and this was constructed in 2014. The Red Butte Creek fish barrier is located just outside of the Glacier Loon project boundary.

ALTERNATIVES CONSIDERED IN DETAIL

ALTERNATIVE A – NO ACTION

This alternative represents the existing condition in the Glacier Loon Project Area. Under this alternative, none of the activities proposed for the Glacier Loon Project would occur. No fuels reduction or forest health activities, temporary road and access management, and planting activities to aid in vegetation recovery, or other activities associated with the Proposed Action would occur at this time. Ongoing activities, such as recreation, public firewood gathering, fire suppression, and normal road maintenance would continue. Activities identified in Chapter 3 as current and foreseeable actions would occur.

ALTERNATIVES B, C, AND D (ACTION ALTERNATIVES)

Alternative B is the Proposed Action as described on pages 2-16 through 2-21.

Alternative C responds to the Purpose and Need and addresses comments received on Scenic Values and Water Quality concerns. This alternative focuses on eliminating the impacts to scenic values and reducing sedimentation to streams and water bodies by focusing on dropping proposed treatment units, reducing the amount of new temporary road construction, and increasing opportunities for decommissioning of historic road templates.

Alternative D is an alternative which responds to the Purpose and Need and focuses on wildlife security, retention of hiding cover and habitat connectivity, riparian habitat protection, and retention and recruitment of old growth habitat and lynx forage. Alternative D proposes the treatment of stands that would not continue to provide wildlife habitat in the short-term (5 to 10 years) without management intervention. Forested stands that would likely continue to provide habitat for longer than 5 to 10 years, without management intervention, were deferred from

treatment at this time, in order to maintain hiding cover, connectivity of habitat, and wildlife security.

TREATMENTS USED IN THE ACTION ALTERNATIVES

The section that follows describes silvicultural treatments, fuels treatments, site preparation, reforestation, and road management that are used to varying degrees in the descriptions of the individual action alternatives which follow this section.

VEGETATION MANAGEMENT

Silvicultural treatments are often defined as either regeneration or intermediate treatments. Regeneration methods are those that purposefully establish a new age class. Conversely, intermediate treatments are meant to enhance growth, quality, vigor, and composition of a stand prior to a regeneration treatment. Associated fuel treatments, site preparation and reforestation treatments are also proposed. Descriptions of the proposed treatments follow. Please refer to Appendix C in this document for detailed illustrations of the Silvicultural Treatments.

REGENERATION TREATMENTS

- **Clearcut with Reserves** - This treatment will remove nearly all trees from the site to facilitate regeneration of a new age class and increase species diversity. Although limited, all long lived, fire resistant, shade intolerant species (western larch, ponderosa pine, western white pine, and occasionally Douglas-fir) would be retained, where feasible and where not acting as an insect or disease vector. Reserve trees would be retained to provide long term structural diversity. These treatment areas consist of primarily even-aged lodgepole pine with little species or structural diversity and are either experiencing mountain pine beetle mortality or are at risk of being affected. Regeneration of trees would result from natural seeding, planted seedlings, or a combination of both. Mechanical treatments and/or prescribed fire could be used to reduce fuels, recycle nutrients and prepare the site for regeneration.

The National Forest Management Act and Forest Service Handbook direction dictate that clearcutting must be justified as the optimum method to meet management objectives when prescribed. Fourteen areas are proposed for clearcutting in this project. Clearcutting was determined to be the optimum regeneration method for meeting management objectives for each of these areas by the Project Silviculturist. Criteria used to make this determination included; species composition relative to management direction and availability of desired species for seed sources, species susceptibility to observed insect agents, presence of disease infections which would be transmitted to the regenerated stand or where non-susceptible species conversion is necessary, and stands subject to windthrow if residual trees were retained. Appendix A of the Silviculture Report (Project File Exhibit I-1) discusses the criteria which applied to specific treatment areas.

All of the action alternatives include one unit - #48 (clearcut with reserves) that would require Regional Forester approval to create an opening that exceeds 40 acres in size. However, during project layout, there is the potential that this unit may be broken into several subunits separated by buffers resulting in no unit being greater than 40 acres in size.

Regional Forester policy (FSM 2471.1) directs the size of harvest openings created by even-aged silvicultural practices would be normally 40 acres or less, to support NFMAs general intent to limit the size of harvest openings. Creation of larger openings requires 60-day public review and Regional Forester approval. The public is being given 60 days notification of the potential for an opening over 40 acres with this EA. More information

about the stand conditions and the proposed treatments are provided in Chapter 3 – Forest Vegetation.

- **Seed Tree with Reserves** - A portion of the existing overstory long-lived, fire-resistant, shade intolerant species (western larch, ponderosa pine, western white pine, and occasionally Douglas-fir) would be retained and reserved at a density sufficient to facilitate regeneration of these desired species and create a two-aged stand structure (e.g., 5 to 15 trees per acre). This density is designed to provide seed sources and long-term structural diversity, while not interfering with the successful regeneration of desired species. The majority of these areas are dominated by lodgepole pine infested with mountain pine beetle or at risk. In addition, some proposed areas are affected by dwarf mistletoe and/or root diseases. Regeneration of trees would result from natural seeding, planted seedlings, or a combination of both. Mechanical treatments and/or prescribed fire could be used to reduce fuels, recycle nutrients and prepare the site for regeneration.
- **Shelterwood with Reserves** - A portion of the existing overstory long-lived, fire-resistant, shade-intolerant species (typically; western larch, ponderosa pine, western white pine, and occasionally Douglas-fir) would be retained and reserved at a density sufficient to facilitate regeneration of these desired species and create a two-aged stand structure (e.g., 10 to 30 trees per acre). This density is designed to provide seed sources, long-term structural diversity, and provide shelter and a moderated micro-climate favorable for regeneration. Although similar to Seed Tree Treatments, the number of trees retained in Shelterwood Treatments would be greater. Again, these areas are currently affected by mountain pine beetle, dwarf mistletoe, and/or root diseases. Regeneration of trees would result from natural seeding, planted seedlings, or a combination of both. Mechanical treatments and/or prescribed fire could be used to reduce fuels, recycle nutrients and prepare the site for regeneration.

INTERMEDIATE TREATMENTS

- **Commercial Thin** - Existing tree density would be reduced from current levels to a target residual density ranging from 60 to 120 square feet of basal area per acre. This equates to approximately 50 to 150 trees per acre depending on tree species and site variables. Long-lived, fire-resistant, shade-intolerant species (typically; western larch, ponderosa pine, western white pine, and occasionally Douglas-fir) would be favored for retention. The purpose of this treatment is to enlarge the growing space of desirable trees and reduce tree competition for limited site resources allowing for improved tree growth, vigor, resilience, and manipulation of fuel continuity. Mechanical treatments and/or prescribed fire would be used to reduce fuels and recycle nutrients.
- **Modified Commercial Thin** - This treatment is specific to Units 66 and 67 as these units are in the vicinity of the Lindbergh Lake Campground and adjacent to private lands near Cygnet Lake. A modified commercial thin is proposed in those portions of Units 66 and 67 which are adjacent to and which would directly impact the campground and private lands. The commercial thin treatment would be “modified” so that the primary treatment objectives of fuels reduction and hazard tree mitigation are met while ensuring retention/enhancement of the recreational experience and privacy retention/screening for private lands. Modifications could include, but not limited to, items such as varying residual tree densities near private lands and strategically retaining understory trees for visual/noise screening. During implementation, the Project Silviculturist would work closely with the District Recreation Staff and private land owners on treatment specifics.
- **Improvement Cut** - These treatments would be designed to achieve one of two objectives. Where mature ponderosa pine trees exist, the purpose would be to reduce impacts from mountain pine beetle by altering the stand micro-environment and enlarging the growing space of desirable trees. The existing tree density would be reduced from current levels either through thinning (residual densities ranging from 60 to 80 square feet of basal area per acre) or “Daylighting.” Daylighting Treatments are applied on an

individual tree basis and involve clearing vegetation within a specified distance (~30 feet) of a target tree. Ponderosa pine and non-susceptible species (e.g. western larch and Douglas-fir) would be favored for retention in all treatments. In addition to the thinning of live trees, dead trees and pine trees currently infested with mountain pine beetle would be salvaged from these areas if encountered. Alternatively, improvement cutting is also proposed in immature stands with high existing tree densities and designed to manipulate fuel continuity and reduce mountain pine beetle hazard. Here, tree density would be reduced from current levels to a target residual density ranging from 50 to 200 trees per acre. Many of the trees to be removed would be smaller than the minimum Forest Service sawlog specifications of 7 inches DBH; however larger trees are also likely to be removed. Mechanical treatments would be used to reduce fuels and recycle nutrients.

- **Sanitation/Salvage** - In these treatment areas the existing stand structure would generally remain intact following treatment. However, these areas would be modified by removal of dead, dying, or damaged trees. Primarily this includes lodgepole pine trees affected by mountain pine beetle. Where concentrations of affected trees exist, stand structure would be more significantly modified. The purpose of this treatment is to improve stand health, recover economic value, and manipulate fuel loadings and continuity. Mechanical treatments would be used to reduce fuels and recycle nutrients.
- **Post and Pole** - Areas identified as "Post and Pole" would be established as personal use post and pole areas. In these areas permitted individuals would be allowed to harvest live lodgepole pine trees less than 5 inches DBH. Areas would be identified on the ground and all specified permit conditions would apply, including limits on material harvested.
- **Pre-Commercial Thin** - In this treatment the existing immature tree density would be reduced to a target residual density (e.g., 50 to 300 trees per acre). The primary purpose of this treatment is to reduce fuel continuity, adjust species composition, and concentrate growth on the most desirable trees. This treatment would focus on the removal of sapling and pole-sized trees generally not greater than 5 inches DBH. Mechanical treatments and/or pile burning would be used to reduce fuels and recycle nutrients. This treatment is typically accomplished through hand thinning methods or through mechanized chipping/mastication.

FUEL TREATMENTS

A number of prescribed treatments are designed to reduce natural and activity generated fuels within the proposed treatment areas. These treatments include mechanical methods and the use of prescribed fire. Mechanical treatments could include a combination of the following; whole tree yarding (or possibly yarding of tops), lop and scatter, masticating, and/or excavator piling. Fuel accumulations at landings would be addressed through burning, chipping/masticating, and/or removal from National Forest lands. Prescribed fire treatments could include broadcast burning, pile burning and/or jackpot burning.

SITE PREPARATION

Depending on existing vegetation and ground conditions, site preparation may be prescribed to create favorable conditions to help ensure adequate regeneration. These treatments are often prescribed in both artificial and natural regeneration situations and typically address competing vegetation, seed bed preparation, fuel accumulations, and duff reduction. Site preparation can be accomplished through hand, mechanical, or prescribed fire methods. Hand methods usually involve creating favorable conditions at the time of planting using hand tools. Mechanical treatments are often accomplished during harvest operations or shortly afterwards and involve scarification and seed bed preparation through the use of mechanized equipment. Prescribed fire can also be used to recycle nutrients, consume excess fuels, reduce competing vegetation, and create a favorable seedbed.

REFORESTATION

Where regeneration treatments are proposed, a combination of natural and artificial reforestation is planned (specifically, hand planting of desired species). Where planting occurs, species selection would be based on management direction and site characteristics. Emphasis would be placed on establishing long-lived shade intolerant species such as western larch, ponderosa pine, western white pine, and occasionally Douglas-fir. It is expected that some level of natural regeneration would occur in all regeneration units.

ROAD MANAGEMENT

ROAD MAINTENANCE (BEST MANAGEMENT PRACTICES)

The objectives of road maintenance are to reduce the concentration of sub-surface and surface water runoff, minimize road surface erosion, filter ditch water before entering streams, and decrease the risk of culvert failures during peak runoff events. Maintenance work could include culvert installation, replacement of existing culverts with larger culverts, installation of drainage dips and surface water deflectors, placement of rip-rap to armor drainage structures, aggregate surface replacement, aggregate placement to reinforce wet surface areas, ditch construction and cleaning where needed, and surface blading to restore drainage efficiency of the road surface. These actions would bring the roads up to current BMP Standards and provide benefits to the streams in the project area. Best Management Practices are required under Timber Sale Contracts prior to hauling of timber over these roads.

ROAD CONSTRUCTION

The Glacier Loon Transportation Plan identified several areas that would need to be accessed by temporary roads. The proposed road construction would allow temporary access to proposed treatment areas through historic road templates and new temporary roads.

Historic Road Template

An historic template can be defined as a constructed road surface that was once used for a transportation need but is not currently a part of the National Forest Road System. It has an overall template that has not been re-contoured, and is in a state that is impassible to full sized motor vehicles due to waterbars and culvert removals and/or closure by vegetation, earth berm, or other natural features.

Temporary Roads

Temporary roads would be constructed to the minimum standards necessary for log hauling on National Forest System (NFS) roads. Temporary road surface width would be limited to truck bunk width plus 4 feet. Temporary roads would be reclaimed following their use using drain dips, out-sloping, scarifying, seeding, and re- contouring.

ROAD DECOMMISSIONING

Road decommissioning is defined as activities that result in the stabilization and restoration of unneeded roads to a more natural state (36 CFR 212.1), (FSM 7703). Decommissioning removes roads from the landscape that are no longer needed for current or future resource management or which pose a threat to water quality or wildlife security. This action would restore the natural drainage patterns interrupted when the roads were constructed. These methods for decommissioning include active and passive restoration. **Active treatment** may include total re-contouring that would restore the road template to the natural hill slope, partial re-contouring to fill ditches or remove unstable road shoulders, removing culverts and other drainage structures, ripping the roadbed to reduce compaction, installing water bars, out-sloping the road prism, seeding and fertilizing disturbed soil, and blocking the road entrance and abandoning the road to allow re-vegetation. **Passive treatment** would not involve any ground disturbing work.

Please refer to Table 2-1 below for a summary by alternative of management activities.

TABLE 2-1. TREATMENT SUMMARY BY ALTERNATIVE			
	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D
COMMERCIAL HARVEST TREATMENT ACRES*			
Clearcut with Reserve Trees	240	229	217
Seed Tree with Reserve Trees	463	405	347
Shelterwood with Reserve Trees	70	51	31
Commercial Thin	851	624	236
Improvement Cut	117	117	84
Sanitation/Salvage	8	11	5
Post and Pole	10	10	10
Pre-Commercial Thin	343	343	95
Modified Commercial Thin	0	119	125
Total Treatment Acres	2,102	1,909	1,150
LOGGING SYSTEM ACRES*			
Tractor	1,697	1,549	1,038
Skyline	44	0	0
Mechanical	356	355	107
Hand	5	5	5
Total Logging System Acres	2102	1909	1150
FUEL TREATMENT ACRES*			
Fuels treatments within the Wildland Urban Interface	1,710	1,526	902
Fuels treatments outside the Wildland Urban Interface	392	383	248
ROAD MANAGEMENT MILES			
Haul Routes (BMPs to be applied to meet Timber Sale Requirements)	37.7	34.7	29.1
Temporary Road Construction	11.5	7.4	5.8
Roads Proposed for Decommissioning	4.1	8.4	8.4
Resource Enhancement Projects	Two Projects to Improve Values (See narrative below)		

* Acres will likely be slightly less due to change in buffer (Management Requirement and Design Criteria) for unoccupied water howellia habitat from 150 feet to 300 feet.

RESOURCE ENHANCEMENT PROJECTS

Resource enhancement projects identified during project design are shown in the Table 2-2 below. These projects were identified to improve other resource values within the project area. Please refer to Maps 2-2 through 2-6 at the end of this chapter for a display of the project locations. These projects, while in the project analysis area, are not needed to mitigate effects of the proposed action or any of the alternatives. These projects represent site specific resource enhancement opportunities that, through this decision, would be authorized to occur. The implementation of these projects could occur as stand-alone projects and or could be associated with the proposed actions through stewardship contracting. Additional detail on the projects and potential funding sources follow.

TABLE 2-2. RESOURCE ENHANCEMENT PROJECTS.		
GROUND LOCATION	PROJECT # ON MAP	PROJECT DESCRIPTION

TABLE 2-2. RESOURCE ENHANCEMENT PROJECTS.

GROUND LOCATION	PROJECT # ON MAP	PROJECT DESCRIPTION
End of Road #9591Y in T20N, R17W, Section 14	#1	A historic road (unmapped, no number) or skid trail was discovered about 0.25 miles from the end of FSR 9591Y. This road was built in the bottom of a small draw and not reclaimed. This draw now collects water into a stream that runs down the middle of the old road. The stream is small and not substantially eroding but it may have slightly altered the groundwater input of the wetland it flows into, which happens to be occupied by <i>Howellia</i> . This project would plant approximately 400 shrubs and seedlings on about 250' length of the stream. As the plants mature, they should be able to restore natural groundwater movement and help the stream fade away.
Road #9552 in T19N, R17W, Sections 33	#2	The existing road is poorly designed where it crosses the unnamed stream that flows between Meadow Lake and Bunyan Lake. The culvert is a seasonal fish migration barrier and the road surface erodes into the creek. Both Bunyan and Meadow Lake have wild (self-sustaining) cutthroat trout and the barrier is not desirable. This project would replace the culvert with either a larger culvert that provides fish passage or a bridge. The road would be reconstructed so that it does not erode into the stream. Minor work would also take place at the trailhead to reduce erosion.

Several sources of funding exist for resource enhancement projects. Many items have the potential to be funded through timber sales, while other items could be funded with Congressionally-approved funds (Collaborative Forest Landscape Restoration Program) or Stewardship dollars. Implementation would be based on annual budgets and program direction. It is anticipated that this project may be offered under a Stewardship Contract. Actual authority to offer under such a contract comes from the Regional Forester on a case-by-case basis. If approved as a Stewardship offering, these items will be included in Stewardship Projects, but inclusion of projects in the final award will depend on the bid value received for the project. Some, none, or all of the projects may be implemented through Stewardship contracting depending on market conditions at the time of offer. Implementation through direct project funding will be based on annual budgets and program direction. If funding were not available, the improvements from these projects would not be accomplished.

DESIGN CRITERIA

Table 2- 16 located at the end of this chapter describes the Design Criteria applied to this project to protect resources.

MONITORING

Monitoring and evaluation compared the results being achieved to those projected in the Forest Plan. Monitoring is conducted on a sample basis to evaluate the overall progress in implementing the Forest Plan, the assumptions on which the Forest Plan is based, and to provide a feedback loop for determining effectiveness of project and mitigation implementation (USDA Forest Service 2001). For this project, monitoring and evaluation would be conducted as described in Appendix A of this document. Those monitoring components not specifically discussed in this appendix tier to the monitoring described in the Forest Plan.

ACTIVITIES SPECIFIC TO THE ACTION ALTERNATIVES

Features unique to each alternative are described below. Maps displaying each alternative (Maps

2-1, 2-2, 2-3, 2-4, 2-5, and 2-6) are found at the end of this chapter.

ALTERNATIVE B – PROPOSED ACTION (MAPS 2-1 AND 2-2)

Intent: Alternative B was developed to respond to the Purpose and Need for the Glacier Loon Project. The Proposed Action focuses on reducing hazardous fuel buildup and improving forest health in the Glacier Loon Project Area by using various vegetative treatments, both commercial and non-commercial. Features associated with this alternative include the following:

- Fuel reduction and forest health treatment of affected stands on approximately **2102 acres** of NFS lands within the Glacier Loon Project Area including:
 - 240 acres of Clearcut with Reserve Trees;
 - 463 acres of Seed Tree with Reserve Trees;
 - 70 acres of Shelterwood with Reserve Trees;
 - 851 acres of Commercial Thin;
 - 117 acres of Improvement Cut;
 - 8 acres of Sanitation/Salvage;
 - 10 acres of Post and Pole; and
 - 343 acres of Pre-Commercial Thin.
- Harvest activities would be implemented using the tractor, skyline, mechanical, and hand treatments in the summer and tractor and forwarder logging systems during the winter.
- Slash would be treated through a combination of the following; whole tree yarding (or possibly yarding of tops), lop and scatter, masticating, and/or excavator piling. Fuel accumulations at landings would be addressed through burning, chipping/masticating, and/or removal from National Forest lands. Prescribed fire treatments could include broadcast burning, pile burning and/or jackpot burning.
- Hand planting would occur on an estimated **400 acres** of desired species within regeneration treatment units. Where adequate site preparation is achieved, natural regeneration would be expected to occur and in some cases supplement planted seedlings. A variety of species would likely become naturally established.
- Fuels Treatment would occur on **1,710 acres** within the Wildland Urban Interface.
- Fuels Treatment would occur on **392 acres** outside the Wildland Urban Interface.
- Best Management Practices would be implemented on an estimated **37.7 miles** of haul routes to meet Timber Sale Requirements.
- Units would be accessed through an estimated **11.5 miles** of temporary road construction as shown in Table 2-3 below. System roads would be used for road haul.
- Road decommissioning is proposed on an estimated **4.1 miles**.
- Minimal harvest activity would occur within Riparian Habitat Conservation Areas (RHCAs) in upland areas. Some temporary road locations would occur within RHCAs and cross streams. Site specific Design Criteria would assure that there would not be any adverse effects to streams, fish, or fish habitat. Portions of Units 19, 24, 57, 61, and 205 totaling 4.3 acres and a portion of Unit 64 totaling 2.08 acres would occur within RHCAs.

TABLE 2- 3. TEMPORARY ROAD NEEDS FOR ALTERNATIVE B - PROPOSED ACTION			
UNIT	TEMP ROAD NAME	ACCESS	MILES
2	14A	Access via NFS Road #9591	0.27
3, 4, 5, 6, 7, 8	23A	Access via NFS Road #91306 & #91305	0.76
6	14B	Access via NFS Road #91306	0.09
9	14D	Access via NFS Road #9591	0.35
9, 10	23B	Access via NFS Road #9591 & #91306	0.14
11	23C	Access via NFS Road #91306	0.11
12, 13, 14	24A	Access via NFS Road #9780	0.48
13, 14	24A	Access via NFS Road #9780	0.32
15, 16, 17	26A	Access via NFS Road #561	0.65
18	27A	Access via NFS Road #561	0.17
20, 21, 22, 23	36C	Access via NFS Road #9579C	0.98
24, 25	36A	Access via NFS Road #9579	0.16
26	36B	Access via NFS Road #9579C	0.30
27, 28	01B	Access via NFS Road #9579 & #9579C	0.34
29	01C	Access via NFS Road #9579C	0.19
30	01A	Access via NFS Road #9579C	0.13
41	06A	Access via NFS Road #10567	0.13
47, 48	11A	Access via NFS Road #9578 & #11648B	0.44
48	02D	Access via NFS Road #9578 & #11648B	0.12
51	11B	Access via NFS Road #11648B & #10741	0.47
52, 53, 54, 55, 57, 58	12E	Access via NFS Road #79	0.84
59	12D	Access via Missoula County #79	0.34
60, 61, 62, 63	12A	Access via NFS Road #10566	0.40
60	12C	Access via NFS Road #10566	0.16
61, 63	12B	Access via NFS Road #10566	0.20
66	14B and 11C	Access via NFS Road #79	0.37
67, 68, 69, 70	15C	Access via NFS Road #91240	0.74
71	15D	Access via NFS Road #90243	0.19
76	15A and 15B	Access via NFS Road #90241 & #90242	0.55
79, 80, 81	22A	Access via NFS Road #79A	0.61
84, 85	22B	Access via NFS Road #10734	0.26
90	22C	Access via NFS Road #9575	0.30
Total Temporary Roads			11.5

Alternative B vegetation treatments and associated activities are summarized in the following table.

TABLE 2- 4 SUMMARY OF PROPOSED TREATMENT ACTIVITIES FOR ALTERNATIVE B.	
HARVEST TREATMENT ACRES *	
Clearcut with Reserve Trees	240
Seed Tree with Reserves	463
Shelterwood with Reserves	70
Commercial Thin	851
Improvement Cut	117
Sanitation/Salvage	8
Post and Pole	10

TABLE 2- 4 SUMMARY OF PROPOSED TREATMENT ACTIVITIES FOR ALTERNATIVE B.	
HARVEST TREATMENT ACRES *	
Pre-Commercial Thin	343
Total Treatment Acres	2102
LOGGING SYSTEM ACRES *	
Tractor	1,697
Skyline	44
Mechanical	356
Hand	5
Total Logging System Acres	2102
SLASH TREATMENT *	
Chip/Excavator Pile/Burn	13
Chip/Pile Remove	339
Lop & Scatter/Pile/Burn	5
Lop & Scatter/Hand Pile/Burn	10
Whole Tree Yarding	468
WTY/Broadcast Burn	164
WTY, Excavator Pile/Burn Piles	751
WTY/Excavator Pile/Burn/Chip	311
WTY/Hand Pile/Burn/Chip	41
Total Slash Treatment Acres	2102
ROAD MANAGEMENT	
Haul Routes (BMPs) to be applied to meet Timber Sale Requirements	37.7
Temporary Road Construction	11.5
Roads Proposed for Decommissioning	4.1

* Acres will likely be slightly less due to change in buffer (Management Requirement and Design Criteria) for unoccupied water howellia habitat from 150 feet to 300 feet.

TABLE 2- 5 PROPOSED TREATMENT ACTIVITIES FOR ALTERNATIVE B - PROPOSED ACTION.					
UNIT No.	UNIT ACRES	ALTERNATIVE B TREATMENT	LOGGING SYSTEM	SLASH TREATMENT	FOREST PLAN MA DIRECTION
1	10	Commercial Thin	Tractor	WTY	15C
2	12	Clearcut with Reserves	Tractor	WTY, Broadcast Burn	15C
3	6	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
4	2	Sanitation/Salvage	Tractor	WTY	15C
5	15	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
6	29	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
7	3	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
8	2	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
9	15	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
10	5	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
11	3	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C

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ALTERNATIVES CONSIDERED

TABLE 2- 5 PROPOSED TREATMENT ACTIVITIES FOR ALTERNATIVE B - PROPOSED ACTION.

UNIT No.	UNIT ACRES	ALTERNATIVE B TREATMENT	LOGGING SYSTEM	SLASH TREATMENT	FOREST PLAN MA DIRECTION
12	6	Commercial Thin	Tractor	WTY	15C
13	88	Commercial Thin	Tractor	WTY	15C
14	36	Commercial Thin	Tractor	WTY	15C
15	75	Commercial Thin	Tractor	WTY	15C
16	5	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
17	21	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
18	9	Commercial Thin	Tractor	WTY	15C
19	11	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
20	14	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
21	1	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
22	31	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
23	24	Commercial Thin	Tractor	WTY, Excavator Pile, Burn Piles	15C
24	17	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
25	20	Commercial Thin	Tractor	WTY	15C
26	24	Commercial Thin	Tractor	WTY	15C
27	11	Improvement Cut	Tractor	WTY	15C
28	17	Commercial Thin	Tractor	WTY, Excavator Pile, Burn Piles	15C
29	16	Improvement Cut	Tractor	WTY	15C
30	6	Improvement Cut	Tractor	WTY	15C
31	26	Improvement Cut	Tractor	WTY	15C
32	23	Commercial Thin	Tractor	WTY	5
33	24	Commercial Thin	Tractor	WTY	5
34	16	Improvement Cut	Tractor	WTY, Hand Pile/Burn, Chip	5
35	41	Commercial Thin	Tractor	WTY	5
36	4	Improvement Cut	Tractor	WTY, Hand Pile/Burn, Chip	5
37	21	Improvement Cut	Tractor	WTY, Hand Pile/Burn, Chip	5
38	11	Clearcut with Reserve Trees	Tractor	WTY	5
39	14	Improvement Cut	Mechanical	Chip, Excavator Pile, Burn	5
40	3	Improvement Cut	Mechanical	Chip, Excavator Pile, Burn	5
41	22	Commercial Thin	Tractor	WTY, Excavator Pile, Burn Piles	15C
42	23	Commercial Thin	Tractor	WTY, Excavator Pile, Burn Piles	17
43	16	Commercial Thin	Tractor	WTY, Excavator Pile, Burn Piles	15C
44	4	Commercial Thin	Tractor	WTY, Excavator Pile, Burn Piles	15C
45	7	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
46	2	ST Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C

UNIT No.	UNIT ACRES	ALTERNATIVE B TREATMENT	LOGGING SYSTEM	SLASH TREATMENT	FOREST PLAN MA DIRECTION
47	12	Clearcut with Reserves	Tractor	WTY, Broadcast Burn	15C
48	76	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
49	6	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
50	10	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
51	20	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
52	34	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	17
53	3	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	17
54	11	Commercial Thin	Tractor	WTY	17
55	4	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	17
56	6	Sanitation/Salvage	Tractor	WTY	15C
57	18	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
58	16	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	17
59	10	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
60	10	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
61	20	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
62	2	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
63	9	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
64	9	Commercial Thin	Tractor	WTY	15C
65	3	Commercial Thin	Tractor	WTY	17
66	96	Commercial Thin	Tractor	WTY, Excavator Pile, Burn, Chip	5
67	87	Commercial Thin	Tractor	WTY, Excavator Pile, Burn, Chip	5
68	34	Commercial Thin	Tractor	WTY, Excavator Pile, Burn Piles	5
69	5	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
70	18	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
71	10	Commercial Thin	Tractor	WTY	15C
72	9	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
73	17	Seed Tree with Reserves	Tractor	WTY, Broadcast Burn	15C
74	23	Seed Tree with Reserves	Tractor	WTY, Broadcast Burn	15C
75	6	Seed Tree with Reserves	Tractor	WTY, Broadcast Burn	15C
76	128	Commercial Thin	Tractor	WTY, Excavator Pile, Burn, Chip	15C
77	18	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15
78	10	Post and Pole	Tractor	L&S, Hand Pile/Burn	15

GLACIER LOON FUELS REDUCTION AND FOREST HEALTH PROJECT

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ALTERNATIVES CONSIDERED

TABLE 2- 5 PROPOSED TREATMENT ACTIVITIES FOR ALTERNATIVE B - PROPOSED ACTION.					
UNIT No.	UNIT ACRES	ALTERNATIVE B TREATMENT	LOGGING SYSTEM	SLASH TREATMENT	FOREST PLAN MA DIRECTION
79	11	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15
80	21	Shelterwood with Reserves	Tractor	WTY, Broadcast Burn	15
81	23	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15
82	21	Seed Tree with Reserves	Tractor	WTY, Broadcast Burn	15
83	7	Seed Tree with Reserves	Tractor	WTY, Broadcast Burn	15
84	6	Shelterwood with Reserves	Tractor	WTY, Broadcast Burn	15
85	12	Shelterwood with Reserves	Skyline	WTY, Broadcast Burn	15
86	32	Seed Tree with Reserves	Skyline	WTY, Broadcast Burn	15
87	3	Seed Tree with Reserves	Tractor	WTY, Broadcast Burn	15
88	9	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15
89	31	Shelterwood with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15
90	17	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15
92	10	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15
94	25	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15
200	8	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
201	133	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
202	44	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
203	4	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
204	53	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
205	6	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
206	3	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
207	5	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
208	5	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
209	2	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	17
210	4	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	17
211	8	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
212	14	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
213	17	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
214	6	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	9
215	7	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
216	5	Pre-Commercial Thin	Hand	Lop & Scatter, Pile/Burn	15C
217	6	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
218	5	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	5
219	8	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15
Total Acres	2102				

ALTERNATIVE C (MAPS 2-3 AND 2-4)

Intent: Alternative C was developed to respond to Issue #1, Scenic Values (primarily views from the property owners on the northwest shore of Lindbergh Lake) and Water Quality (reducing sedimentation to streams and water bodies). To address these concerns, treatment units were modified by shape, reduced in acreage, or dropped. Proposed temporary roads were shortened, re-located, or dropped. In addition, an increased number of roads were proposed for decommissioning. Features associated with this alternative include the following:

- Fuel reduction and forest health treatment of affected stands on approximately **1909 acres** of NFS lands within the Glacier Loon Project Area including:
 - 229 acres of Clearcut with Reserve Trees;
 - 405 acres of Seed Tree with Reserve Trees;
 - 51 acres of Shelterwood with Reserve Trees;
 - 624 acres of Commercial Thin;
 - 117 acres of Improvement Cut;
 - 11 acres of Sanitation/Salvage;
 - 10 acres of Post and Pole; and
 - 343 acres of Pre-Commercial Thin; and
 - 119 acres of Modified Commercial Thin
- Harvest activities would be implemented using the tractor, skyline, mechanical, and hand treatments in the summer and tractor and forwarder logging systems during the winter.
- Slash would be treated through a combination of the following; whole tree yarding (or possibly yarding of tops), lop and scatter, masticating, and/or excavator piling. Fuel accumulations at landings would be addressed through burning, chipping/masticating, and/or removal from National Forest lands. Prescribed fire treatments could include broadcast burning, pile burning and/or jackpot burning.
- Hand planting would occur on an estimated **340 acres** of desired species within regeneration treatment units. Where adequate site preparation is achieved, natural regeneration would be expected to occur and in some cases supplement planted seedlings. A variety of species would likely become naturally established.
- Fuels Treatment would occur on **1,526 acres** within the Wildland Urban Interface.
- Fuels Treatment would occur on **383 acres** outside the Wildland Urban Interface.
- Best Management Practices (BMPs) would be implemented on an estimated **34.7 miles** of haul routes to meet Timber Sale Requirements.
- Units would be accessed through an estimated **7.4 miles** of temporary road construction as shown in Table 2- 6 Temporary Road Needs for Alternative C.below. System roads would be used for road haul.
- Road decommissioning is proposed on an estimated **8.4 miles**.
- No new temporary road construction would occur within riparian areas.
- Minimal harvest activity would occur within Riparian Habitat Conservation Areas (RHCAs) in upland areas. Portions of Units 19, 24, 57, 61, and 205 totaling 4.3 acres and a portion of Unit 64 totaling 2.08 acres would occur within RHCAs. Site specific

Design Criteria would assure that there would not be any adverse effects to streams, fish, or fish habitat.

■

2	14A	Access via NFS Road #9591	0.07
3, 4, 5, 6, 7, 8	23A	Access via NFS Road #91306 & #91305	0.76
9	14D	Access via NFS Road #9591	0.35
9, 10	23B	Access via NFS Road #9591 & #91306	0.10
11	23C	Access via NFS Road #91306	0.11
12, 13	24A	Access via NFS Road #9780	0.48
15, 16, 17	26A	Access via NFS Road #561	0.45
18	27A	Access via NFS Road #561	0.17
26	36B	Access via NFS Road #9579C	0.30
27, 28	01B	Access via NFS Road #9579 & #9579C	0.22
29	01C	Access via NFS Road #9579C	0.19
30	01A	Access via NFS Road #9579C	0.06
47, 48	11A	Access via NFS Road #9578 & #11648B	0.37
48	02D	Access via NFS Road #9578 & #11648B	0.12
51	11B	Access via NFS Road #11648B & #10741	0.47
52, 53, 54, 55,	12D	Access via NFS Road #79	0.62
60, 61, 62, 63	12A	Access via NFS Road #10566	0.40
61, 63	12B	Access via NFS Road #10566	0.20
66	14B and 11C	Access via NFS Road #79	0.37
68,70	15C	Access via NFS Road #91240	0.24
71	15D	Access via NFS Road #90243	0.19
76	15B	Access via NFS Road #90241 & #90242	0.35
80	22A	Access via NFS Road #79A	0.05
89	27A	Access via NFS Road #10734	0.09
90	22C	Access via NFS Road #10728	0.30
Total Temporary Roads			7.4

Alternative C vegetation treatments and associated activities are summarized in the following table.

HARVEST TREATMENT ACRES *	
Clearcut with Reserve Trees	229
Seed Tree with Reserves	405
Shelterwood with Reserves	51
Commercial Thin	624
Improvement Cut	117
Sanitation/Salvage	11
Post and Pole	10
Pre-Commercial Thin	343
Modified Commercial Thin	119
Total Treatment Acres	1,909

TABLE 2- 7 SUMMARY OF PROPOSED TREATMENT ACTIVITIES FOR ALTERNATIVE C.

HARVEST TREATMENT ACRES *	
LOGGING SYSTEM ACRES	
Tractor	1,549
Skyline	0
Mechanical	355
Hand	5
Total Logging System Acres	1,909
SLASH TREATMENT *	
Chip/Excavator Pile/Burn	14
Chip/Pile Remove	338
Lop & Scatter/Pile/Burn	5
Lop & Scatter/Hand Pile/Burn	10
Whole Tree Yarding	432
WTY/Broadcast Burn	102
WTY, Excavator Pile/Burn Piles	730
WTY/Excavator Pile/Burn/Chip	237
WTY/Hand Pile/Burn/Chip	41
Total Slash Treatment Acres	1,909
ROAD MANAGEMENT *	
Haul Routes (BMPs) to be applied to meet Timber Sale Requirements	34.7
Temporary Road Construction	7.4
Roads Proposed for Decommissioning	8.4

* Acres will likely be slightly less due to change in buffer (Management Requirement and Design Criteria) for unoccupied water howellia habitat from 150 feet to 300 feet.

TABLE 2- 8 PROPOSED TREATMENT ACTIVITIES FOR ALTERNATIVE C.

UNIT NO.	UNIT ACRES	ALTERNATIVE C TREATMENT	LOGGING SYSTEM	SLASH TREATMENT	FOREST PLAN MA DIRECTION
1	10	Clearcut with Reserves	Tractor	WTY	15C
2	12	Clearcut with Reserves	Tractor	WTY, Broadcast Burn	15C
3	6	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
4	2	Sanitation/Salvage	Tractor	WTY	15C
5	15	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
6	29	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
7	3	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
8	2	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
9	15	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
10	5	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
11	3	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
12	6	Commercial Thin	Tractor	WTY	15C
13	88	Commercial Thin	Tractor	WTY	15C
15	75	Commercial Thin	Tractor	WTY	15C

TABLE 2- 8 PROPOSED TREATMENT ACTIVITIES FOR ALTERNATIVE C.

UNIT NO.	UNIT ACRES	ALTERNATIVE C TREATMENT	LOGGING SYSTEM	SLASH TREATMENT	FOREST PLAN MA DIRECTION
16	5	Commercial Thin	Tractor	WTY, Excavator Pile, Burn Piles	15C
17	21	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
18	9	Commercial Thin	Tractor	WTY	15C
19	11	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
20	14	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
22	31	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
23	24	Commercial Thin	Tractor	WTY, Excavator Pile, Burn Piles	15C
24	17	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
25	20	Commercial Thin	Tractor	WTY	15C
26	24	Commercial Thin	Tractor	WTY	15C
27	11	Improvement Cut	Tractor	WTY	15C
28	17	Commercial Thin	Tractor	WTY, Excavator Pile, Burn Piles	15C
29	16	Improvement Cut	Tractor	WTY	15C
30	6	Improvement Cut	Tractor	WTY	15C
31	26	Improvement Cut	Tractor	WTY	15C
32	23	Commercial Thin	Tractor	WTY	5
33	24	Commercial Thin	Tractor	WTY	5
34	16	Improvement Cut	Tractor	WTY, Hand Pile/Burn, Chip	5
35	41	Commercial Thin	Tractor	WTY	5
36	4	Improvement Cut	Tractor	WTY, Hand Pile/Burn, Chip	5
37	21	Improvement Cut	Tractor	WTY, Hand Pile/Burn, Chip	5
38	11	Commercial Thin	Tractor	WTY	5
39	14	Improvement Cut	Mechanical	Chip, Excavator Pile, Burn	5
40	3	Improvement Cut	Mechanical	Chip, Excavator Pile, Burn	5
41	22	Commercial Thin	Tractor	WTY, Excavator Pile, Burn Piles	15C
42	23	Commercial Thin	Tractor	WTY, Excavator Pile, Burn Piles	17
43	16	Commercial Thin	Tractor	WTY, Excavator Pile, Burn Piles	15C
44	4	Commercial Thin	Tractor	WTY, Excavator Pile, Burn Piles	15C
45	7	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
46	2	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
47	12	Clearcut with Reserves	Tractor	WTY, Broadcast Burn	15C
48	76	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
49	6	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
50	10	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
51	20	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
52	34	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	17
53	3	Seed Tree with Reserve Trees	Tractor	WTY, Excavator Pile, Burn Piles	17
54	11	Commercial Thin	Tractor	WTY	17

TABLE 2- 8 PROPOSED TREATMENT ACTIVITIES FOR ALTERNATIVE C.

UNIT NO.	UNIT ACRES	ALTERNATIVE C TREATMENT	LOGGING SYSTEM	SLASH TREATMENT	FOREST PLAN MA DIRECTION
55	4	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	17
56	6	Sanitation/Salvage	Tractor	WTY	15C
57	18	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
58	2	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	17
59	10	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
60	10	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
61	20	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
62	2	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
63	9	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
64	9	Commercial Thin	Tractor	WTY	15C
65	3	Sanitation/Salvage	Tractor	WTY	17
66	96	Modified Commercial Thin	Tractor	WTY, Excavator Pile, Burn, Chip	5
67	23	Modified Commercial Thin	Tractor	WTY, Excavator Pile, Burn, Chip	5
68	34	Commercial Thin	Tractor	WTY, Excavator Pile, Burn Piles	5
70	18	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
71	10	Commercial Thin	Tractor	WTY	15C
72	9	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
73	17	Seed Tree with Reserves	Tractor	WTY, Broadcast Burn	15C
74	23	Seed Tree with Reserves	Tractor	WTY, Broadcast Burn	15C
75	6	Seed Tree with Reserves	Tractor	WTY, Broadcast Burn	15C
76	118	Commercial Thin	Tractor	WTY, Excavator Pile, Burn, Chip	15C
77	18	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15
78	10	Post & Pole	Tractor	Lop and Scatter, Hand Pile/Burn	15
79	11	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15
80	20	Shelterwood with Reserves	Tractor	WTY, Broadcast Burn	15
81	23	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15
82	19	Seed Tree with Reserves	Tractor	WTY, Broadcast Burn	15
88	9	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15
89	31	Shelterwood with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15
90	17	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15
92	10	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15
94	25	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15
200	8	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
201	133	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
202	44	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
203	4	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
204	53	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C

TABLE 2- 8 PROPOSED TREATMENT ACTIVITIES FOR ALTERNATIVE C.

UNIT NO.	UNIT ACRES	ALTERNATIVE C TREATMENT	LOGGING SYSTEM	SLASH TREATMENT	FOREST PLAN MA DIRECTION
205	6	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
206	3	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
207	5	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
208	5	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
209	2	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	17
210	4	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	17
211	8	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
212	14	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
213	17	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
214	6	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	9
215	7	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
216	5	Pre-Commercial Thin	Hand	Lop & Scatter, Pile/Burn	15C
217	6	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
218	5	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	5
219	8	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15
Total Acres	1909				

ALTERNATIVE D (MAPS 2-5 AND 2-6)

Intent: Alternative D was developed to respond to Issue #2, Wildlife Security. Wildlife security, retention of hiding cover and habitat connectivity, riparian habitat protection, and retention of recruitment of old growth habitat and lynx forage were the focal points for the development of this alternative. To address these concerns, some units in Alternative B have been retained, modified, or dropped. Proposed road management in Alternative D is also different; there has been a decrease in the amount of temporary road construction and an increase in the amount of road decommissioning as compared to Alternative B. With the reduction in the amount of temporary road construction, longer skidding distances would occur with this alternative.

Alternative D proposes the treatment of stands that would not continue to provide wildlife habitat in the short-term (5-10 year) without management intervention. Forested stands that would likely continue to provide habitat for longer than 5-10 years, without management intervention, were deferred from treatment at this time, in order to maintain hiding cover, connectivity of habitat, and wildlife security. Features associated with this alternative include the following:

- Fuel reduction and forest health treatment of affected stands on approximately **1150 acres** of NFS lands within the Glacier Loon Project Area including:
 - 217 acres of Clearcut with Reserve Trees;
 - 347 acres of Seed Tree with Reserve Trees;
 - 31 acres of Shelterwood with Reserve Trees;
 - 236 acres of Commercial Thin;
 - 84 acres of Improvement Cut;
 - 5 acres of Sanitation/Salvage;
 - 10 acres of Post and Pole; and
 - 95 acres of Pre-Commercial Thin
 - 125 acres of Modified Commercial Thin

- Harvest activities would be implemented using the tractor, skyline, mechanical, and hand treatments in the summer and tractor and forwarder logging systems during the winter.
- Slash would be treated through a combination of the following; whole tree yarding (or possibly yarding of tops), lop and scatter, masticating, and/or excavator piling. Fuel accumulations at landings would be addressed through burning, chipping/masticating, and/or removal from National Forest lands. Prescribed fire treatments could include broadcast burning, pile burning and/or jackpot burning.
- Hand planting would occur on an estimated **290 acres** of desired species within regeneration treatment units. Where adequate site preparation is achieved, natural regeneration would be expected to occur and in some cases supplement planted seedlings. A variety of species would likely become naturally established.
- Fuels Treatment would occur on **902 acres** within the Wildland Urban Interface.
- Fuels Treatment would occur on **248 acres** outside the Wildland Urban Interface.
- Best Management Practices (BMPs) would be implemented on an estimated **29.1 miles** of haul routes to meet Timber Sale Requirements.
- Units would be accessed through an estimated **5.8 miles** of temporary road construction as shown in Table 2- 9 **Error! Reference source not found.** below. System roads would be used for road haul.
- Road decommissioning is proposed on an estimated **8.4 miles**.
- Minimal harvest activity would occur within Riparian Habitat Conservation Areas (RHCAs) in upland areas. Some temporary road locations would occur within RHCAs and cross streams. Portions of Units 19, 24, 57, 61, and 205 totaling 4.3 acres would occur within RHCAs. Site specific Design Criteria would assure that there would not be any adverse effects to streams, fish, or fish habitat.

UNIT	TEMP ROAD NAME	ACCESS	MILES
2	14A	Access via NFS Road #9591	0.07
3, 4, 5, 6, 7, 8	23A	Access via NFS Road #91306 & #91305	0.76
9	14D	Access via NFS Road #9591	0.35
9, 10	23B	Access via NFS Road #9591 and #91306	0.10
12, 13, 14	24A	Access via NFS Road #9780	0.79
17	26A	Access via NFS Road #561	0.45
22	36C	Access via NFS Road #9579C	0.43
26	36B	Access via NFS Road #9579C	0.30
48	11A	Access via NFS Road #11648B	0.44
48	02D	Access via NFS Road #9578	0.12
59	12D	Access via NFS Road #79	0.34
52, 53	12D	Access via NFS Road #79	0.40
61, 63	12A	Access via NFS Road #10566	0.12
61, 63	12B	Access via NFS Road #10566	0.20
66	14B	Access via NFS Road #90243	0.10
66	11C	Access via NFS Road #90243	0.27
68, 70	15C	Access via NFS Road #90241 & #90242	0.24
89	27A	Access via NFS Road #10734	0.08
90	22C	Access via NFS Road #10728	0.30
Total Temporary Roads			5.8

Alternative D vegetation treatments and associated activities are summarized in the following table.

TABLE 2- 10 SUMMARY OF PROPOSED TREATMENT ACTIVITIES FOR ALTERNATIVE D.	
HARVEST TREATMENT ACRES *	
Clearcut with Reserve Trees	217
Seed Tree with Reserves	347
Shelterwood with Reserves	31
Commercial Thin	236
Improvement Cut	84
Sanitation/Salvage	5
Post and Pole	10
Pre-Commercial Thin	95
Modified Commercial Thin	125
Total Treatment Acres	1150
LOGGING SYSTEM ACRES *	
Tractor	1,038
Skyline	0
Mechanical	107
Hand	5
Total Logging System Acres	1150
SLASH TREATMENT *	
Chip/Excavator Pile/Burn	13
Chip/Pile Remove	90
Lop & Scatter/Pile/Burn	5
Lop & Scatter/Hand Pile/Burn	10
Whole Tree Yarding	228
WTY/Broadcast Burn	82
WTY, Excavator Pile/Burn Piles	556
WTY/Excavator Pile/Burn/Chip	125
WTY/Hand Pile/Burn/Chip	41
Total Slash Treatment Acres	1150
Haul Routes (BMPs) to be applied to meet Timber Sale Requirements	29.1
Temporary Road Construction	5.8
Roads Proposed for Decommissioning	8.4

* Acres will likely be slightly less due to change in buffer (Management Requirement and Design Criteria) for unoccupied water howellia habitat from 150 feet to 300 feet.

TABLE 2- 11 PROPOSED TREATMENT ACTIVITIES FOR ALTERNATIVE D.					
UNIT NO.	UNIT ACRES	ALTERNATIVE D TREATMENT	LOGGING SYSTEM	SLASH TREATMENT	FOREST PLAN MA DIRECTION
2	12	Clearcut with Reserves	Tractor	WTY, Broadcast Burn	15C
3	6	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
4	2	Sanitation/Salvage	Tractor	WTY	15C
5	15	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C

TABLE 2- 11 PROPOSED TREATMENT ACTIVITIES FOR ALTERNATIVE D.

UNIT No.	UNIT ACRES	ALTERNATIVE D TREATMENT	LOGGING SYSTEM	SLASH TREATMENT	FOREST PLAN MA DIRECTION
6	29	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
7	3	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
8	2	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
9	15	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
10	5	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
12	22	Commercial Thin	Tractor	WTY	15C
13	13	Commercial Thin	Tractor	WTY	15C
14	20	Commercial Thin	Tractor	WTY	15c
17	21	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
19	11	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
20	14	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
22	31	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
24	17	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
25	20	Commercial Thin	Tractor	WTY	15C
26	24	Commercial Thin	Tractor	WTY	15C
31	26	Improvement Cut	Tractor	WTY	15C
32	23	Commercial Thin	Tractor	WTY	5
33	24	Commercial Thin	Tractor	WTY	5
34	16	Improvement Cut	Tractor	WTY, Hand Pile/Burn, Chip	5
35	41	Commercial Thin	Tractor	WTY	5
36	4	Improvement Cut	Tractor	WTY, Hand Pile/Burn, Chip	5
37	21	Improvement Cut	Tractor	WTY, Hand Pile/Burn, Chip	5
38	11	Commercial Thin	Tractor	WTY	5
39	14	Improvement Cut	Mechanical	Chip, Excavator Pile, Burn	5
40	3	Improvement Cut	Mechanical	Chip, Excavator Pile, Burn	5
44	4	Commercial Thin	Tractor	WTY, Excavator Pile, Burn Piles	15C
48	76	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
49	6	Clearcut with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
52	34	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	17
53	3	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	17
57	18	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
58	2	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	17

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TABLE 2- 11 PROPOSED TREATMENT ACTIVITIES FOR ALTERNATIVE D.

UNIT No.	UNIT ACRES	ALTERNATIVE D TREATMENT	LOGGING SYSTEM	SLASH TREATMENT	FOREST PLAN MA DIRECTION
59	10	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
61	20	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
63	9	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
65	3	Sanitation/Salvage	Tractor	WTY	17
66	96	Modified Commercial Thin	Tractor	WTY, Excavator Pile, Burn, Chip	5
67	29	Modified Commercial Thin	Tractor	WTY, Excavator Pile, Burn, Chip	5
68	34	Commercial Thin	Tractor	WTY, Excavator Pile, Burn Piles	5
70	18	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15C
73	17	Seed Tree with Reserves	Tractor	WTY, Broadcast Burn	15C
74	23	Seed Tree with Reserves	Tractor	WTY, Broadcast Burn	15C
75	6	Seed Tree with Reserves	Tractor	WTY, Broadcast Burn	15C
77	18	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15
78	10	Post & Pole	Tractor	L&S, Hand Pile/Burn	15
79	11	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15
81	23	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15
82	21	Seed Tree with Reserves	Tractor	WTY, Broadcast Burn	15
83	7	Seed Tree with Reserves	Tractor	WTY, Broadcast Burn	15
88	9	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15
89	31	Shelterwood with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15
90	17	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15
92	10	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15
94	25	Seed Tree with Reserves	Tractor	WTY, Excavator Pile, Burn Piles	15
205	6	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
206	3	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
207	5	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
208	5	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
209	2	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	17
210	4	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	17
211	8	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
212	14	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
213	17	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
215	7	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
216	5	Pre-Commercial Thin	Hand	Lop & Scatter, Pile/Burn	15C

TABLE 2- 11 PROPOSED TREATMENT ACTIVITIES FOR ALTERNATIVE D.

UNIT No.	UNIT ACRES	ALTERNATIVE D TREATMENT	LOGGING SYSTEM	SLASH TREATMENT	FOREST PLAN MA DIRECTION
217	6	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15C
218	5	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	5
219	8	Pre-Commercial Thin	Mechanical	Chip/Pile/Remove	15
Total Acres	1150				

FOREST PLAN MANAGEMENT DIRECTION

The Flathead Forest Plan sets management direction for this project area. The Forest Plan provides forest-wide goals and objectives (pages II-1 through II-57). The Forest Plan also divides the Flathead National Forest into subunits called Management Areas (MAs). Each of these MAs has resource or activity goals and management standards (Forest Plan, pages III-1 through III-126). In keeping with Forest Service Policy on multiple use, the Forest Plan established goals to strike a balance among different resources (Forest Plan, page II-5).

FOREST PLAN MANAGEMENT AREA CHANGE

Comments were received from the public requesting that the MA designation be changed on the western shore of Lindbergh Lake. The statements below are examples of comments received during scoping, which articulated these concerns (Project File Exhibit D-1).

- I would like the management description for these areas to be reclassified. A classification of MA2 would put this area into a category closely representing “Backcountry” designation, which was proposed during the previous ranger’s tenure at Swan Lake. While I am very concerned for the high visual impact of this area, I would not be completely opposed to some thinning due to diseased and dead trees; but would definitely not wish to have it be in what I consider the drastic form of the current proposal (Project File Exhibit C-21).
- We would like the management description for these areas to be reclassified. A classification of MA2 would put this area into a category closely representing “Backcountry” designation, which was proposed during the previous ranger’s tenure at Swan Lake (Project File Exhibit C-29).
- It is quite clear that proposed roads and logging units on the slopes above Lindbergh Lake are not acceptable from a visual quality perspective, especially to those who recreate on or have homes on the lake. We ask that the underlying Forest Plan Management Area (MA) designation be changed to MA 5 or MA 2 in order to provide retention of the current visual quality and keep management activities from being noticeable – and to make the MA consistent with those on either side of the proposed activities (Project File Exhibit C-34).

Based on the above public comment, Alternatives C and D include a proposed change to the MA for a portion of the Glacier Loon Project Area along Lindbergh Lake, including the highly visible portions of the project area from the lakeshore to the slope break totaling approximately 221 acres. The proposal would change 213 acres from MA 15, which consists of timberlands where timber management with roads is economical and feasible as currently assigned, to MA 5, which consists of roaded timberlands in areas of high scenic value. The other 8 acres would be changed from MA 15C, timberlands with emphasis on white-tailed deer summer range, to MA 5.

A brief overview of each of the MAs in this project area follows. More specific Forest Plan direction is discussed in each resource section later in this chapter. Please refer to Maps 2-7 and

2-8 for a display of official Forest Plan MAs and the proposed MA changes for Alternatives C and D. If Alternative C or D is selected, a Forest Plan Amendment would be completed with the Glacier Loon Decision Notice.

MA	DESCRIPTION	MANAGEMENT EMPHASIS	TOTAL ACRES	
			ALT. B.	ALTS. C&D
MA 1	Consists of non-forest lands and timberlands where timber management is uneconomical or currently technologically infeasible due to topographic features.	Maintain the present condition with minimal investment for resource activities, while protecting the basic soils, water, and wildlife resources. Generally, these areas will retain a natural appearance.	245	245
MA 2	Consists of unroaded lands that offer a variety of dispersed recreation opportunities.	Provide a variety of primitive and semi-primitive recreation opportunities.	474	474
MA2A	Consists of unroaded lands suited for dispersed recreation that meet the ROS classification of semi-primitive non-motorized.	Dispersed recreation opportunities will be managed to meet the semi-primitive non-motorized ROS classification.	2,089	2,089
MA 5	Roaded timberlands in areas of high scenic value.	Maintain a pleasing, natural appearing landscape in which management activities are not evident.	1233	1,454
MA 7	Consists of timberlands in areas of high scenic value.	Maintain a pleasing, natural-appearing landscape in which management activities are not dominant.	497	497
MA 9	Consists of timberlands capable of providing white-tailed deer winter habitat.	Provide the size, age, diversity, and distribution of habitat units (both cover and forage areas) suitable for white-tailed deer winter habitat.	48	48
MA11C	Timberlands capable of providing grizzly bear habitat located on the southern portion of the Swan Lake Ranger District.	Manage the Swan/Clearwater Divide as an area that provides a security grizzly bear travel route between the Mission and Swan Mountain Ranges. Desired cover relationship is provided through vegetative manipulation including timber harvest and prescribed burning.	19	19
MA 12	Includes riparian areas consisting of aquatic, riparian, and a portion of terrestrial ecosystems along most perennial streams, lakes, ponds, marshlands, bogs, and some important seasonal flow streams.	Manage riparian areas throughout the Forest to enhance vegetation and wildlife diversity and maintain or enhance water quality and fisheries. Emphasize water and soil protection and old growth habitat. Management of other resources must be compatible with the riparian habitat management standards.	942	942
MA 15	Timberlands where timber management with roads is economical and feasible.	Emphasize cost-efficient production of timber while protecting the productive capacity of the land and timber resource.	4,098	3,885
MA15C	Consists of timberlands where timber management with roads is economical and feasible, and is key white-tailed deer summer range.	Special consideration will be given to white-tailed deer summer range within this MA.	7,108	7,100
MA 17	Includes riparian areas consisting of aquatic, riparian, and a portion of terrestrial ecosystems along perennial stream reaches, and some important streams with typically a seasonal flow.	Protect and maintain this riparian zone throughout the Forest, including fish and wildlife habitat, while maintaining a sustained yield of timber.	290	290

TABLE 2- 12 MANAGEMENT AREA DESCRIPTIONS, EMPHASIS, AND MANAGEMENT AREA ACRES FOR THE GLACIER LOON FUELS REDUCTION AND FOREST HEALTH PROJECT.

MA	DESCRIPTION	MANAGEMENT EMPHASIS	TOTAL ACRES	
			ALT. B.	ALTS. C&D
MA 22	Mission Mountains Wilderness classified wilderness designated in 1975 by the US Congress.	Manage this area in accordance with the Wilderness Act of 1964 to maintain an enduring system of high quality wilderness representative of all National Forest ecotypes.	12,321	12,321
Non-National Forest			7,556	7,556
Lindbergh Lake			400	400
Total NFS Lands			37,320	37,320

COMPARISON OF ALTERNATIVES

This section provides a comparison of the alternatives in terms of:

- How the alternatives meet the Purpose and Need for the proposal;
- How the alternatives respond to the key issues;
- The potential environmental consequences associated with the implementation of the alternatives.

(Some activities are listed more than once because they meet more than one Purpose and Need.)

TABLE 2- 13 COMPARISON OF ALTERNATIVES - HOW THEY RESPOND TO THE PURPOSE AND NEED.

PURPOSE AND NEED	INDICATOR	ALT. A	ALT. B	ALT. C	ALT. D
Hazardous Fuels Reduction	Acres of Treatment	0	2102	1909	1150
Improve Forest Health	Acres of Treatment	0	2102	1909	1150
Provide wood products for local economies	Million Board Feet	0	10.5	9.0	6.7

TABLE 2- 14 COMPARISON OF ALTERNATIVES - HOW THEY RESPOND TO THE KEY ISSUES.

ISSUE	INDICATOR	ALT. A	ALT. B	ALT. C	ALT. D
Meets Forest Plan Visual Quality Objectives	Does or does not meet	Meets	Meets	Meets	Meets
Change in Scenic Integrity	Number of harvest units seen within viewsheds of high concern	0	23	17	16
Magnitude of Visual Impact	Number of regeneration harvest units within viewsheds of high concern	0	10	3	3
Water Quality	Miles of New Temporary Road	0	9.3	5.4	4.5
	Miles of Temporary Road on Historic Templates	0	2.3	2.0	1.4
	Miles of Road Decommissioned	0	4.1	8.4	8.4
	Miles of Best Management Practices (BMP Work)	0	37.7	34.7	29.1
Wildlife Security	Decrease in hiding cover (Acres)	0	1453	1310	888
	Acres treated adjacent to wetland complexes	0	612	597	320
	Use of restricted (gated/bermed) roads (miles)	0	23.6	21.6	16.0

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TABLE 2- 14 COMPARISON OF ALTERNATIVES - HOW THEY RESPOND TO THE KEY ISSUES.

ISSUE	INDICATOR	ALT. A	ALT. B	ALT. C	ALT. D
	Miles of temporary road construction	0	11.5	7.4	5.8
	High contrast edge created adjacent to Old Growth Stands (Feet/Miles)	0	10,400/2.0	8,800/1.7	6,600/1.3
	Acres treated in lynx habitat within WUI	0	1587	1473	755
	Acres treated in lynx habitat outside WUI	0	358	279	238

TABLE 2- 15 COMPARISON OF ENVIRONMENTAL EFFECTS BY ALTERNATIVE.

ENVIRONMENTAL CONSEQUENCE	INDICATOR	ALT. A	ALT. B	ALT. C	ALT. D
SOIL RESOURCE					
Detrimental soil disturbance resulting from alternative implementation	Units exceeding 15% detrimental soil disturbance	0	0	0	0
Meets Forest Service Regional Soil Quality Standard	Does or does not meet standard	Yes	Yes	Yes	Yes
HYDROLOGY					
Water Quantity (water yield Increase over baseline conditions)	Glacier Creek Watershed	5.9%	6.0%	6.0%	5.9%
	Upper Swan River Watershed	0.9%	1.2%	0.9%	1.1%
	Swan River Valley Bottom Area	19.8%	21.4%	21.0%	20.8%
Water Quality (Sediment Delivery)	Sediment increase compared to baseline conditions	Immeasurable	Immeasurable	Immeasurable	Immeasurable
Beneficial Uses	Does or Does not Meet	Meets	Meets	Meets	Meets
Channel Stability	Channel Stability Maintained	Maintained	Maintained	Maintained	Maintained
FISHERIES - THREATENED, ENDANGERED, AND SENSITIVE SPECIES					
Bull Trout/BullTrout Critical Habitat	Biological Assessment Determination	---	May affect, but not likely to adversely affect		
Metwater Lednian Stonefly	Biological Assessment Determination	—	No effect		
Westslope Cutthroat Trout	Biological Evaluation Determination	--	May impact individuals or habitat, but will not likely result in a trend towards federal listing or reduced viability for the population or species.		
Western Pearlshell Mussel	Biological Evaluation Determination	---	No impact		
WILDLIFE - THREATENED AND ENDANGERED, SENSITIVE, OTHER MANAGEMENT INDICATOR (MIS) SPECIES					
Decrease in Habitat Security due to displacement from potential habitat	Acres treated adjacent to wetland complexes	0	612	597	320
	Acres treated in lynx habitat outside WUI	0	358	279	238
	Acres treated in lynx habitat within WUI	0	1,587	1,473	755
Habitat loss due to decreases in hiding cover	Decrease in hiding cover (acres)	0	1,453	1,310	888

TABLE 2- 15 COMPARISON OF ENVIRONMENTAL EFFECTS BY ALTERNATIVE.

ENVIRONMENTAL CONSEQUENCE	INDICATOR	ALT. A	ALT. B	ALT. C	ALT. D
Decrease in Habitat Security due to increased motorized access	Use of Restricted (gated/bermed) roads	0.0	23.6	21.6	16.0
	Miles of temporary road construction	0.0	11.5	7.4	5.8
	Open Road Density (ORD)/Total Road Density (TRD) in Glacier Loon Subunit during implementation (assuming all units active at the same time)	22.06/43.28 (Existing)	41.9/47.28	40.73/46.65	38.13/46.08
Decrease in quality of important old growth habitats	High contrast edge created adjacent to Old Growth stands (Feet/Miles)	0/0	10,400/2.0	8,800/1.7	6,600/1.3
Wildlife Habitat Improvement	Miles of proposed road decommissioning	0.0	4.1	8.4	8.4
	Proposed Management Area change on 221 acres of MA15/15C to MA5 (This would be beneficial to most wildlife species).	No	No	Yes	Yes
Potential for disturbance to Common Loon nesting pair on Loon Lake from proposed activities	Based on proposed activity near lake and timing of activity	No potential for disturbance	High potential for disturbance	High potential for disturbance	Low potential for disturbance
Grizzly Bear	Biological Assessment Determination	May affect, Likely to Adversely Affect			
Canada Lynx	Biological Assessment Determination	May Affect, Likely to Adversely Affect			
Lynx Critical Habitat	Biological Assessment Determination	May Affect, Likely to Adversely Affect			
Wolverine	Biological Assessment Determination	Would not Jeopardize			
FOREST VEGETATION					
Harvest volume of merchantable timber from suitable lands	Million Board Feet	0	10.5	9.0	6.7
Stand Composition shifted towards greater representation of western larch, western white pine, and/or ponderosa pine.	Acres of commercial and pre-commercial silvicultural treatments	0	2092	1899	1140
Forest Structure modified resulting in: reduced stand densities, increased single storied stand conditions, larger average stand	Acres of commercial and pre-commercial silvicultural treatments	0	2092	1899	1140

TABLE 2- 15 COMPARISON OF ENVIRONMENTAL EFFECTS BY ALTERNATIVE.					
ENVIRONMENTAL CONSEQUENCE	INDICATOR	ALT. A	ALT. B	ALT. C	ALT. D
diameters, and increased growing space.					
Change in Seral Stage Distribution	Acres converted to early seral stage	0	783	694	604
Insect and Disease Conditions affected through reduced stand densities and increased representation of resistant species.	Acres of commercial and pre-commercial silvicultural treatments	0	2092	1899	1140
Reduce forest fuels buildup adjacent to public and private lands	Acres of treatment within WUI	0	1710	1526	902
Reduce forest fuels buildup adjacent to public and private lands	Acres of treatment outside of WUI	0	392	383	248
Regional Forester's Sensitive Plants	Biological Evaluation Determination	No Impact	May affect individuals and habitat, but would not result in a trend toward federal listing or cause a loss of viability for sensitive species.		
Threatened Plant Species – Water howellia	BA Determination	--	May affect, but not likely adversely affect		
Threatened Plant Species – Spalding's Catchfly	BA Determination	--	No Effect		
Noxious Weed Establishment and Spread	Risk Level	Low	High risk of introduction, spread, establishment, and persistence		
SCENIC VALUES					
Meets Forest Plan Visual Quality Objectives	Does or does not meet	Meets	Meets	Meets	Meets
Change in Scenic Integrity	Number of units seen within viewsheds of high concern	-	23	17	16
Magnitude of Visual Impact	Number of regeneration unit within viewsheds of high concern	-	10	3	3
RECREATION					
Restrictions on existing recreation opportunities	Does or does not restrict	No	No	No	No
HERITAGE RESOURCES					
Effects to Heritage Resources	Number of sites affected	0	0	0	0
SOCIAL & ECONOMIC					
Direct Employment	Number of jobs	0	69	61	44
Indirect and Induced Employment	Number of Jobs	0	58	51	38
Total	Number of Jobs	0	128	112	83
Economic viability of alternative	Predicted High Bid \$/CCF	\$0	\$31.80	\$33.27	\$33.79
Sawtimber Volume Harvested	CCF	0	19,456	16,889	12,644

MANAGEMENT REQUIREMENTS AND DESIGN CRITERIA

The measures identified in the following table serve to further reduce impacts to the specific resources identified. Most are considered Design Criteria and are included in all action alternatives.

Several abbreviations are used in the responsibility section of Table 2- 16. The following explains those abbreviations:

ARCH	Archeologist	LEO	Law Enforcement Officer
BT	Botanist	NWM	Noxious Weed Manager
DR	District Ranger	RA	Range Administrator
DRC	District Road Coordinator	RF	Resource Forester
ENG	Engineer	SA	Sale Administrator
AFMO	Assistant Fire Mgmt Officer	SILV	Silviculturist
FISH	Fisheries Biologist	SP	Sale Prep
FMO	Fire Management Officer	SS	Soils Scientist
HYD	Hydrologist	TMC	Timber Marking Crew
IDT	Interdisciplinary Team	TP	Timber Sale Purchaser
LA	Landscape Architect	WB	Wildlife Biologist

TABLE 2- 16 MANAGEMENT REQUIREMENTS AND DESIGN CRITERIA.

OBJECTIVE	TASK	RESPONSIBILITY	DUE DATE
Grizzly Bear Security and SVGBCA Compliance	The Glacier-Loon Grizzly Bear Subunit was "active" 2012 through 2014 and is currently "inactive." Standards and guidelines for an inactive grizzly bear subunit will be followed, as per the Swan Valley Grizzly Bear Conservation Agreement during the "inactive" period. The subunit is "active" again in 2021 through 2023 under the SVGBCA. The Buck Holland Subunit is "Active from 2018 through 2020, and becomes "Inactive" again in 2021.	WB, SA, SP	Pre & Post Sale
Grizzly Bear Security and SVGBCA Compliance	In order to avoid the potential disturbance of grizzly bear in important Spring Habitat, management activities that are planned in Spring Habitat, which is defined as areas within designated Linkage Zones, below 5,200 feet, will not occur within the spring period (April 1 through June 15). This timing restriction would apply to all units except Units 1-14, 19-26, 30-34, 90, 92, 94, 200, and 205.	SP, SA, TMC, WB	Pre & Post Sale
Grizzly Bear Security and SVGBCA Compliance	Seed Tree Units and Clearcut with Reserve Units will be designed so that no point in the unit is more than 600 feet from cover; in other words, a bear in the unit would be able to find cover anywhere in the unit within 600 feet or less.	SP, WB	Pre & Post Sale
Grizzly Bear Security (SVGBCA Compliance) - General Wildlife Security	Visual screening will be retained adjacent to open roads in proposed cutting units.	SP, SA, TMC, WB	Pre & Post Sale
Wildlife – TES	Provisions will be included in the contract to cease activity or otherwise protect populations and individuals of threatened or endangered species. This allows for modification of the project should an unforeseen issue(s) be identified during operations. Standard contractual requirements used in all contracts provide for modification or termination of the contract to avoid impacts and protect TES.	WB, SA, SILV	Contract Prep & During Harvest Activities
Wildlife – TES	Public motorized access will be restricted on temporary roads and skid trails normally closed to use.	WB, SA, DRC	Pre & Post Sale, During Harvest Activities
Wildlife– TES	Contractors working under contract on NFS lands are prohibited from carrying firearms on roads within the project area that are normally closed to public use (SVGBCA).	SA, LEO, WB	Pre & Post Sale, During Harvest Activities
Wildlife - Security	Vegetation and/or rock barriers will be retained around berms and gates, where needed, to maintain closure effectiveness.	DRC, SA, WB	Pre & Post Sale, During Harvest Activities
Wildlife – Security	If berms are removed for access to treatment units, temporary gates will be installed. Berms will be re-installed when sale activities are complete.	SB, SA, DRC	Pre & Post Sale, During Harvest Activities
Snag Retention for Snag Associated Wildlife Species	In treatment units, where available, a minimum average of 6 snags per acre that are 12-20 inches DBH would be left, and all snags greater than 20 inches would be left. If existing snag densities are below these densities, substitute live trees would be left. All standing dead cull western larch, ponderosa pine, and Douglas-fir trees 16 inches DBH or greater may be retained. Generally, snags to be left would be further than 150 feet from open roads and private land boundaries. Snags that pose a safety hazard to the Contractor's operation would be removed.	SILV, WB, SP, SA, TP	Pre & Post Sale, During Harvest Activities

TABLE 2- 16 MANAGEMENT REQUIREMENTS AND DESIGN CRITERIA.

OBJECTIVE	TASK	RESPONSIBILITY	DUE DATE												
Retention of Down Woody Material for Down Woody Habitat Associated Wildlife Species	The minimum retention for down woody material will be approximately 10 tons per acre, where available. To achieve the tonnage required, retain (where it exists) down woody material which includes the longest material available (e.g., 16 feet long or longer) and retain the woody debris with the largest diameters available (e.g., 15 inches DBH or greater), sufficient to achieve the tons per acre.	SILV, WB, SP, SA, TP	Pre & Post Sale, During Harvest Activities												
Hardwood Retention for Associated Wildlife Species	All hardwood trees will be reserved where feasible.	SILV, SA, TP, SP	Pre & Post Sale, During Harvest Activities												
Public Safety	Contracts would require the contractor to clearly post signs warning the public of nearby activities and truck hauling traffic associated with the treatments.	SA, DRM	Pre & Post - Sale, During Harvest Activities												
Public Safety	The District Assistant Fire Management Officer (Fuels) or designated liaison would notify nearby landowners prior to fuel reduction activities commencing on NFS lands that are adjacent to their properties.	FAFMO	Pre-Sale, During Harvest Activities												
Special Use Permits	All permitted improvements, including power and phone service lines and water transmission lines (authorized by special use permits) would be clearly marked and protected during project implementation.	SA, TMC, IF, FMO, SP, RF	Pre- & Post-Sale												
Protect Site and Soil Productivity	All mechanized units that remove commercial products would be logged using designated skid trails. Equipment would occasionally leave the trails to access trees or accomplish other activities.	SA	During Harvest Activities												
Protect Site and Soil Productivity	Skid trail spacing width must average at least 75 feet in all tractor harvest units. The goal is to occupy less than 15 percent of the treatment area including soil disturbance from skid trails, temporary roads and landings associated with past and proposed activities.	SA, SP, SS	Pre & Post Sale, During Harvest Activities												
Protect Site and Soil Productivity	<p>Winter harvest is required to meet the Region 1 soil quality standard and/or protect sensitive soils in the following units by alternative:</p> <table border="1" data-bbox="625 1101 1377 1357"> <thead> <tr> <th>Alternative</th> <th>Winter Tractor Unit</th> <th>Winter CTL/Forwarder Unit</th> </tr> </thead> <tbody> <tr> <td>B</td> <td>10, 11, 16, 34, 59</td> <td>2, 5</td> </tr> <tr> <td>C</td> <td>10, 11, 16, 34</td> <td>2, 5</td> </tr> <tr> <td>D</td> <td>10, 17, 20, 22, 34</td> <td>2, 5</td> </tr> </tbody> </table> <p>Winter logging requires that there be enough snow to prevent muddy water from mixing into the snow where equipment operates. This would require about ten inches of snow. The depth of snow varies with the snow</p>	Alternative	Winter Tractor Unit	Winter CTL/Forwarder Unit	B	10, 11, 16, 34, 59	2, 5	C	10, 11, 16, 34	2, 5	D	10, 17, 20, 22, 34	2, 5	SA, SP, SS	During Harvest Activities
Alternative	Winter Tractor Unit	Winter CTL/Forwarder Unit													
B	10, 11, 16, 34, 59	2, 5													
C	10, 11, 16, 34	2, 5													
D	10, 17, 20, 22, 34	2, 5													

TABLE 2- 16 MANAGEMENT REQUIREMENTS AND DESIGN CRITERIA.

OBJECTIVE	TASK	RESPONSIBILITY	DUE DATE
	conditions. It takes more dry powder snow than wet dense snow to protect the soil surface. Soils must be frozen enough to prevent deformation of the soil surface where equipment operates.		
Protect Site and Soil Productivity	All existing roads and skid trails would be reused to the extent feasible unless doing so would adversely affect soil, water or other resources. If roads or trails cannot be reused, their extent and location must be considered when laying out additional skid trails.	SA, SP, SS	Pre & Post Sale, During Harvest Activities
Protect Site and Soil Productivity	Logging would occur when soils are dry as determined by the hand feel method (Project Record Exhibit 21).	SA	During Harvest Activities
Protect Site and Soil Productivity	Sale administrators will monitor soil moisture conditions prior to allowing equipment to begin operations in summer. This monitoring must be documented in the Timber Sale Daily Report.	SA	Pre-Sale
Protect Site and Soil Productivity	All mechanical fuel reduction will be accomplished with excavators. Excavators will, to the extent feasible, remain on skid trails.	SA	During Harvest Activities
Protect Site and Soil Productivity	Prescribed burning prescriptions would be prepared and implemented to not exceed moderate burn severity conditions.	FMO, AFMO	Post Sale
Improve soil condition, protect fish and wildlife habitat, and protect water quality	<p>All newly constructed temporary roads and extended log skidding corridors would be reclaimed after timber harvest is completed or as soon as logistically practical. The reclamation of new temporary roads would include:</p> <ul style="list-style-type: none"> ▪ Re-contouring the entire road template to the natural ground contour ▪ Where re-contouring is unnecessary, scarify with excavator teeth to a depth equal sufficient to ameliorate the presence of detrimental soil compaction (usually between 2 and 12 inches) <ul style="list-style-type: none"> ▪ Removing any installed culverts or temporary bridges. ▪ Installing erosion control features where needed. ▪ Revegetation with native shrubs or native seed mix (specified by the Forest Botanist) after soil is replaced as soon as feasible after disturbance to provide for site protection until native species are established. <ul style="list-style-type: none"> ▪ Placing woody material on the template 	SA, SS, TP, BT, NWM	Post-Sale
Improve soil condition, protect fish and wildlife habitat, and protect water quality	<p>All temporary roads re-constructed for this project that utilize historic road templates would be reclaimed by any site-appropriate combination of the following:</p> <ul style="list-style-type: none"> ▪ Removing any installed culverts or temporary bridges. ▪ Installing erosion control features where needed. ▪ Scarification with excavator teeth to a depth equal sufficient to ameliorate the presence of detrimental soil compaction (usually between 2 to 14 inches). ▪ Revegetation with native shrubs or native seed mix (specified by the Forest Botanist) after soil is replaced as soon as feasible after disturbance to provide for site protection until native species are established. <ul style="list-style-type: none"> ▪ Placing woody material on the template. <p>Roads should be reclaimed as soon as access is no longer required, before the close of the project.</p>	SA, SS, TP, BT, NWM	Post-Sale
Water Quality	Skid Trail crossings of scoured channels will require drainage protection measures as required by State BMPs. BMPs will be followed for harvest, temporary road and system road management.	SA	During Harvest Activities

TABLE 2- 16 MANAGEMENT REQUIREMENTS AND DESIGN CRITERIA.

OBJECTIVE	TASK	RESPONSIBILITY	DUE DATE
Protect Fish Habitat	<p>With the exception of Units 19, 24, 57, 61, 64, and 205; no harvest activity will take place in Riparian Habitat Conservation Areas (RHCAs). Lindbergh Lake is a priority watershed. The RHCAs in Lindbergh Lake watershed are:</p> <ul style="list-style-type: none"> ▪ 300' from fish-bearing streams ▪ 150' from perennial, non-fish-bearing streams <ul style="list-style-type: none"> ▪ 100' from intermittent streams ▪ 150' from lakes or wetlands greater than 1 acre <ul style="list-style-type: none"> ▪ 50' from wetlands less than 1 acre <p>All other watersheds are not priority watersheds. The RHCAs in all other watersheds are:</p> <ul style="list-style-type: none"> ▪ 300' from fish-bearing streams ▪ 150' from perennial, non-fish-bearing streams <ul style="list-style-type: none"> ▪ 50' from intermittent streams ▪ 150' from lakes or wetlands greater than 1 acre <ul style="list-style-type: none"> ▪ 50' from wetlands less than 1 acre 	SA, SP, FISH, AFMO	Pre & Post Sale, During Harvest Activities
Protect Fish Habitat Water Quality Protection	<p>All temporary roads that cross streams will have culverts or temporary bridges installed, <u>there will be no fords</u>. Culverts will be installed when the channel is dry (intermittent streams) or the stream will be diverted during low flow periods (perennial streams). The culvert will be removed during dry or low flow periods with appropriate sediment reduction devices (Straw bales) in place. Stream channels will be reshaped to natural contours after the culvert is removed. All fill material will be removed by equipment from stream channels to restore the natural channel contours after the culvert is removed.</p>	SA, FISH, HYD	Pre & Post Sale, During Harvest Activities
Protect Fish Habitat BMP Compliance, Protect Beneficial Uses	<p>Any culverts replaced for BMPs will be adequately sized for 100 year flood events.</p>	FISH, HYD, ENG, DRC	Pre-Sale
Protect Fish Habitat	<p>The new culvert on Road #9552 at Meadow Lake outflow will be designed for aquatic fish passage and will be sized for 100 year flood event. During project implementation, the stream will be de-watered at the worksite. Sediment retention devices will be installed immediately below the terminus of the de-watering pipe. This may be either 2 straw bales staked into the streambed or one commercially-manufactured burlap fence called "Sedimat" (provided by the Forest Service). After stream flow is resumed, a hand crew shall shovel out trapped sediments and dispose the straw bales on adjacent ground. If a "Sedimat" is used, the excavator shall remove and dispose the soiled mat.</p>	FISH, HYD, ENG, DRC	Post Sale
Protect Fish Habitat	<p>The old culvert on temporary Road #12A would be removed (when the stream is dry) even though no haul is anticipated on this portion of the road. This design criteria is unique to Alternative D.</p>	FISH, HYD, ENG, DRC	Post Sale
Protect Fish Habitat	<p>Mechanical equipment would not utilize Road #79Y if there is any water on the road. The culverts on this road were removed years ago. When the road is dry, equipment may use the road. If not, equipment will need to find alternative access across private ground or defer work out of away from any wet area.</p>	FISH, HYD, ENG, DRC	During Harvest Activities
Forest Vegetation	<p>Prepare detailed site specific silvicultural prescription for all treatment areas requiring vegetation manipulation</p>	SILV	Prior to presale activities
Forest Vegetation	<p>Consult with Project Silviculturist where treatment deviations are required during contract execution, as a result of changed or unidentified conditions that materially affect the intended treatment as described in the detailed site specific silvicultural prescription. As needed, the silvicultural prescription will be modified and re-approved by a</p>	SILV, TSA, SP, FMO	Pre, During, and Post Harvest

TABLE 2- 16 MANAGEMENT REQUIREMENTS AND DESIGN CRITERIA.

OBJECTIVE	TASK	RESPONSIBILITY	DUE DATE
	certified silviculturist.		Activities
Forest Vegetation (Leave Tree Protection)	Contractor will take all reasonable care to avoid damage to the roots, bole, and crown of trees to be reserved from cutting. No more than 5 percent of the trees designated to be reserved should be damaged beyond recovery by the Contractor's operations. Any tree damaged beyond recovery, (will die within one year due to damage), can be removed or otherwise treated by the Contractor as instructed by the Forest Service.	TP, TSA, SILV	Pre, During, and Post Harvest Activities
Forest Vegetation (Down Woody Material)	The minimum retention for down woody material will be approximately 10 tons per acre, where available. To achieve the tonnage required, retain (where it exists) down woody material which includes the longest material available (e.g., 16 feet long or longer) and retain the woody debris with the largest diameters available (e.g., 15 inches DBH or greater), sufficient to achieve the tons per acre.	SILV, SA, TP, SP	Pre, During, and Post Harvest Activities
Forest Vegetation (Snag Retention)	In treatment units, where available, a minimum average of 6 snags per acre that are 12-20 inches DBH would be left, and all snags greater than 20 inches would be left. If existing snag densities are below these densities, substitute live trees would be left. All standing dead cull western larch, ponderosa pine, and Douglas-fir trees 16 inches DBH or greater may be retained. Generally, snags to be left would be further than 150 feet from open roads and private land boundaries. Snags that pose a safety hazard to the Contractor's operation would be removed.	SILV, SA, TP, SP	Pre, During, and Post Harvest Activities
Forest Vegetation (Implementation in Units 66 and 67)	In those areas of Units 66 and 67 which would directly impact the adjacent recreation site or private land, the Project Silviculturist and Presale Forester will coordinate layout and prescriptive parameters with the recreation staff, fuels specialist, and private land owners (if they are interested).	SILV, SP, RS,FS	Pre Harvest Activities
Preserve TES Plant Populations and Their Habitats	Protect occupied howellia ponds located near haul routes and in treatment units. No vegetation management activities may be conducted within 300 feet of occupied howellia ponds. If ground disturbing BMP-related activities occur within 300 feet to the north and south of these ponds, natural filtration zones, sediment retention structures, or straw bales would be applied to ensure limited sediment deposition into these ponds. See attached table for occupied pond label and location, and see Project File Exhibit J-7 for specific locations of ponds.	SILV, SA, TP, SP	Pre & Post Sale & During Harvest Activities
Preserve TES Plant Populations and Their Habitats	Protect unoccupied howellia ponds located near haul routes and in treatment units. No vegetation management activities may be conducted within 300 feet of unoccupied howellia ponds. If ground-disturbing BMP activities occur in the vicinity of these ponds, natural filtration zones, sediment retention structures, or straw bales would be applied to ensure limited sediment deposition into these ponds. See attached table for occupied pond label and location, and see Project File Exhibit J-7 for specific locations of ponds.	SP, SA, BT, ENG	Pre & Post Sale & During Harvest Activities
Preserve TES Plant Populations and Their Habitats	Howell's gumweed occurs in Units 34-37 along Highway 83. Common camas occurs in Units 2, 14, 61, 57, 219 . Adder's tongue occurs adjacent to Units 51 and 215. Sites will be flagged by the Forest Botanist or certified botany technicians ahead of pre-sale prior to implementation to be avoided by equipment and other disturbance.	SP, SA, BT,	Pre & Post Sale & During Harvest Activities
Preserve TES Plant Populations and Their Habitats	Several wetlands and ponds support sensitive species in the project area. See Project Exhibit J-8 for species information. Avoid all wetlands with all ground-disturbing activities, including lakes, ponds, marshes, fens, and streams. Establish buffers around wetlands – 150 feet for areas greater than 1 acre and 50 feet for areas less than 1 acre. Buffers should begin where riparian vegetation ends.	SP, SA, BT,	Pre & Post Sale & During Harvest Activities
Preserve TES Plant Populations and Their Habitats	If unknown populations of sensitive plants are found during project implementation, they will be evaluated and protected as necessary to retain population viability. A contract clause would incorporate this into any timber sale contract and would specify that the contract would be modified to protect these plants if located.	SILV, SP, TP, SP	Pre & Post Sale & During Harvest Activities
Control Spread and	Re-establish vegetation on bare ground created by road decommissioning or timber harvest activity. Seed	SA, BT, DRC	Post-Sale

TABLE 2- 16 MANAGEMENT REQUIREMENTS AND DESIGN CRITERIA.

OBJECTIVE	TASK	RESPONSIBILITY	DUE DATE
Reduce Potential spread of Noxious Weeds	landings, decommissioned roads, and roadsides with soil disturbance with a Montana-Certified grass ground cover (seed mix of native plants will be specified by the Forest Botanist), as soon as feasible after disturbance to provide for site protection until native species are established.		
Control Spread and Reduce Potential spread of Noxious Weeds	Equipment use associated with timber harvest and road maintenance (excluding pickups and trucks used to remove forest products) would be power scrubbed or steam cleaned on the undercarriage and chassis before transport to the project area. This cleaning shall remove all soil, plant parts, seeds, vegetative matter, or other debris that could contain or hold seeds. All subsequent entries of equipment to the project area shall be treated in the same manner as the initial entry. "Off-road equipment" includes all logging and construction machinery, except for log trucks, chip vans, service vehicles, water trucks, pickup trucks, cars, and similar vehicles. Contractors will be required to adhere to C6.351#- Washing Equipment, or similar contract provision which specifies the above washing criteria.	SA, TP	Pre-Harvest
Control Spread and Reduce Potential spread of Noxious Weeds	Spray weeds along designated Forest Road haul routes (prism) and disturbed areas. Existing roads within the project boundary would be identified for noxious weed treatment. Specific roads and mileage to be treated would be prepared in consultation with the Forest Weeds Coordinator. Road prism is the road and associated toe of the fill to the top of the cut slope, including the running surface and turnouts. However, when a contiguous patch of weeds extends beyond the road prism, it shall be treated via force account or other means. Spraying of appropriate herbicides would occur pre- and post-haul, during the periods from June 1 to July 15 or September 1 to September 30. Pre- and post-haul treatment shall be the responsibility of the contractor and specified in contract clause C6.27#- Noxious Weed Treatment. Roads would be monitored after initial treatment, and future treatments would be the responsibility of the Forest. Treatment of invasive plants would be consistent with the strategy outlined in the Noxious and Invasive Weed Control Environmental Assessment (March 2001).	NWM	Post-Sale
Control Spread and Reduce Potential spread of Noxious Weeds	When the use of a temporary road is no longer needed for the project, the first 100 feet where the temporary road or skid trail meets a traveled road should be more heavily brushed and blocked with large woody debris to discourage unauthorized entry and any resulting spread of weeds.	SA, TP	Post-Sale
Control Spread and Reduce Potential spread of Noxious Weeds	The Noxious Weeds Manager or Forest Botanist will, if necessary, provide noxious weed material to sale administrators and contractors identifying the Forest's target species and recommended control measures.	NWM, BT	Post-Sale
Protect Heritage Resources	Modify contractual requirements to provide for protection of heritage resources and modify the contract to avoid impacts to heritage resource if cultural resources are discovered during ground disturbing activities.	SA, ARCH, SP	Pre & Post Sale, During Harvest Activities
Reduce Immediate Foreground View Effects to Scenery Resources	<p>Units 32, 33, 34, 36, 37, 43, 44, 57, 58, 61, 64, 65, 66, 67, 212, 218</p> <ul style="list-style-type: none"> ▪ No more than 12 ton per acre of slash (favoring course material) would remain within 150' of road (Highway 83, Lindberg Lake Road and Lindbergh Lake Campground campsites). Slash, root wads, and other debris will be removed, buried, burned, chipped or lopped to a height of 2 feet or less. ▪ Maintain 8" or less stumps (flush cut if feasible) within 150' of road (Highway 83, Lindberg Lake Road and Lindbergh Lake Campground campsites). ▪ Mask any boundary or leave tree marking that is clearly visible from sensitive viewing locations (Highway 83, Lindberg Lake Road and Lindbergh Lake Campground campsites). It would generally not be necessary to extend this treatment further than about 150 feet from the viewpoints. Other options to mitigate for this visual impact include using Cut Tree Marking or other methods of designating leave trees - for example using spacing clauses in a stewardship contract, or using 	SP, SA, LA	Pre-Sale

TABLE 2- 16 MANAGEMENT REQUIREMENTS AND DESIGN CRITERIA.

OBJECTIVE	TASK	RESPONSIBILITY	DUE DATE
	<p>removable "tags" to designate leave or boundary trees.</p> <ul style="list-style-type: none"> ▪ Site landing offset from road to reduce visual impact if feasible. Do not locate landings immediately adjacent to the road unless limited by terrain. Extend short "jump up" road spurs into unit to landings, with vegetative screening between road and landing location left where possible. ▪ Landing clean up should be more thorough than may ordinarily occur, specifically the burning of the debris in landing piles should be nearly complete, with repiling/reburning occurring if it burned poorly the first time and left unsightly "bones". Slash piles visible from roadside shall be removed or burned upon unit completion. <p>Where new access roads and skid trails meet a primary travel route or trail, they should intersect at a right angle and, given the physical limitations of expected truck traffic, should curve to the extent feasible after the junction to minimize the length of route seen from the primary travel route or trail.</p>		
	<p>Units 66 and 67 All slash shall be removed within 50' of campsites.</p>	SP, SA, LA	Pre-Sale
	<p>Units 67, 68, 73, 74 All slash shall be removed from trails (Lindbergh Lake Campground and Glacier Slough Trail #481).</p>	SP, SA, LA	Pre-Sale
	<p>Units 73 and 74 Maintain 8" or less stumps (flush cut if feasible) within 50' of trail (Glacier Slough Trail #481). Where new access roads and skid trails meet a primary travel route or trail, they should intersect at a right angle and, given the physical limitations of expected truck traffic, should curve to the extent feasible after the junction to minimize the length of route seen from the primary travel route or trail.</p>	SP, SA, LA	Pre-Sale
	<p>Units 32, 33, 34, 36, and 37 As seen from Highway 83, along edge of unit apply transition zones that would be left along north and south edge of unit where tree retention would be modified to create a more gradual visual transition of the treated stand to the adjacent stand and soften unit edges. This may mean progressively decreasing the leave tree density in this zone (such as if next to an existing opening) or progressively increasing the leave tree density in this zone (such as if next to a dense uncut forest).</p>	SP, SA, LA	Pre-Sale
*Reduce Middle ground and Foreground Views Effects to Scenery Resources	<p>Units 83, 84, 85, 86, and 87 To reduce the visual contrast of skyline corridors align corridors so they are less visible, where feasible designate skyline corridors after felling trees (avoiding regular spaced widths between corridors) and/or, and/or avoid skyline corridors on alignment perpendicular to sensitive view, and/or use lateral yarding capabilities. Transition zones would be left along edge of unit openings where tree retention would be modified to create a more gradual visual transition of the treated stand to the adjacent stand and soften unit edges. Progressively increasing the leave tree density in this zone for 50' to 100' along the boundary edge.</p>	SP, SA, LA	Pre-Sale

* A Forest Service Staff Member trained in Visual Resource Management will review visual Design Criteria with Presale Forester and Sale Administrator before implementation of the project. A portion of the Design Criteria was selected from the Northern Region Scenic Resource Mitigation Menu & Design Considerations for Vegetation Treatments, March 1, 2011.

