Environmental Analysis

for the

Rollins Area Sanitation Timber Project

Prepared By

Kalispell Unit, Northwestern Land Office

Montana Department of Natural Resources and Conservation

June 2011

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CHECKLIST ENVIRONMENTAL ASSESSMENT

Project Name:	Rollins Area Sanitation Timber Project
Proposed Implementation Date:	July 2011
Proponent:	Department of Natural Resources and Conservation, Northwestern Land Office, Kalispell Unit
Location:	Sections 8, 16, 18, 20, 30, Township 25N, Range 20W Section 36, Township 25N, Range 21W
County:	Lake

I. TYPE AND PURPOSE OF ACTION

The Kalispell Unit, Montana Department of Natural Resources and Conservation (DNRC) is proposing the Rollins Area Sanitation Timber Project. The project area is located approximately 20 air miles south of Kalispell, Montana (see Vicinity Map in Attachment I). The land involved in the project is held by the State in trust for the support of specific beneficiary institutions (*Enabling Act, 1889: 1972 Montana Constitution, Article X, Section 11).* s. 8 & 18 – School of Mines; s. 16 & 36 – Common Schools; s. 20 – University of Montana; s. 30 – School for the Deaf and Blind.

Under the proposed action, approximately 1 million board feet would be harvested from approximately 1,120 acres. No new road construction would be needed. Estimated revenue of $140,000 would be generated for the beneficiary. Specific objectives of this project are to maintain and improve forest health by removing dwarf mistletoe infected trees and thinning dense clumps of overstory trees, and increase forest productivity beneficial to future trust actions. If the Action Alternative is selected, activities could begin in August 2011.

Project Purpose and Need:

1) Improve forest health and vigor by removing diseased trees.

2) Sell forest products from trust lands within the project area to generate revenue for various trusts to produce the largest measure of reasonable and legitimate return over the long run for specific beneficiary institutions (*Section 77-1-202, Montana Codes Annotated (MCA)).*

II. PROJECT DEVELOPMENT

1. PUBLIC INVOLVEMENT, AGENCIES, GROUPS OR INDIVIDUALS CONTACTED:

On April 11, 2011, the DNRC sent scoping letters to adjacent landowners and other known interested parties and organizations. A public notice was posted in *The Daily Interlake* on 4 consecutive Sundays (April 3, 10, 17, & 24, 2011). One letter was received and offered support of the project as proposed. Hydrological, soils, wildlife and vegetative issues were identified by DNRC specialists and field foresters for both the No Action and the Action Alternative.

2. OTHER GOVERNMENTAL AGENCIES WITH JURISDICTION, LIST OF PERMITS NEEDED:

No other governmental agencies have jurisdiction, and no permits are needed.

3. ALTERNATIVES CONSIDERED:

No Action Alternative: Under the No Action Alternative, no activity would be undertaken. No timber would be harvested and diseased trees would not be removed. The No Action alternative would likely result in decreased growth rates and an increase in the occurrence of dwarf mistletoe. This alternative would not produce revenue for the Trust Beneficiary. Effects of the No Action Alternative are further described in the Resource Analyses in Attachment 2.

Action Alternative: Under the Action Alternative, DNRC would harvest up to 1 million board feet from approximately 1,120. Timber would be harvested using ground based logging systems with conventional, mechanical or cut-to-length operations and would be focused on the removal of dwarf mistletoe infected trees and suppressed and intermediate trees.

Issues surrounding this proposed action have either been resolved or mitigated through project design. Mitigations would be included as specific contractual requirements of this project. Recommendations to minimize direct, indirect and cumulative effects have been incorporated in the project design (Attachment II, Resource Analyses; Attachment III, Prescriptions: Attachment IV, Mitigations;).

III. IMPACTS ON THE PHYSICAL ENVIRONMENT

4. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE:

The sale area is located on moderate to steep slopes with high rock fragment residual soils on the mountain ridges. Moderate to deep, silty, glacial till soils from limestone occur on mountain sideslopes. These are higher productivity soils with calcareous subsoils that limit rooting depth. Localized areas of deep lacustrine silts and gravelly alluvium occur along streams and in small parts of all sections. Soils maps and interpretations are referenced in project file. Previous stand entries have established roads, skid trails and landings for most units. The following paragraphs describe soil information more specific to the individual parcels.

Harvest activities would comply with Best Management Practices (BMP's) and would use existing roads and segments of existing skid trails where feasible. Mitigations include: limiting equipment operations to minimize soil compaction and rutting, planning appropriate skid trails, limiting skidding to slopes less than 40% and less than 20% of the harvest unit acreage, limiting disturbance and scarification, and retaining adequate amounts of large woody debris and fine litter following harvest. Thus, direct, indirect, and cumulative effects to the soil resource would be minimal.

Please refer to Attachment 2, Soils Analysis for a more detailed analysis, and Attachment 4, Mitigations for a more detailed description of mitigations.

5. WATER QUALITY, QUANTITY AND DISTRIBUTION:

Streams, draws and road systems within and approaching the project area were reviewed in 2011 by a DNRC hydrologist. Stream channels, where they exist, were found to be in fair to good condition with no unstable reaches or in-channel sediment sources. No substantive sources of erosion or sediment delivery

from roads were identified during field reconnaissance. All applicable BMPs were implemented through past activities, and include installation of rolling drain dips and rubber belt diverters.

Harvest activities would use existing roads and segments of existing skid trails where feasible, would require DNRC approved drainage features on skid trails, and would comply with BMPs and all laws pertaining to Streamside Management Zones (SMZs). The project design and compliance with applicable regulations and rules, direct, indirect, and cumulative effects to the water resource would be minimal.

Please refer to Attachment II, Water Resources Analysis for a more detailed analysis, and Attachment IV, Mitigations for a description of mitigations.

6. AIR QUALITY:

The project is located in Montana State Airshed 2 and outside the Kalispell Impact Zone. Under the Action Alternative, all burning would be conducted during times of adequate ventilation and within the existing rules and regulations. The DNRC will try and utilize logging slash to avoid burning. Slash burning would be conducted when conditions favor good smoke dispersion. Burning would produce some particulate matter but impacts are expected to be minor and temporary.

7. VEGETATIVE COVER, QUANTITY AND QUALITY:

A major timber harvest occurred over the project area from 1999 to 2003. This timber harvest focused on removing dwarf mistletoe infected trees and other diseased trees. Stocking density was also reduced to improve overall health and vigor. This harvest treatment would remove the remaining dwarf mistletoe infected trees and thin any remaining overstocked stands to improve stand health and vigor. No old growth stands as defined by Green et al. (1992) are present in the project area. The predominant appropriate cover type is western larch / Douglas-fir. Noxious weeds, primarily spotted knapweed, are present along existing roads. No sensitive plants listed by the Montana Natural Heritage Program were identified in the project area.

Under the Action Alternative, timber harvest would occur on approximately 1,120 acres and would be focused on the removal of dwarf mistletoe infected trees and those infected or susceptible to insect and disease mortality. Occurrence of noxious weeds may increase.

Recommendations to minimize direct, indirect and cumulative effects have been incorporated into the project design (Attachment 1; Attachment 2, Vegetation Analysis; Attachment 3, Prescriptions; Attachment 4, Mitigations). Measures to minimize noxious weeds, insects and disease are included in the project design (Attachment 4, Mitigations).

8. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS:

No fish populations were identified during field reconnaissance, and the Montana Fisheries Information System does not identify any fish populations in any project area streams. Potential fish habitat was identified in Forrey Creek, but no fish were observed. There is a low risk of direct, indirect, or cumulative effects to aquatic life and habitat from this project. Please refer to Attachment 2 – Water Resource Analysis for further discussion of potential impacts to fish habitat.

For all other resources related to this heading, please refer to Attachment 2, Wildlife Analysis for a detailed analysis and Attachment 4, Mitigations for a detailed description of mitigations.

9. UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES:

Please refer to Attachment 2 Wildlife Analysis for a more detailed analysis and Attachment 4, Mitigations, for a more detailed description of mitigations.

10. HISTORICAL AND ARCHAEOLOGICAL SITES:

A DNRC archaeologist has reviewed this project. Significant sites or artifacts were not identified during these reviews.

11. AESTHETICS:

Some portions of the project area will be visible from Highway 93. It may also be visible from adjacent properties. Given the small amount of cut volume per acre (approximately 1 MBF per acre), changes in the visual appearance of the area will be very minimal.

12. DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR OR ENERGY:

No impacts are likely to occur under either alternative.

13. OTHER ENVIRONMENTAL DOCUMENTS PERTINENT TO THE AREA:

No other environmental documents are pertinent to the project area.

IV. IMPACTS ON THE HUMAN POPULATION

14. HUMAN HEALTH AND SAFETY:

Human health would not be impacted by the proposed timber sale or associated activity. There are no unusual safety considerations associated with the proposed timber sale.

15. INDUSTRIAL, COMMERCIAL AND AGRICULTURAL ACTIVITIES AND PRODUCTION:

Timber harvest would provide continuing industrial production in the Flathead Valley.

16. QUANTITY AND DISTRIBUTION OF EMPLOYMENT:

People are currently employed in the wood products industry in the region. Due to the relatively small size of the timber sale program, there would be no measurable impacts from this proposed action.

17. LOCAL AND STATE TAX BASE AND TAX REVENUES:

People are currently paying taxes from the wood products industry in the region. Due to the relatively small size of the timber sale, there would be no measurable cumulative impact from this proposed action on tax revenues.

18. DEMAND FOR GOVERNMENT SERVICES:

Log trucks hauling to the purchasing mill would result in temporary increased on access roads and US Highway 93. This increase is a normal contributor to the activities of the local community and industrial base, and they are not considered a new or increased source of demand.

19. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS:

On June 17, 1996, the Land Board approved the SFLMP. The SFLMP provides the philosophy adopted by DNRC through programmatic review (DNRC, 1996). The DNRC will manage the lands in this project according to this philosophy, which states:

> *Our premise is that the best way to produce long-term income for the trust is to manage intensively for healthy and biological diverse forests. Our understanding is that a diverse forest is a stable forest that will produce the most reliable and highest long-term revenue stream…In the foreseeable future, timber management will continue to be our primary source of revenue and our primary tool for achieving biodiversity objectives.*

On March 13, 2003, the DNRC adopted Rules (Administrative Rules of Montana [ARM] 36.11.401 through 450). These Rules provide DNRC personnel with consistent policy, direction, and guidance for the management of forested trust lands. Together, the SFLMP and Rules define the programmatic framework for this project.

20. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITIES:

The project area receives dispersed recreational use by hunters, -walkers, joggers, and some mountain bikers. Some of the parcels do not provide for access to the general public. Implementation of the proposed project will not displace any current uses of the area. Use is expected to remain the same or increase following this project.

21. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING:

There would be no measurable cumulative impacts related to population and housing due to the relatively small size of this project, and the fact that people are already employed in this occupation in the region.

22. SOCIAL STRUCTURES AND MORES:

No impacts related to social structures and mores would be expected. under either alternative.

23. CULTURAL UNIQUENESS AND DIVERSITY:

No impacts related to cultural uniqueness and diversity would be expected. under either alternative.

24. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:

Costs, revenues and estimates of return are estimates intended for relative comparison of alternatives. They are not intended to be used as absolute estimates of return. The estimated stumpage is based on comparable sales analysis. This method compares recent sales to find a market value for stumpage. These sales have similar species, quality, average diameter, product mix, terrain, date of sale, distance from mills, road building and logging systems, or anything that could affect to buyer's willingness to pay for. The Action Alternative would generate an estimated return to the school trust of $140,000. The No Action alternative would not generate any return to the trust.

EA Checklist Prepared By:	**Name:** Pete Seigmund **Date:** June 2011 **Title:** Management Forester

V. FINDING

25. ALTERNATIVE SELECTED:

Upon review of the Checklist EA and attachments, I find the Action Alternative as proposed meets the intent of the project objectives as stated in section I, Type and Purpose of Action. It complies with all pertinent environmental laws, DNRC State Forest Land Management Plan, and a consensus of professional opinion on limits of acceptable environmental impact. The No Action Alternative does not meet the project objectives. For these reasons I have selected the Action Alternative for implementation on this project.

26. SIGNIFICANCE OF POTENTIAL IMPACTS:

After a review of the scoping documents, Department policies, standards, guidelines, and the State Forest Land Management Plan (SFLMP), I find all the identified resource management concerns have been fully addressed in this Checklist EA and its attachments. Specific mitigation measures for each resource concern are listed in Attachment IV. The action alternative provides for income to the trust and promotes the development of a healthy, biologically diverse, and productive forest. It also provides the opportunity to improve reduce fuel loading and crown fire potential near homes and private property. I find there will be no significant impacts to the human environment as a result of implementing the action alternative. Specific project design features and various resource management specialist recommendations have been implemented to ensure that this project will fall within the limits of acceptable environmental change and result in no significant impacts.

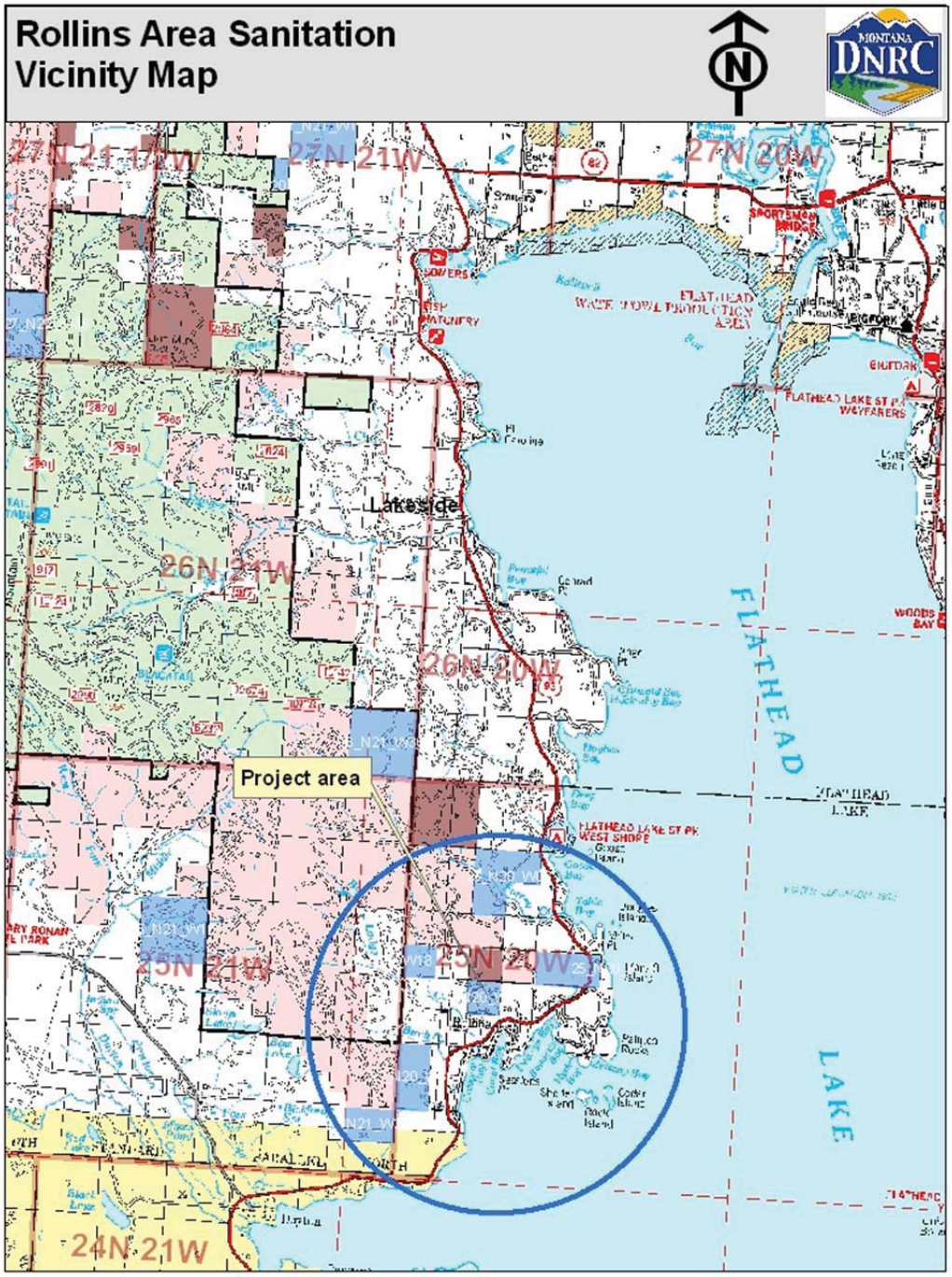
27. NEED FOR FURTHER ENVIRONMENTAL ANALYSIS:

☐ EIS ☐ More Detailed EA ■ No Further Analysis

EA Checklist Approved By:	**Name:** Greg Poncin **Title:** Kalispell Unit Resource Program Manager
Signature: *Greg Poncin*	**Date:** July 21, 2011

Attachment I: MAPS

Vicinity Map
&
Sale Map


Rollins Area Sanitation
Vicinity Map
N
MONTANA DNRC
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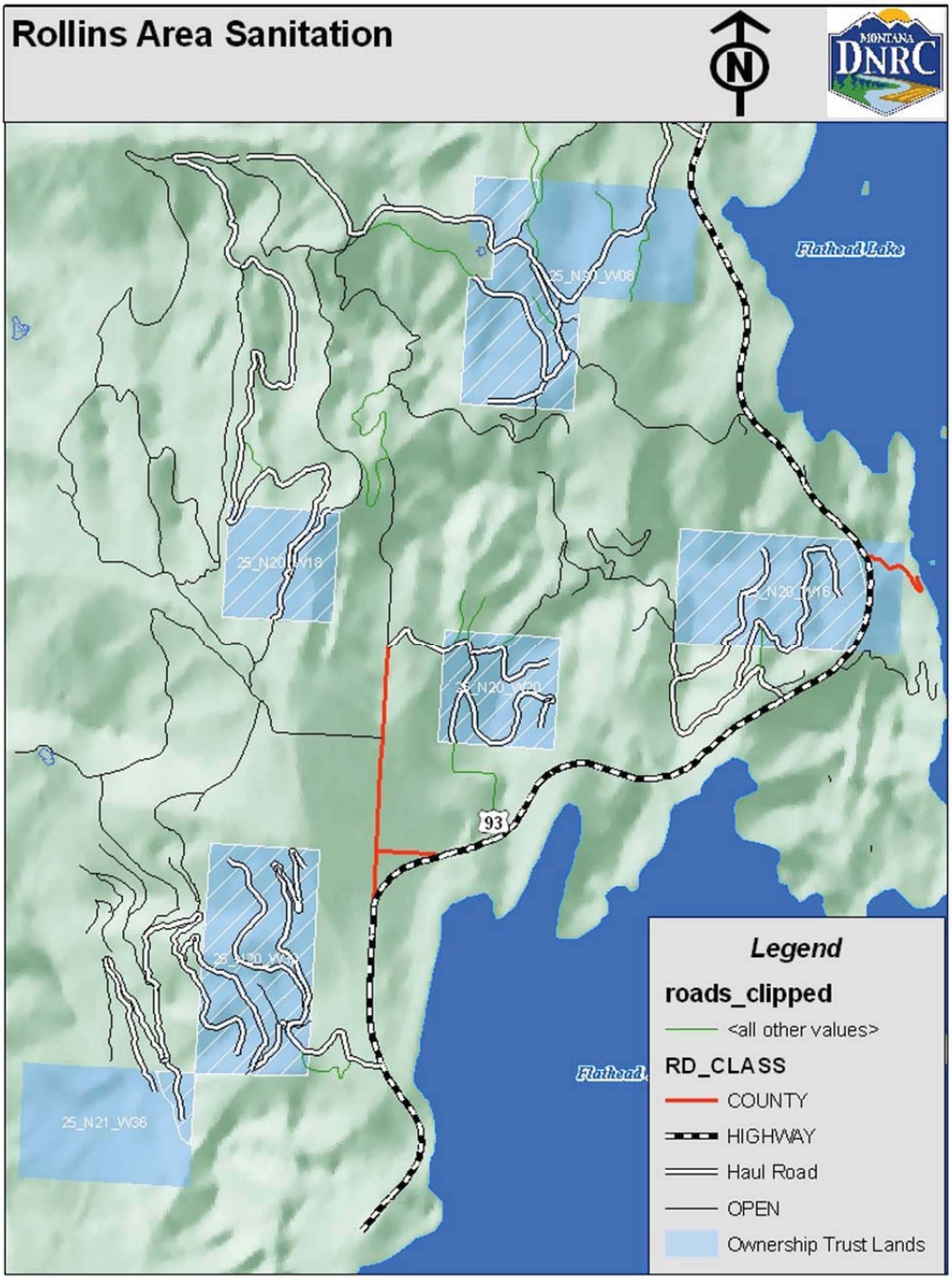
27N 20W
Lakeside
26N 21W
26N 20W
Project area
FLATHEAD LAKE
25N 21W
25N 20W
24N 21W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DNRC
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Haul Road
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Ownership Trust Lands

Attachment II

Resource Analyses: Existing Conditions & Direct, Indirect and Cumulative Effects

Vegetation Analysis

Water Resources Analysis

Soils Analysis

Wildlife Analysis

EXISTING CONDITIONS & ENVIRONMENTAL EFFECTS

Introduction

This section identifies and describes those resources that may be affected by the proposed action and describes the environmental effects of each alternative on the resources. The section is organized by general resource categories and their associated issues. The descriptions of the existing conditions found in this section can be used as a baseline for comparison with the Action Alternative.

Cumulative effects from current management and foreseeable future State actions are discussed. These include other active timber sales, those in the planning stage, ongoing maintenance, and other uses of the areas being analyzed. Direct, indirect and cumulative effects on the resources being analyzed were considered.

General description of the area

The proposed Rollins Area Sanitation Project area is located approximately 21 miles south of Kalispell, Montana and includes approximately 1,400 acres of State Trust Lands. It is located within Sections 8, 16, 18, 20, 30, Township 25N, Range 20W and Section 36, Township 25N, Range 21W. State Trust Lands within the project share property boundaries with numerous private landowners. Several other analysis areas were delineated to assess direct, indirect and cumulative effects of the alternatives considered. More specific details about these are contained under each corresponding resource heading.

Vegetation Analysis

The vegetation section describes present conditions and components of the forest as well as the anticipated effects of both the No Action and the Action Alternatives. Issues expressed during initial scoping by the public and internally were:

- Dwarf mistletoe is prevalent in the Douglas-fir and western larch.
- Insects and disease may affect timber productivity and value.
- Timber harvesting and associated activities may increase noxious weeds in the project area.

These issues can be evaluated by analyzing the anticipated changes in current forest conditions in the project area, in conjunction with the extent and location of silvicultural treatments.

Analysis Methods

Administrative Rules of Montana (ARM 36.11.404) direct DNRC to take a coarse filter approach to favor an appropriate mix of stand structures and compositions on state lands, referred to as a desired future condition. The following characteristics: forest composition, age class distribution, cover type and structure, are used to describe current forest and stand conditions in comparison to the estimated natural forest characteristics for Montana prior to extensive influences from fire suppression, logging, and development. This analysis will compare the desired stand conditions that DNRC believes to be appropriate for the site with current stand conditions.

Forest/Timber Analysis Methods **–**

The DNRC site–specific model (ARM 36.11.405), was used to determine the characteristics of the desired future condition and to evaluate the potential direct, indirect, and cumulative effects. This model compares the 1930's forest inventory data used in *Losensky's* 1993 analysis and subsequent 1997 report of estimated proportions of forest stand structural stages by cover type historically represented throughout Montana, to the 2006 DNRC Stand Level Inventory database that estimates current forest conditions. More recent field observations and tree data were gathered to further refine specific forest stand characteristics within the project area. This data is available at the Kalispell Unit. The method used to analyze current and appropriate (desired future conditions; DFC) stand conditions, old-growth timber stands, and stand development follows:

- *Current & Appropriate Conditions:* Two filters were developed for the Kalispell Unit Landscape and applied to 2009 Stand Level Inventory (SLI). The filters were assigned cover types similar to those used in the 1930's inventory. The first filter followed the 1930's criteria exactly, or as closely as possible, representing current conditions. The second filter represents the department's DFC as defined in ARM 36.11.404 and 405. The second filter for appropriate conditions assigns cover types using criteria primarily designed to help address the situation where succession from one cover type to another is occurring. This successional filter was developed to indicate that those areas in the absence of fire suppression, introduced pathogens, and timber harvesting would likely have been assigned to a different cover type than the current cover type filter would suggest. The appropriate filter estimates, from the current stand conditions, what cover type representation might have looked like in 1900.
- *Old Growth Timber Stands:* the methods to identify old growth timber stands, as defined by ARM 36.11.403 (48), are based on the Kalispell SLI data. The process uses the SLI to identify stands that may meet the minimum criteria (number of trees per acre that have a minimum dbh and minimum age) for a given habitat type group as described in Green et al (1992), *Old Growth Forest Types of the Northern Region*. Field surveys were used to verify that the definition is met in the identified stands and to determine if additional stands meet the definition.
- *Stand Structure/Development:* the analysis on stand structure and development is qualitative, and discusses the conditions of timber stands, including how various natural and man-caused disturbances and site factors have affected and may continue to affect timber stand development.

Sensitive Plant Analysis Methods **–**

The Montana Natural Heritage Program (MNHP) database was consulted by DNRC for information regarding occurrence of plant species of special concern and the potential for sensitive plants and their habitats within the project area

Noxious Weed Analysis Methods **–**

During field reconnaissance, DNRC personnel assessed road conditions, road locations, various susceptible timber stands, stream conditions, and generally evaluated noxious weed occurrence, extent and location.

Analysis Area

Forest/Timber Analysis Area **–**

This analysis area includes 3 geographic scales for assessing potential direct, indirect and cumulative effects on forest cover type, species composition, the distribution of age classes, structural stages, and fragmentation.

- Climatic Section M333B - **Lower Flathead Valley (Losensky 1997) Scale** was used in this analysis for comparing historic conditions related to the distribution of forest cover types and age classes, to current conditions within the project area. The Lower Flathead Valley geographic area includes Flathead Lake west to the Montana border, from the Canadian border south to Missoula, MT (Losensky 1997*)*.

- The **DNRC Kalispell Landscape Scale** includes all scattered forested trust land parcels, administered by the Kalispell Unit for DNRC. This geographic area is a subset of the above Lower Flathead Valley Climatic Section and includes school trust lands in the vicinity of Whitefish, MT south to Arlee, MT and school trust lands in the vicinity of Bigfork, MT west to the Thompson Chain of Lakes. Current and appropriate conditions related to forest cover types and age class distribution were analyzed on this scale.

- The **Rollins Area Project Area Level Scale** includes all trust lands within the project area and more specifically those stands proposed for harvesting under each alternative. This scale was used to analyze expected changes in current forest conditions of the project area.

Sensitive Plants/Noxious Weeds Analysis Area **–**

The analysis area for noxious weeds and sensitive plants species, are trust lands within the project area. Surveys identifying sensitive plant occurrences were compared to proposed harvest sites and road construction locations for assessing direct, indirect, and cumulative effects, and developing mitigation measures, if needed.

Existing Conditions

General Forest Vegetation Information **–**

The existing vegetative types, more specifically forest habitat types and cover types within the Kalispell Landscape and the Rollins project area, reflect the varied influences of site factors, fire regimes or disturbance patterns, and past management activities.

Site conditions vary depending upon the physiographic and climatic factors associated with geographic locations. Soil types, slope aspect and position, length of growing season, and moisture availability influence the type, growth and development of forest vegetation. These site factors are considered in the forest habitat classifications (Pfister et al. 1977), used to generally describe forest vegetation, forest stand development, and relative forest productivity associated with the given site and climatic factors.

Forest Habitat Types –

In the Rollins Project Area, the area is occupied by forest habitat types in the Douglas-fir (*Pseudotsuga menziesii)* and Grand fir (*abies grandis*) series indicating the influence of moderately warm/dry and moderately cool/moist climatic conditions Douglas-fir and western

larch are most prevalent with some scattered spruce, grand fir, ponderosa pine, and lodgepole pine.

Timber productivity ranges from moderate (Douglas-fir) to very high (grand fir) for these habitat types.

Fire Regimes –

Fire regimes for the Kalispell Landscape are variable, given the broad and scattered nature of trust lands, but are predominantly within the moderate severity fire regime. As a whole, the forest exists as a mosaic of differing age and size classes that have developed from different human activities, fire frequencies and intensities in relation to other site factors such as aspect, elevation, weather, stand structure, and fuel loadings. Areas of frequent fire have produced WL/DF, PP, and DF cover types. In low severity fire regimes, fires occur frequently and create relatively smaller patches of open-grown forest. Historically, these low severity regimes maintained stand conditions that were resistant to stand replacement fires, by regularly consuming forest fuels, killing small trees, and pruning boles of small trees. As fire intervals become longer and management activities occur less frequently, more shade tolerant tree species begin to develop in the understory and stands tend to be multi-storied, with varied patch sizes. These characteristics reflect a moderate to low severity fire regime. High severity fire regimes are characterized by large patch sizes and stand replacement fires, but often include low severity fires that act as a thinning agent, or create small openings where clumps of trees die where small crown fires erupt.

A mosaic of even and multi-aged patches is present in the project area. The majority of the Rollins project area would be classified in a low to moderate/ mixed severity fire regime. Fire intervals are considered to be frequent, 50 years or less. Most of the project area has evidence of past fire activity. Forest stands shaped by frequent to mixed severity fires typically have an abundance of seral species in the overstory.

As a result of fire suppression, stands of the PP (ponderosa pine) and WL/DF (western larch/Douglas-fir) cover types that characteristically would have been open-grown now have thick understories of more shade tolerant species throughout both the project area and Kalispell Landscape. In general, fire return intervals have been lengthened and fire intensity has increased due to increased fuel loadings vertically and horizontally. Lower intensity, more frequent fires would have kept a larger composition of seral species and provided for less shade tolerant regeneration.

Forest Age Class & Cover Type Distribution –

Table 3–1 compares the DNRC Kalispell Landscape (current cover types) with historical data (appropriate cover types) from Losensky (1997) for the Lower Flathead Valley section, as an assessment of desired future conditions regarding cover types.

Table 3–1. Current and appropriate cover types for the Kalispell Unit.

Cover Type	Current Cover Type (Acres	Appropriate Cover Type (Acres)	Current Type Minus (-) Appropriate Type (Acres)
SAF	2249.9	254.8	1995.1
DF	1646.5	1029.4	617.1
HW	449	207	242
LP	2269.2	1376.8	892.4
MC	10265.8	2282.3	7983.3
PP	10636.9	11936.2	-1299.3
OTHER	3635.4	3576.2	59.2
WL/DF	25494.6	32974.5	-7479.9
WWP	567.6	3577.7	-3010.1
TOTAL	57214.9	57214.9	--

SAF = subalpine fir. DF = Douglas-fir. LP = lodgepole pine. MC = mixed conifer. PP = ponderosa pine. WL/DF = western larch/ Douglas-fir. WWP = western white pine. Other = non stocked lands, nonforest, or water. The Current Type minus Appropriate Type column above lists the excess and deficit (-) acres for each Cover Type.

The longer intervals between disturbances and commodity extraction generally explain the decrease in the WL/DF and PP cover types. The PP, WL/DF, and WWP cover types are not as well represented within the Kalispell Landscape as estimated for the early 1900's. Most notable, is the conversion of over 11,000 acres in the WL/DF, PP, and WWP cover types, over the last 100 years, to the present over abundance of the MC and SAF cover types by approximately 10,000 acres.

Active fire suppression initiated in the early 1900's has interrupted wildfire frequencies and intensities in conjunction with 50 years or more of logging practices that favored the removal of commercially valuable western larch (*Larix occidentalis)*, ponderosa pine (*Pinus ponderosa)*, western white pine (*Pinus monticola)* and Douglas-fir (*Pseudotsuga menziesii)* for railroad ties, mining timbers, and construction lumber. Many open, mature stands dominated by western larch and other seral species with even-aged patches of immature seral trees in the understory have been replaced with more densely stocked stands in both the overstory and understory. These stands often include a higher percentage of more shade tolerant trees such as, Douglas-fir, grand fir (*Abies grandis*), or spruce (*Picea spp*.), as a result of longer intervals between disturbances.

Table 3–2. Current and appropriate cover types & stand compositions for the Rollins Sanitation Project area.

Cover Type	Current Cover Type (Acres)	Appropriate Cover Type (Acres)	Current Type Minus (-) Appropriate Type (Acres)
SAF	0	0	0
DF	698	51	647
HW	0	0	0
LP	0	0	0
MC	12	0	12
PP	18	1280	-1262
Other	3	5	-2
WL/DF	694	89	605
WWP	0	0	0
TOTAL	1425	1425	--

SAF = subalpine fir. DF = Douglas-fir. LP = lodgepole pine. MC = mixed conifer. PP = ponderosa pine. WL/DF = western larch/ Douglas-fir. WWP = western white pine. Other = non stocked lands or nonforest. The Current Type minus Appropriate Type column above lists the excess and deficit (-) acres for each Cover Type.

The Rollins project area reflects the same trend in forest cover type shifts as the Kalispell landscape, notably that PP cover types represent a smaller proportion of the cover types, and DF represents a much larger proportion, than likely occurred in the early 1900's.

Distribution of Old-Growth Stands –

As per the Land Board's decision in February, 2001, the DNRC adopted definitions for old growth by forest habitat groups, based on minimum number and size of large trees per acre and age of those trees as noted in *Old-Growth Forest Types of the Northern Region(Green et. Al. 1992).* The DNRC approach to old-growth management (and forest management in general) is further clarified in (ARM 36.11.401 to 36.11.450). Field verification of older stands modeled in the coarse filter analysis of SLI data for the project area identified no stands within the project area meeting the DNRC's old growth definition.

Stand Structure and Development –

Stand structure and patch size indicates a characteristic of stand development and disturbance and how a stand may continue to develop. Stand structure is classified as single-storied, two-storied, or multi-storied. Patch size for this project is estimated from stand sizes and provides further insight into the severity of a disturbance as it relates to dominant tree canopies. Table 3-3 displays the percent of area in the Rollins Sanitation Project Area and Kalispell Landscape by stand structure class and estimates of stand size.

Table 3–3. Proportion (%) of analysis area by stand structure and estimated patch size.

Stand Structure	Kalispell Landscape	Kalispell Average Stand Size	Project Area	Project Area Average Stand Size
Single-storied	15%	24 acres	0%	n/a
Two-storied	3%	28 acres	12%	27 acres
Multi-storied	82%	31 acres	88%	47 acres

Single-storied stands are most often associated with stand replacement events, such as severe fires or regeneration harvests including clearcutting or seedtree cutting. Stands are fairly simple in vertical structure and are often even aged. Regeneration harvests, such as a seedtree or shelterwood, that retain 10% or more of the upper crown canopy and has a seedling/sapling understory are considered 2-storied stands. Two-storied stands have simple vertical structure and are frequently even aged, although at least two age classes are generally present. The multi-storied condition arises when a stand has progressed through time and succession to the point that shade-tolerant species are encroaching into a shade-intolerant overstory. Three or more age classes may be present in these stands and vertical structure can be complex. These stands often experience a long interval between disturbances. Stand size refers to openings created by disturbances and provides insight regarding the severity of a disturbance event regarding tree mortality. Larger patch sizes are generally associated with moderate and high severity fire regimes or regeneration harvests. Smaller sizes are attributed to low or moderate severity fire regimes, and harvest treatments that retain larger proportions of the overstory.

Over 80 % of both the Rollins project area and Kalispell Landscape consists of stands with multi-storied structures. The various tree canopy levels may be patchy in nature or well distributed and several age classes are usually present. Single or two-storied, even aged structures occur in less than 12% of the Rollins acreage and are largely represented by the younger age classes.

Timber Productivity and Value –

Insects: Since the summer of 2000, various species of bark beetles have been responsible for increased tree mortality in the Flathead Valley. In the Rollins project area, fir engraver (*scolytus ventralis*) and Douglas-fir (*dendroctonus pseudotsugae*) bark beetles have been active. Dwarf mistletoe has contributed to an increase in bark beetle activity. Any other factors that stress trees and cause a reduction in tree vigor will make them more susceptible to attack. Since the year 2000, western Montana has experienced some of the hottest and driest summers on record. This has lead to an increase in droughty conditions which further weakened and stressed large numbers of trees.

Tree Vigor: Radial growth rates are good to moderate in the younger (less than 150 years). Radial growth is static or declining in the 150 plus age class. Low vigor is also making many of the stands in the project area more susceptible to bark beetle attacks.

Sensitive Plants –

A review of the records from the MNHP for the project indicated no plant species of special concern identified within the project area. Field reconnaissance also indicated no unique or sensitive plants within the project area.

Noxious Weeds –

Invasions of noxious weeds are generally restricted to old logging roads and trails in less recently logged areas. Areas logged in the last few decades, however, have invasions spreading from the well established weed populations in the roads into adjacent openings. Native plant species may not re-colonize these areas. Several factors increase the likelihood of continued weed encroachment in the Rollins area. They are: persistent and increasing usage of the area for recreation, the residential development of the surrounding private lands.

Environmental Effects

Forest Age Class & Cover Type Distribution –

No Action Alternative – Direct and Indirect Effects

Natural processes would continue to have a direct influence on these forest characteristics. In the absence of wildfires, the effects of current disease infected trees and insect infestation-induced mortality will continue to influence both short and long term age class distribution and cover type representation.

Openings created in the canopy from insect and disease mortality are not expected to resemble natural fire effects. Openings are likely to be smaller and many may continue to be stocked with younger pole-sized trees. Without duff reduction and soil exposure, the regeneration of openings is expected to favor shade tolerant species over seral species. The lack of regeneration under denser canopies or the predominance of Douglas-fir in numerous understories would perpetuate the trend of increasing DF and MC cover types over much of the project area. Without fire, the older age classes from 100 years up would continue to dominate the area and the 0-39 and 40 to 99 age classes would continue to decline, as several 70 to 80 year old stands move into the next age class without replacement.

No Action Alternative – Cumulative Effects

There would likely be a decline in acreage in PP (ponderosa pine) cover types. Ponderosa pine and western larch composition will continue to decrease leading to a shift from PP and WL/DF to DF or MC cover types. Across the landscape, fire suppression, insect and disease occurrence, and increasing human use may influence cover type and age class distribution to an unknown degree. In the absence of stand replacement fires, variability of age class and cover type distribution would decline.

Action Alternative – Direct and Indirect Effects

As a result of harvesting, WL/DF cover types would persist within the harvest units. Dominant tree composition would begin to move toward historic conditions. By removing shade tolerant species (mostly grand fir, spruce, and Douglas-fir) and retaining seral species, WL/DF cover types would become more resilient by promoting historic cover types, age classes, and stand structure. The average age of some treated stands would decrease, although some stands would remain in the same age class after harvest, depending on the extent of overstory tree removal.

This alternative would harvest 1,120 acres. Sanitation cutting and commercial thinning would occur in combination on all acres. Sanitation cutting would remove diseased and insect infested trees. The main pathogen is dwarf mistletoe. Tree spacing will be more variable in the improvement cut areas with some small openings possibly being created. In the commercial thin areas, harvest prescriptions would favor the retention of western larch and ponderosa pine. Healthy Douglas-fir would also be retained to help achieve desired stocking levels but larch and

pine would be favored over Douglas-fir. The reduction in Douglas-fir would increase the proportion of other species in the overstory resulting in a slight change in composition.

The Action Alternative would treat approximately 78% of the Rollins project area. This project is not expected to have any change to age class distribution in the project area.

Action Alternative – Cumulative Effects

Since any change in cover type distribution would be negligible, no cumulative effects are expected to cover types on the Kalispell Unit. Across the landscape, fire suppression, insect and disease occurrence, and increasing human use may influence cover type and age class distribution to an unknown degree.

Distribution of Old-Growth Stands –

No Action Alternative – Direct and Indirect

No old growth stands are present within the project area. Stands would continue to develop under the influence of suppressed wildfire activity and other natural disturbances such as insect and disease activity. Maintenance of old-growth characteristics would be dependent on the rate of mortality. If droughty conditions continue in this area, it is expected that the live trees will continue to die resulting in a younger stand, or an old stand of smaller trees in the near future.

No Action Alternative – Cumulative Effects

Fire suppression activities would continue and the potential for future insect outbreaks could continue. The potential for the development of larger diameter trees would be reduced.

Action Alternative – Direct and Indirect

Effects to old growth would be similar to the No Action Alternative. Commercial thinning and sanitation cutting would improve the growth and vigor of residual trees and help stands to develop old-growth characteristics sooner on 1,120 acres.

Action Alternative – Cumulative Effects

The potential for future insect outbreaks would be reduced and vigor would be increased. This would lead to an increase in growth and increase the potential for the development of larger diameter trees.

Stand Structure and Development –

No Action Alternative – Direct and Indirect Effects

Stand structure and development could continue to change as a result of damaging agents. The mosaic pattern of multi-aged and multi-storied or small even-aged patches are likely to persist with this type of disturbance, resembling the unstable conditions and stand development often associated with late successional forests. More shade tolerant species would increase in all canopy levels continuing to replace or inhibit growth of seral species, as dense small diameter trees develop in the understory. Area coverage of forest in early successional stages, especially in larger patch sizes would continue to decrease. Forest fuels, both ground and vertical would continue to build up in stand areas where mortality is occurring, increasing the potential for severe, less controllable fires that may result in large scale stand replacement fires.

No Action Alternative – Cumulative Effects

Forest succession and fire suppression would continue. Conditions favoring the establishment of shade tolerant species in canopy gaps, the slow growth of seedlings and saplings under closed canopies or the hindrance of tree establishment under closed canopies, and increasing fuel loadings would continue.

Action Alternative – Direct and Indirect Effects

Commercial thinning and sanitation cutting proposed for 1,120 acres would maintain current stand ages and structures, although canopy closure and forest fuels would be reduced. Commercial thinning would maintain some of the mid- and lower-canopy, favoring seral species and vigorous trees. These treatments would resemble low severity fires and act as a thinning agent, killing the less fire resistant species and releasing the more fire resistant trees, such as ponderosa pine. After slash disposal treatments are completed more fire resistant stand conditions and structures would be maintained for several decades.

Overstory tree canopy closure would be reduced on all harvested acres, temporarily reducing the percentage of closed canopy stands in the Rollins project area.

Action Alternative – Cumulative Effects

The area covered by single or two-storied stand structures across the Kalispell Landscape would remain the same.

Timber Productivity and Value –

No Action Alternative – Direct and Indirect Effects

Due to the effects of insects and disease the commercial value of sawlogs would continue to decline. Non-sawlog or pulp values are generally less than that received for sawlogs, and the value of this timber trust asset would continue to decline. Growth rates of individual trees in denser, older stands would remain static or continue to decline and opportunities for establishment of replacement trees would be limited to small openings favoring shade tolerant trees. Development of larger diameter commercially valuable tree component in the overstory of older stands would be hindered. Loss of dead and dying trees along both open and closed roads would continue to occur from activities associated with firewood gathering and maintenance of powerline corridors and public right-of-way easements. The request for small-scale salvage permits would likely increase.

No Action Alternative – Cumulative Effects

Without silvicultural treatments or wildfires to control tree densities, reduce losses to insects or disease, and recover mortality or initiate new stands, the trend towards increasing acreage on the Kalispell Unit covered by older, slower growing stands that are more susceptible to beetle infestations, stem decays, or wildfires would continue.

Action Alternative – Direct and Indirect Effects

Silvicultural treatments would remove diseased trees and decrease stand densities. Healthy and vigorous trees of all species would be favored for retention where they occur. Snags and snag recruits in quantities meeting DNRC requirements would be left. Larger diameter snags and cull trees, especially shade intolerant species, if not infected with dwarf mistletoe would be favored for potential snag recruits and snag retention. Due to the removal of low vigor or diseased trees stand health would improve. Between-tree competition would be reduced allowing residual trees to maintain or increase current growth rates. The bark beetle hazard for the treated stands will

decrease due to a decrease in stocking, removal of a good number of the larger diameter, decadent trees, and by freeing up more available water, sunlight, and nutrients for residual trees.

Commercial thinning and sanitation cutting (intermediate harvests) would remove fewer trees, producing less fuel loadings than regeneration harvests. Slash reduction will mainly include tree length skidding and burning of landing piles the ensuing fall. Some small diameter slash will be placed on skid trails for erosion control and nutrient cycling. Residual trees would adequately stock these units with healthy and vigorous trees.

Silvicultural treatments would be applied to about 1,120 acres. The effects for the various types of cuts as described above would occur on the treated acres. Timber productivity on the treated acres would increase or be maintained at a level closer to the site potential, improving the future opportunities for generating revenue for the trust with the use of the timber resource.

Action Alternative – Cumulative Effects

The percentage of forested land that is producing timber closer to the site potential would increase by approximately 2% on the Kalispell Unit. The acres of forest stands that are less susceptible to beetle infestations, stem decays, or wildfires would increase. Higher potential for greater long-term revenue from the timber resource is expected.

Sensitive Plants –

No Action Alternative – Direct and Indirect Effects

A review of the records from the MNHP for the project indicated no plant species of special concern identified within the project area. Field reconnaissance also indicated no unique or sensitive plants within the project area.

No Action Alternative – Cumulative Effects

Cumulative effects to the distribution or viability of sensitive plants populations are not expected.

Action Alternative – Direct and Indirect Effects

Since no sensitive plants are present within the project area, no direct or indirect effects to sensitive plants.

Action Alternative – Cumulative Effects

Since no sensitive plants are present within the project area, no cumulative effects to sensitive plants.

Noxious Weeds –

No Action Alternative – Direct and Indirect Effects

Weed seed would continue to be spread or be introduced throughout the project area from recreational use, residential development and use adjacent to state land or within, and commercial and non-commercial use. Herbicide treatment along open, public roads and enhancement of road closures would continue as funding and unit priorities allow. Containment of weed infestation areas or a reduction of weed infested acres may be realized.

No Action Alternative – Cumulative Effects

Cumulatively, the potential spread of weed seeds and increases in areas where weed populations could start is possible across the Kalispell Landscape, as well. With adoption of ARM 36.11.445 and implementation of Cooperative Noxious Weed Agreements with Flathead, Lake, and Lincoln counties, a more aggressive approach to identification and treatment of noxious weeds has occurred than in the past. This ongoing treatment of noxious weeds should limit large increases in noxious weed spread and may reduce the number of acres infested in the future.

Action Alternative – Direct and Indirect Effects

Logging disturbance would increase the potential for further establishment of noxious weeds with the exposure of mineral soil in skid trails, landings, existing roads, new road construction, and road improvement sites. Applying integrated weed management techniques within the sale design would reduce the occurrences and spread of weeds. Grass seeding new and disturbed roads and landings and spot spraying new weed infestations would reduce or prevent establishment of additional populations. Washing logging equipment prior to use would limit the introduction of weed seeds into the forest. Trampling slash in skid trails and closing additional roads would limit the potential for soil disturbance within these routes during or after logging, reducing the potential for weed establishment. Treating existing weed populations along or within roads with herbicide spray would reduce current weed populations, or contain the area of infestation.

Under the Action Alternative, harvesting would occur approximately 1,120 acres. Acreage within harvest units are at higher risk of incurring weed establishment within the units due to soil disturbances that may occur from skidding, landing, and heavy equipment use for scarifying or fuels reduction treatments. This risk would be limited by mitigation measures described above. Enhancement of existing road closures, trampling slash in road prisms, grass seeding sites disturbed during road construction or work, and additional road closures in combination with spot herbicide treatments would reduce current coverage of weed populations and limit the potential risk of further establishment.

Action Alternative – Cumulative Effects

In combination with other management activities and recreational use of the Kalispell Landscape, the action alterative would increase the risk of further encroachment of forested sites by noxious weeds. The potential risk would be limited with the use of prevention measures implemented under County Weed plans in addition to the site-specific mitigation measures for the Rollins area project. Actual treatments would likely be applied to a more extensive area under the Action Alternative, and have a greater potential for reducing current weed populations within the project area, thereby reducing the noxious weed affected area within the Kalispell Landscape.

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WATERSHED AND HYDROLOGY ANALYSIS FOR THE ROLLINS SANITATION TIMBER SALE

INTRODUCTION

Project Area and Project Activities

The gross project area includes 1,406 acres distributed among 5 tracts of Trust Lands near Rollins, Montana. Affected watersheds include the Forrey Creek and Birch Creek watersheds. All of these parcels are within the Flathead Lake watershed, but Forrey Creek is the only stream that contributes surface flow to Flathead Lake or any other body of water. The project area is adjacent to land managed by Plum Creek Timber Company, non-industrial private ownership, and the DNRC. The proposed action alternative would include a combination of ground based and cable yarding methods to harvest timber on approximately 1,120 acres within the project area.

Resource Description

Water yield and sediment delivery will be assessed in this analysis. Water yield increases (WYI) can affect channel stability if dramatically altered, and sediment delivery from both in-channel and introduced sources is a primary component of overall water quality in a watershed.

Issues and Measurement Criteria

The following issues encompass the specific issues and concerns raised through public comment and scoping of the proposed project. For a specific list of individual comments and concerns, please refer to the project file.

Sediment Delivery

Timber harvesting and related activities, such as road construction, can lead to water-quality impacts by increasing the production and delivery of fine sediment to streams. Construction of roads, skid trails, and landings can generate and transfer substantial amounts of sediment through the removal of vegetation and exposure of bare soil. In addition, removal of vegetation near stream channels reduces the sediment-filtering capacity and may reduce channel stability and the amounts of large woody material. Large woody debris is a very important component of stream dynamics, creating natural sediment traps and energy dissipaters to reduce the velocity and erosive power of stream flows.

Measurement Criteria: Tons of sediment delivery per year using procedures adapted from the Washington Forest Practices (WFP) Board (*Callahan 2000*). Sediment from harvesting activities and vegetative removal will be analyzed qualitatively through data collected during past statewide and DNRC internal BMP field reviews.

Water Yield

Timber harvesting and associated activities can affect the timing, distribution, and amount of water yield in a harvested watershed. Water yields increase proportionately to the percentage of canopy removal (*Haupt 1976*), because removal of live trees reduces the amount of water transpired, leaving more water available for soil saturation and runoff. Canopy removal also decreases interception of rain and snow and alters snowpack distribution and snowmelt, which lead to further water-yield increases. These impacts are ameliorated as new trees begin to grow and use water. New growth also begins to return snowpack distribution to pre-harvest levels as stands grow. Higher water yields may lead to increases in peak flows and peak-flow duration, which can result in accelerated streambank erosion and sediment deposition. Vegetation removal can also reduce peak flows by changing the timing of snowmelt. Openings will melt earlier in the spring with solar radiation and have less snow available in late spring when temperatures are warm. This effect can reduce the synchronization of snowmelt runoff and lower peak flows.

Measurement criteria: Equivalent Clearcut Acres (ECA). All past and proposed timber management activities are converted to ECA using procedures outlined in Forest Hydrology Part II (*Haupt 1976*). Peak flow duration and timing will be addressed qualitatively.

Analysis Area

Sediment Delivery

Direct, indirect and cumulative effects to sediment delivery will be analyzed on all existing roads in and leading to the proposed project area. Sediment delivery will be analyzed where stream crossings exist within the proposed project area using procedures adapted from the WFP Board (*Callahan 2000*). Additional sites on proposed haul routes located outside the project area will be assessed qualitatively for their potential to affect downstream water.

Water Yield

Direct, indirect and cumulative effects to water yield will be analyzed in the Forrey Creek watershed. A map of the Forrey Creek watershed and its relation to the proposed project area is found below in *FIGURE H-1 – PROJECT AREA WATERSHED*. All existing activities on all ownership and proposed activities related to the Rollins Sanitation project will be analyzed using the ECA method to estimate the water yield changes that may occur as a result of the proposed project. This watershed was chosen as an appropriate scale of analysis for the ECA method, and will effectively display the estimated impacts of proposed activities.

EXISTING CONDITIONS

Regulatory Framework

Montana Surface Water Quality Standards: According to ARM 17.30.608 (2), the Flathead Lake drainage and its tributaries are all classified as A-1. Among other criteria for A-1 waters, no increases are allowed above naturally occurring levels of sediment or turbidity. "Naturally occurring," as defined by ARM 17.30.602 (17), includes conditions or materials present during runoff from developed land where all reasonable land, soil and water conservation practices (commonly called BMPs) have been applied. Reasonable practices include methods, measures or practices that protect present and reasonably anticipated beneficial uses. These practices include but are not limited to structural and non-structural controls and operation and maintenance procedures. Appropriate practices may be applied before, during, or after completion of activities that may impact the resource.

There is one surface water within the proposed project area. It is for domestic water use on an unnamed, discontinuous stream found in the Birch Creek portion of the project area.

Designated beneficial uses in the proposed project area may include cold water fisheries in Forrey Creek. No other beneficial water uses were identified due to a lack of stream channels or lack of delivery to downstream waters.

Water Quality Limited Waterbodies: No portion of the proposed project area is listed in the 2010 List of Waterbodies in Need of Total Maximum Daily Load (TMDL) Development publication produced by the Montana Department of Environmental Quality (DEQ, 2010).

Montana Streamside Management Zone (SMZ) Law: By the definition in ARM 36.11.312, Forrey Creek is a class 1 stream since it contains fish, flows more than 6 months per year and contributes flow to Flathead Lake. There are several other stream channels identified within the project area parcels which are either class 2 or class 3. None of these other streams contributes flow to a lake, stream or other body of water.

Forrey Creek Parcel

Sediment Delivery

The Forrey Creek channel was reviewed by a DNRC hydrologist in 2011. The stream was classified as a B4/B5 channel using a classification system developed by *Rosgen* (*1996*). Channel types rated as "B" are typically in the 2- to 4-percent gradient range, and have a moderate degree of meander (sinuosity). Channel-bed materials in B4 types are mainly gravel, and channel-bed materials in B5 types are mainly sand. Given the sand and gravel content and the gradient of this reach, bed materials commonly move. No areas of down-cut channels were identified during field reconnaissance. Large woody debris was found in adequate supply to support channel form and function. Woody material in a stream provides traps for sediment storage and gradient breaks to reduce erosive energy and work as flow deflectors to reduce bank erosion. Little evidence of

past SMZ harvesting was found, and where past logging took place in the SMZ, no deficiency of existing or potential downed woody material to support hydrologic function was apparent in the streams.

One in-channel source of sediment was identified on Forrey Creek during field review. Near the west boundary of the Forrey parcel, a small debris jam has formed. This debris caused water to back up and pond upstream, which in turn allowed water to route around the main channel and form a side channel. This channel runs parallel to the main channel for approximately 300 feet before it re-joins Forrey Creek. This side-channel has down-cut in places, which has led to delivery of in-channel sediment to Forrey Creek. No evidence of above normal deposition was identified downstream from this site. No other in-channel sources of sediment were identified.

The existing road system in the Forrey Creek parcel is moderate standard native-surfaced road, and meets applicable best management practices for surface drainage or erosion control. None of the existing roads are located in draw bottoms, but portions are constructed on grades over 8%. No substantive sources of erosion or sediment delivery were identified through field reconnaissance. All applicable BMPs were implemented through past activities, and include installation of rolling drain dips and rubber belt diverters. Field review using WFP Board method shows approximately 0.02 tons of sediment delivered per year to Forrey Creek from the road system in this parcel. No other sources of erosion or deposition were identified through field review.

Water Yield

According to *ARM 36.11.423*, allowable WYI values were set at levels to ensure compliance with all water-quality standards, protect beneficial uses, and exhibit a low degree of risk. This means that the allowable level is a point below which water yields are unlikely to cause any measurable or detectable changes in channel stability. The allowable WYI for the Forrey Creek watershed has been set at 10 percent based on channel-stability evaluations, watershed sensitivity, and acceptable risk. This WYI would be reached approximately when the ECA level in Forrey Creek reaches the estimated level of 984 acres. Based on review of aerial photography and DNRC section records in the project area, timber-harvesting and associated road-construction activities have taken place in the Forrey Creek watershed since the 1920s. In addition, an assessment of past timber management on Plum Creek Timber Company and FH Stoltze Land and Lumber Company lands within the Forrey Creek watershed. These activities, combined with the vegetative recovery that has occurred, have led to an estimated 7.6 percent WYI over a fully forested condition in the Forrey Creek watershed. *TABLE H-2 – CURRENT WATER YIELD* summarizes the existing conditions for water yield and the associated ECA levels in the Forrey Creek watershed. Estimated water yield and ECA levels are well below the established threshold.

TABLE H-2 – CURRENT WATER YIELD. *Water yield and ECA increases in Forrey Creek watershed.*

	FORREY CREEK
Existing % WYI	7.6

Allowable % WYI	10
Existing ECA	644
Allowable ECA	984

Fish Habitat

Forrey Creek is the only perennial Class 1 stream that spatially connected to another body of water (Flathead Lake). According to the Montana Fisheries Information System, there are no fish population data for Forrey Creek. In the late 1990s, Department of Fish, Wildlife and Parks fisheries biologist Scott Rumsey was contacted to confirm the lack of data. He confirmed that no fish populations have been identified in Forrey Creek. During field reconnaissance in 2011 by a DNRC hydrologist, visual inspection of pools and riffles did not reveal any fish sightings.

Big Lodge Parcel

Sediment Delivery

This parcel was reviewed by a DNRC hydrologist in 2011. One stream was identified in this section, with approximately a 2-3 foot bank full channel. The stream was classified as an A3 channel using a classification system developed by *Rosgen* (*1996*). Channel types rated as "A" are typically 4-percent gradient or more, and have a low degree of meander (sinuosity). Channel-bed materials in A3 types are mainly cobble. No areas of down-cut channels were identified during field reconnaissance. Large woody debris was found in adequate supply to support channel form and function. Woody material in a stream provides traps for sediment storage and gradient breaks to reduce erosive energy and work as flow deflectors to reduce bank erosion. No evidence of past SMZ harvesting was found. This stream becomes sub-surface before leaving the State parcel. No evidence of a channel or above-ground flow was identified, and there is no surface delivery from this stream to any other body of water.

The existing road system in the Big Lodge parcel is moderate standard native-surfaced road, and meets applicable best management practices for surface drainage or erosion control. None of the existing roads are located in draw bottoms, and road grades are generally under 8%. No substantive sources of erosion or sediment delivery were identified through field reconnaissance. All applicable BMPs were implemented through past activities, and include installation of rolling drain dips and rubber belt diverters. Field review using WFP Board method shows approximately 0.02 tons of sediment delivered per year to this unnamed, discontinuous stream from the road system in this parcel. No other sources of erosion or deposition were identified through field review.

Water Yield

Past activities in and around the Big Lodge parcel include timber management, agriculture, and home site development. These activities have led to reductions in forest canopy cover, and construction of roads.

Following field reconnaissance of this parcel, it was determined that a detailed water yield analysis would not be necessary on this tract. The existing stream channel becomes subsurface and all evidence of a stream channel are gone prior to leaving State land. None of the broad ephemeral draws within the proposed project area have any evidence of overland flow (channel scour, re-alignment of litter, definable banks). In addition, areas below the project area have no current or historic drainage features. As a result, water yield increases resulting from past activities have not been sufficient to create overland flow, much less a defined stream channel or increased erosion.

Mary B Parcel

Sediment Delivery

This parcel was reviewed by a DNRC hydrologist in 2011. No stream channels were identified in this section. All runoff appears to be ephemeral and subsurface. No evidence of a channel or above-ground flow was identified, and there is no surface delivery from this parcel to any other body of water.

The existing road system in the Mary B parcel is moderate standard native-surfaced road, and meets applicable best management practices for surface drainage or erosion control. None of the existing roads are located in draw bottoms, and road grades are generally under 8%. Erosion and sedimentation problems have not been identified through field reconnaissance due to installation of rolling drain dips and rubber belt diverters. No stream or draw crossings were identified on this parcel, so the WFP Board method was not completed. No other sources of erosion or deposition were identified through field review.

Water Yield

Past activities in and around the Mary B parcel include timber management and home site development. These activities have led to reductions in forest canopy cover, and construction of roads.

Following field reconnaissance of this parcel, it was determined that a detailed water yield analysis would not be necessary on this tract. None of the broad ephemeral draws within the proposed project area have any evidence of overland flow (channel scour, re-alignment of litter, definable banks). In addition, areas below the project area have no current or historic drainage features. As a result, water yield increases resulting from past activities have not been sufficient to create overland flow, much less a defined stream channel or increased erosion.

Rollins Parcel

Sediment Delivery

This parcel was reviewed by a DNRC hydrologist in 2011. No stream channels were identified in this section. All runoff appears to be ephemeral and subsurface. No evidence of a channel or above-ground flow was identified, and there is no surface delivery from this parcel to any other body of water.

The existing road system in the Rollins parcel is moderate standard native-surfaced road, and meets applicable best management practices for surface drainage or erosion control. None of the existing roads are located in draw bottoms, and road grades are generally under 8%. Erosion and sedimentation problems have not been identified through field reconnaissance due to installation of rolling drain dips and rubber belt diverters. No stream or draw crossings were identified on this parcel, so the WFP Board method was not completed. No other sources of erosion or deposition were identified through field review.

Water Yield

Past activities in and around the Rollins parcel include timber management and home site development. These activities have led to reductions in forest canopy cover, and construction of roads.

Following field reconnaissance of this parcel, it was determined that a detailed water yield analysis would not be necessary on this tract. None of the broad ephemeral draws within the proposed project area have any evidence of overland flow (channel scour, re-alignment of litter, definable banks). In addition, areas below the project area have no current or historic drainage features. As a result, water yield increases resulting from past activities have not been sufficient to create overland flow, much less a defined stream channel or increased erosion.

Birch Bow Parcel

Sediment Delivery

This parcel was reviewed by a DNRC hydrologist in 2011. Two small, spring-fed stream channels were identified in the extreme northwest corner of this section. These streams have a weakly defined channel with an approximately 1-foot bank full width. They are heavily impacted by cattle use. These channels become subsurface prior to delivery to any other stream or body of water. All other runoff in this parcel appears to be ephemeral and subsurface. No other evidence of a channel or above-ground flow was identified, and there is no surface delivery from this parcel to any other body of water.

The existing road system in the Birch Bow parcel is moderate standard native-surfaced road, and meets applicable best management practices for surface drainage and erosion control. None of the existing roads are located in draw bottoms, and road grades are generally under 8%. Erosion and sedimentation problems have not been identified through field reconnaissance due to installation of rolling drain dips and rubber belt diverters. No stream crossings were identified on this parcel, and draw crossings are ephemeral with no scour or defined banks, so the WFP Board method was not completed. No other sources of erosion or deposition were identified through field review.

Water Yield

Past activities in and around the Birch Bow parcel include timber management, agriculture and home site development. These activities have led to reductions in forest canopy cover, and construction of roads.

Following field reconnaissance of this parcel, it was determined that a detailed water yield analysis would not be necessary on this tract. None of the broad ephemeral draws within the proposed project area have any evidence of overland flow (channel scour, re-alignment of litter, definable banks). In addition, areas below the project area have no current or historic drainage features. As a result, water yield increases resulting from past activities have not been sufficient to create overland flow, much less a defined stream channel or increased erosion.

DIRECT AND INDIRECT EFFECTS

No Action Alternative

Direct and indirect effects of the No Action alternative would be similar to the conditions described under the existing conditions for sediment delivery and water yield. The sediment delivery and water yield would be unaffected by the no action alternative, and streams and ephemeral draws in the proposed project area would continue to be affected by natural and pre-existing conditions.

Action Alternative

The proposed action alternative would harvest timber from approximately 1,120 acres. The following are the anticipated direct and indirect impacts:

Sediment Delivery – *All Parcels*

This alternative would maintain erosion control and surface drainage on all roads proposed for haul. No new road construction is proposed with this alternative. Short-term risk of low levels of erosion and deposition would be increased for approximately 2 to 3 years after completion due to exposure of bare soil during haul. This risk would return to near current levels as road surfaces re-vegetate. Overall, there is a low to moderate risk of short-term low-level increase in erosion and sediment delivery for about 2-3 years. However, water quality standards are expected to be met and there is a low risk of impacts to beneficial uses.

Fish Habitat

Potential impacts to fish habitat in Forrey Creek would be similar to those reported under the sediment delivery portion of this analysis. Sediment delivery has the highest potential to affect fish habitat by introducing fine sediment to spawning gravels and deposition in pools. There would be a short-term increase in the risk of adverse impacts to fish habitat due to exposure of bare soil as a result of proposed log hauling. This risk would return to near current levels in 2 to 3 years as road surfaces re-vegtetate.

Water Yield

Forrey Creek Parcel

The annual water yield in the Forrey Creek watershed would increase by an estimated 0.6 percent over the current level. This level of projected water-yield increase is an incremental value that refers only to water yield generated by this proposed project and

does not include water yield increases from past activities. The cumulative water-yield increase will assess the impacts of the proposed project when added to the impacts of past and planned future activities; this will be discussed in *Cumulative Effects* portion of this analysis. This level of water-yield increase would produce a low risk of creating unstable channels in any reach of Forrey Creek. These changes have a low risk of low impacts to the stream channels in the Forrey Creek watershed.

Big Lodge, Mary B, Rollins and Birch Bow Parcels
No measurable impacts to water yield are anticipated in these parcels from the proposed harvesting for the following reasons: 1) The selective nature of the harvest over most of the proposed project area would leave substantial amounts of live trees on the site, and is designed to allow more vigorous growth, 2) The well-drained to excessively well-drained nature of the soils would produce little or no detectable change in water yield, 3) The spring-fed streams and ephemeral draws within the project area are stable and vegetated with a dense mat of grass and forb vegetation, making them capable of handling potential water yield increases without destabilizing.

CUMULATIVE EFFECTS

No Action Alternative
Cumulative effects of the No Action alternative on sediment delivery and water yield would be similar to the situations described in the existing conditions. The sediment delivery and water yield would be unaffected by the No Action alternative, and the streams and ephemeral draws in the proposed project area would continue to be affected by natural and pre-existing conditions.

Action Alternative
Past activity in and around the proposed project area has mainly consisted of grazing and agricultural use, with some areas being managed for timber production. On sites where timber was harvested, there has been substantial vegetative and hydrologic recovery with no apparent impact on water yield increases. The anticipated cumulative effects of the proposed action alternative are summarized below.

Sediment Delivery – *All Parcels*
Risk of sediment loading to waters downstream from the proposed project area would be slightly elevated from current levels in the short term and similar to current levels in the long term. Maintenance and improvement of existing erosion control and surface drainage on the existing road system would yield similar erosion rates to current levels and maintain a similar risk of sediment delivery to other areas. Overall, there is a low to moderate risk of short-term low-level increase in sediment loading for about 2-3 years. However, water quality standards are expected to be met and there is a low risk of impacts to beneficial uses.

Fish Habitat
The risk of cumulative impacts to fish habitat and fish populations in Forrey Creek (if they exist) from the proposed project is low. All anticipated impacts are short-term,

minor and temporary. The risk of any cumulative sediment loading affecting fish habitat or fish populations would be slightly elevated during the period of operation. With erosion control measures in place, these risks are still considered low.

Water Yield

Forrey Creek Parcel

The proposed timber harvest would increase the water yield in the Forrey Creek watershed from its current level of approximately 7.6 percent over a fully forested condition to an estimated 8.2 percent. This water-yield increase, and its associated ECA level, includes the impacts of all past management activity, existing roads, proposed timber harvesting, and vegetative hydrologic recovery in the Forrey Creek watershed. The water-yield increase expected from this project leaves the watershed well below the established threshold of concern reported in the existing conditions portion of this analysis. This cumulative level of water-yield increase would produce a low risk of creating unstable channels in Forrey Creek or its tributaries.

The proposed project is expected to have a low risk of cumulative impacts to water yield as a result of the proposed timber harvesting. A summary of the anticipated water-yield impacts of the action alternative to the Forrey Creek drainage is found in *TABLE H-4 – FORREY CREEK WATER YIELD.*

TABLE H-4 – FORREY CREEK WATER YIELD. *ECA and percent WYI results for the Forrey Creek watershed.*

	ALTERNATIVE	
	A	**B**
Allowable water-yield increase	10%	10%
Percent water-yield increase	7.6	8.2
Acres harvested	0	222
ECA generated	0	88
Total ECA	644	732
Allowable ECA	984	984

Big Lodge, Mary B, Rollins and Birch Bow Parcels

The proposal is to selectively harvest the affected stands by commercial thinning. Cumulative effects to water yield in these parcels are not anticipated for the following reasons: 1) The selective nature of the harvest over most of the proposed project area would leave substantial amounts of live trees on the site, and is designed to allow more vigorous growth, 2) The well-drained to excessively well-drained nature of the soils would produce little or no detectable change in water yield, 3) The ephemeral draws within the project area are stable and vegetated with a dense mat of grass and forb vegetation, making them capable of handling potential water yield increases without destabilizing, and 4) All of the proposed harvesting would occur in weakly defined discontinuous streams and ephemeral draws with no surface delivery to another body of water, therefore potential increases in water yield from harvest activities has a very low risk to affect downstream waters.

SOILS ANALYSIS

SOILS AND GEOLOGY: EXISTING ENVIRONMENT

United States Geological Service (USGS) topographic maps, aerial photographs, United States Natural Resource Conservation Service (NRCS) soil maps and interpretations, and ground reconnaissance were used to evaluate and summarize the soils and geology on state ownership. Lands in close proximity to the access routes to be used during the project were evaluated as well, regardless of ownership.

Predominant bedrock is Siyeh limestone that is hard bedrock that is highly calcareous and weathers to soils rich in lime with high silt contents. A geologic fault divides the bedrock and forms several steep bluffs along the main ridge that divides Rollins from the Proctor Valley. The quartzite/argillite bedrock is fair road material that is mainly common excavation except through some rock outcrops that may require ripping or possibly spot blasting in a few locations. There is one site of unique geology, which is a kame terrace @ 4200ft. in the south half of Section 36, T25N, R21W. The kame is a bench of glacial outwash gravel perched near the ridgeline, which is a scenic focal point from HWY 93, but would not be affected by the proposed actions.

Soils- The sale area is located on moderate to steep slopes with high rock fragment residual soils on the mountain ridges. Moderate to deep, silty, glacial till soils from limestone occur on mountain sideslopes. These are higher productivity soils with calcareous subsoils that limit rooting depth. Localized areas of deep lacustrine silts and gravelly alluvium occur along streams and in small parts of all sections. Soils maps and interpretations are referenced in project file. Previous stand entries have established roads, skid trails and landings for most units. The following paragraphs describe soil information more specific to the individual parcels.

Forrey - Section 8, T25N, R20W: Moderate to deep calcareous till soils. Some fine textured lacustrine silts (map unit 5) occur on flat slopes along Forrey creek. This material has poor bearing for roads and will require ditch construction and spot gravel surfacing to prevent rutting/erosion and comply with BMP's. Most of the section is well suited to tractor operations on 20-40% slopes and moderate to deep silty glacial tills. Erosion hazard is moderate. Compaction and displacement hazard is high. Localized area of short, steep slopes in SE corner of parcel are too steep for conventional tractor harvest. Retention of fine litter helps maintain soil productivity. On moderate productivity sites fertilizer application can improve tree growth and forest health on root rot sites.

Mary B - Section 16, T25N, R20W: The Mary B parcel was deeply scoured by glacial ice which removed most loose surface rock and left shallow to moderate depth glacial till and residual soils with more common rock outcrops than other parcels. Road construction near outcropping rock may require blasting depending on site specific review. This is a very dry site with predominately south slopes and ridges with considerable exposed rock, and the longest season of use. Soils are resilient, but shallow and easily displaced. Moderate to deep glacial tills with higher than average rock contents occur in swales and on concave toeslopes and are well suited to Ponderosa Pine and Douglas fir. Typical soils are 4-6" gravelly silt loams over moderate to deep cobbly silt loams. The combination of plant competition, dry, shallow rocky soils and carbonates in the subsoil can stress regeneration and may foster root disease. Erosion and compaction hazard is low. Displacement hazard is high. Maintaining topsoil depth, large woody debris, and some shade can enhance tree regeneration.

Big Lodge - Section 18, T25N, R20W: Moderate to deep calcareous till soils. Some fine textured lacustrine silts (map unit 5) occur on flat slopes along stream on north side of parcel. This material has poor bearing for roads and will likely require some turnpike reconstruction and spot gravel surfacing to prevent rutting/erosion and comply with BMP's. Erosion hazard is moderate. The compaction and displacement hazard is high.

Rollins - Section 20, T25N, R20W: Moderate to deep calcareous till soils of cobbly silt loams. Site is well suited to tractor harvest. Portion of access road crosses poor bearing strength soils for roads and will likely require some turnpike reconstruction and seasonal limitations to prevent rutting/erosion and comply with BMP's. Erosion hazard is moderate. Compaction and displacement hazard is high. These limitations can be mitigated by season of use limits and skid trail planning.

Birch Creek - Section 30 T25N, R20W: Moderate to deep calcareous till soils of cobbly silt loams with shallow rocky soils on steeper slopes. Most of the parcel is well suited to tractor harvest, except for some slopes >45% along the western boundary of the section. Soft track KMC type skidders are best suited to the complex terrain to minimize roads and soil impacts. This is a productive parcel, especially on the NE corner where available soil moisture is greater. Localized wet areas may require season limits or equipment restriction zones. Most of the road system can be used with minimal reconstruction. The private access road has several steep pitches that will require additional drainage and seasonal limitations to prevent rutting/erosion and comply with BMP's.

Bow Lake - Section 36 T25N, R21W: Moderate to deep cobbly silt loam glacial till soils occur on concave slopes and swales with shallow residual soil on steeper midslopes and ridges. Steep slopes >40% require FMC or cable harvest to prevent severe displacement of shallow soils. Portions of access road on steep grades require frequent drainage features and some reconstruction. Segments of oversteep cutslopes that are not revegetated or present visibility problems should be rounded off and reshaped to more stable cutslope angles of 1:1.

ENVIRONMENTAL EFFECTS ON SOILS

The No-action alternative would have no direct effect on soil resources. All sections have extensive skid trails and roads from previous logging. Some existing roads are on poor locations with inadequate drainage and would continue to erode. Portions of the multiple ownership access roads in the Forrey Creek drainage have erosion problems and require a high level of road maintenance.

Harvest Effects of the Action Alternative: Primary soil concerns are potential rutting, compaction or displacement associated with timber harvest operations and site preparation. Susceptibility to impact varies with soil type, harvest method, type of equipment and season of use. Most sensitive soils are wet sites and steep slopes, which would be avoided or protected. Proposed tractor harvest units will implement season of use and skidding restrictions to limit soil impacts. Operations will be limited to times when soils are dry (20% soil moisture or less), frozen, or snow covered.

A combination of silvicultural treatments would remove understory and densely overstocked trees to improve spacing, growth, and utilization of scarce available soil moisture and nutrients. Slash,

needles and course woody debris (CWD) >3"dia. at 10-15 tons/acre would be retained on site to provide for long term nutrient cycling. On drier pine sites CWD > 3" diameter at 8-10 tons/acre would maintain site productivity. Most sites have 3-5 tons or more on the ground. This may require retaining some cull or pulp volume on site to meet CWD needs. On the few sites were CWD is low, the forest officer could designate wood to retain or return skid.

On a few stands whole tree skidding would be used. This method removes nutrients in needles from the site and is an impact to site quality and the future productivity. Mitigation options to maintain soil quality are: 1) use in- woods processing equipment that leaves slash on site, 2) for whole tree harvest, return skid slash and evenly distribute within the harvest area, or 3) cut off tops from every third bundle of logs so that tops are dispersed as skidding progresses.

For the action alternative, general mitigations and BMP's would be implemented to minimize the area and degree of soil effects associated with proposed harvest and road construction. Disturbance will be limited to 15% or less of the area. A complete detailed site specific review for mitigation measures or designation as leave areas will be completed prior to contract development. Site specific, road reconstruction requirements will be implemented that improve road drainage, reduce erosion and associated sediment.

Cumulative Effects to Soil Productivity: Cumulative effects can occur from repeated entries into the harvest area with each entry. Past road construction and harvest was extensive to provide access to all sites. Main skid trails are still evident, but most dispersed skid trails have ameliorated over time. Some of the trails are poorly vegetated, have inadequate drainage and are eroding. The action alternative involves ground skidding that could result in cumulative effects. Cumulative effects would be controlled by limiting the area of detrimental soil impacts to less than 15% of harvest units, by using existing trails on suitable locations and slash disposal mitigation measures that limit the area impacted. Temporary roads would be stabilized and revegetated. Any future harvest would likely use the same road system and skid trails and landings to reduce the risk of cumulative effects. Large woody debris will be retained for nutrient cycling and long term productivity.

WILDLIFE ANALYSIS

INTRODUCTION

This analysis discloses the existing condition of relevant wildlife resources, and displays the anticipated effects that may result from each alternative of this proposal. Considerations and concerns raised by DNRC specialists and public comments received during initial scoping for the proposed project led to the following list of issues:

- Timber harvesting could decrease forested cover, which may reduce habitat connectivity and suitability for wildlife species associated with mature forest.
- Timber harvesting could reduce abundance of snags and coarse woody debris, which could lower habitat quality for species that depend on these structural attributes, and could alter their ability to survive and/or reproduce.
- Timber harvesting and associated activities could alter grizzly bear cover, reduce secure areas, and increase human access, which could adversely affect bears by displacing them from important habitats and/or increasing risk of human-caused bear mortality.
- Timber harvesting and associated activities could remove canopy closure or alter stand conditions, which could result in the reduction or modification of habitats preferred by Canada lynx, which could decrease the area's suitability for lynx.
- Timber harvesting and associated activities could displace gray wolves from the vicinity of the project area, particularly denning and rendezvous sites, and/or alter prey availability.
- Timber harvesting could reduce bald eagle nesting and perching habitats and/or disturb nesting bald eagles.
- Timber harvesting could decrease habitat suitability for fishers through reductions in canopy cover, snag abundance, and the amount of coarse woody debris.
- Timber harvesting could alter flammulated owl habitat by modifying forest structure and removing nest snags
- Timber harvesting and associated activities could negatively affect pileated woodpecker habitat suitability by removing canopy cover and snags used for foraging and nesting.
- Timber harvesting and associated activities could reduce habitat quality for big game, especially during the winter season

The following sections disclose the anticipated direct, indirect, and cumulative effects to these wildlife resources in the analysis area from the proposed actions. Past and current activities on all ownerships in each analysis area, as well as planned future agency actions, have been taken into account for the cumulative-effects analysis.

ANALYSIS AREA

The discussions of existing conditions and environmental effects will focus on two different spatial scales. The first will be the "project area", totaling 1,647 acres, which consists of portions of sections 8, 16, 18, 20, and 30 in T25N, R20W, as well as section 36 of T25N, R21W (see Table W-1). Parcels range in elevation from 3,440 to 4,080 feet and are situated on a variety of aspects.

Table W-1. General description of state sections used as the project area.

Name	Legal Description	Approx. Acres	Elevation	Predominant Cover Types
Big Lodge	Sec 13, T25N R20W	154	3,320-3,680 ft.	Western larch/Douglas-fir
Birch Creek	Sec 30, T25N R20W	314	3,120-4,000 ft.	Western larch/Douglas-fir
Bow Lake	Sec 36, T25N R21W	241	3,480-4,680	Dry grassland, ponderosa pine
Forrey Creek	Sec 8, T25N R20W	463	3,000-3,640 ft.	Western larch/Douglas-fir
Mary B	Sec 16, T25N R20W	314	2,960-3,720 ft.	Douglas-fir
Rollins	Sec 20, T25N R20W	161	3,080-3,520 ft.	Douglas-fir, ponderosa pine

The second scale or the "analysis area" relates to the surrounding landscape for assessing cumulative effects to wildlife species and their habitats. The scales of these analysis areas vary according to the species being discussed, but generally approximate the size of the home range of the focal species.

ANALYSIS METHODS

DNRC attempts to promote biodiversity by taking a coarse-filter approach, which favors a mix of stand structures and compositions on state lands (*ARM 36.11.404*). Appropriate stand structures are based on ecological characteristics (e.g., landtype, habitat type, disturbance regime, unique characteristics). A coarse-filter approach assumes that if landscape patterns and processes are maintained similar to those with which the species evolved, the full complement of species would persist and biodiversity would be maintained. This coarse-filter approach supports diverse wildlife populations by managing for a variety of forest structures and compositions that approximate historic conditions across the landscape. DNRC cannot assure that the coarse-filter approach will adequately address the full range of biodiversity; therefore, DNRC also employs a fine-filter approach for threatened, endangered, and sensitive species (*ARM 36.11.406*). The fine-filter approach focuses on a single species' habitat requirements.

To assess the existing condition of the proposed project area and surrounding landscape, a variety of techniques were used. Field visits, scientific literature, DNRC's stand level inventory (SLI) data, aerial photographs, USDA Forest Service GIS data, Montana Natural Heritage Program (MNHP) data, and consultations with other professionals provided information for the following discussion and effects analysis. Specialized methodologies are discussed under the species in which they occur. Species were dismissed from further analysis if habitat did not exist in the project area or would not be modified by any alternative.

COARSE FILTER WILDLIFE ANALYSIS

Of the 108 mammal species found in Montana, 66 are suspected or known to occur in Flathead County (*Foresman 2001*). The majority of terrestrial vertebrates that were present at the time of European settlement likely still occur in the vicinity of the proposed project area. Six amphibian and seven reptile species have also been documented in Flathead County (*Maxell et al. 2003*) and at least 68 species of birds have been documented in the vicinity in the last 15 years (*Lenard et al. 2003*). Altered wildfire regimes due to fire suppression have resulted in widespread increasing tree densities and levels of shade-tolerant species. Thus, tree species such as Douglas-fir and grand fir have become more prevalent on the landscape than they were historically. These departures from historical conditions probably benefit wildlife species that rely on shade-tolerant tree species and/or closed-

canopy habitats, while negatively affecting species that rely on shade-intolerant tree species and/or open habitats. In the project area vicinity, there is a mosaic of mature and young stands, which benefit species relying on mature forests, and regenerating forests.

Mature forested habitats and landscape connectivity

Issue: Timber harvesting could decrease forested cover, which may reduce habitat connectivity and suitability for wildlife species associated with mature forest.

Introduction

A variety of wildlife species rely on older, mature forest to meet some or all of their life history requirements. Mature forests, characterized by abundant large diameter trees and dense canopy cover, play an important role in providing food, shelter, breeding sites, and resting or travel corridors for certain animals. Wildlife use and/or preference of older, mature forests is species-specific; some species use this habitat exclusively, other species only temporarily or seasonally, and some species avoid mature forests altogether. Several species known to be associated with older, mature forests include pileated woodpeckers (*Dryocopus pileatus)*, American marten (*Martes americana*), brown creepers (*Certhia americana)*, and winter wrens (*Troglodytes troglodytes*).

Forested landscapes in the western United States were historically shaped by natural disturbance events, primarily wildfire, blowdown, and pest outbreaks. Resulting broader landscape patterns were a mosaic of forest patches varying in age, vegetation composition and development. Timber harvest, like stand-replacement fire and blowdown, is a disturbance event that can create open patches of young, early-successional habitats. Patch size, age, shape, abundance, and distance to similar patches (connectivity) can be factors influencing wildlife use. The way through which patch characteristics influence wildlife use and distribution are dependent upon the particular species and its habitat requirements. Temporary non-forested openings, patches, and forest edges created by timber harvest may be avoided by certain wildlife species adapted to mature closed-canopy forest. In contrast, other wildlife species flourish in early seral habitats created by disturbance. Connectivity under historical fire regimes within forest types found in the vicinity of the project area was likely relatively high as fire differentially burned various habitats across the landscape (Fischer and Bradley 1987).

Analysis Area

Direct and indirect effects were analyzed on the six DNRC parcels making up the project area. Cumulative effects were analyzed on an area defined by the HUC12 watershed of Stoner Creek. Consisting of 25,476 acres, this cumulative analysis area includes parcels of various ownerships that surround the project area. The cumulative area is approximately 9% DNRC, 26% private industrial timberland, 64% other private owners, 0.5% tribal, and 0.5% Montana Fish, Wildlife and Parks. This scale of analysis would be large enough to support a diversity of species that use mature forested habitats and/or require connected forested habitats and centers evaluation of cumulative effects on those areas most likely to be affected by the proposed action.

Analysis Methods

Mature forested habitats and landscape connectivity were assessed using field evaluations, aerial-photograph interpretation, USDA Forest Service data, and Geographical Information System (GIS) analysis. Factors considered in the analysis include the level of timber harvesting, amount of mature forested habitats, and connectivity.

Existing Environment

The project area currently contains approximately 375 acres (26%) of mature Douglas-fir/western larch, Douglas-fir and mixed-conifer stands that have a reasonably closed canopy (≥40% crown closure). No stands in the project area meet the definition of old-growth (*Green et al. 1992;* see *VEGETATION ANALYSIS*). Approximately 210 acres (13%) are permanently non-forested, mostly within the Bow Lake parcel. Large portions of the proposed project area underwent selective harvest treatments between 1999 and 2003. Resulting forest stands in harvest units have mature overstory canopy closure values that range between 10-30% and 6-20 large live trees (≥15" dbh) per acre. These stands provide habitat for species adapted to more open forests or a mix of dense and open forest canopies. Small, dense patches of regenerating conifers are present and interspersed throughout all of the DNRC parcels. Mature, closed-canopy stands are reasonably well-connected within the proposed project parcels except for Mary B, where mature stands are more scattered. Average patch size of closed-canopy stands is roughly 20 acres. Roads are prevalent within the project area, with a density of 6.3 linear miles of road per a square mile. Roads that can be accessed by the general public make up a smaller portion of the total roads, with a density of approximately 1.2 miles/sq. mile. Approximately 12 miles of DNRC restricted (not open for public motorized use) roads are periodically accessed by unauthorized motorized traffic from numerous points on adjacent private lands. Unauthorized ATV trails, totaling 0.5 miles are present on the Forrey Creek and Rollins parcels. The majority of restricted road miles within the project area are inaccessible by motor vehicles during normal winter conditions. Montana Highway 93, a major north-south thoroughfare, runs through the eastern half of the Mary B parcel and within one mile of all project area parcels.

While mature forest connectivity within the project area is fair, connectivity surrounding the project area has been reduced with past timber harvesting, housing development, and road construction on private industrial timberlands and private property. Presently, roughly 8 percent (2,071 acres) of the cumulative effects analysis area is comprised of mature, closed canopy forests and 24% (6,221 acres) is permanent non-forest. Average patch size of mature forest is 13 acres (156 patches). Past timber harvesting and home/road building have converted much of the remaining acres into young forest stands or non-forest, respectively. The vast majority of private industrial timberland (6,679 acres) in the western portion of the cumulative effects analysis area has been recently harvested and consists of young, regenerating forest. Approximately 283 miles of roads (total density all roads = 7.0 miles/sq. mile) in the cumulative-effects analysis area, coupled with timber management and land clearing has largely reduced landscape-level connectivity in the cumulative effects analysis area. Any harvesting that may be occurring on other ownerships in the cumulative effects analysis area could continue altering forested habitats and landscape connectivity. Across the cumulative-effects analysis area, landscape connectivity has been appreciably compromised for species requiring connected stands of mature forests.

Environmental Effects

Direct and Indirect Effects of the No-Action Alternative on Mature Forested Habitats and Connectivity

Under this alternative no timber harvesting activities would occur. Thus, no direct or indirect effects to mature forested habitats and connectivity would be expected that could affect wildlife in the project area since: 1) no changes to existing stands would occur; 2) no appreciable changes to forest age, the distribution of dense forested cover, or landscape connectivity would be anticipated; and 3) no changes to wildlife use would be expected.

Direct and Indirect Effects of the Action Alternative on Mature Forested Habitats and Connectivity

Under the action alternative, harvesting would occur on approximately 1,120 acres. Of these acres, around 343 acres (92%) of mature closed-canopy forest stands would receive selective harvesting treatments removing diseased or suppressed/intermediate trees. These areas could undergo harvest levels that would reduce habitat for species that rely on mature, closed-canopy forested habitats. The remaining 763 harvest acres within the proposed project area would likely undergo less of an appreciable change in forest structure, as they already consist of a more open canopy characteristic of historical conditions. Project area parcels would continue to provide a variety of forested habitat conditions for wildlife,

although undisturbed, closed-canopy forest would decrease. Overall, the resultant changes in stand structure could reduce habitats for species associated with dense, mature stands, such as American marten and pileated woodpecker, which benefited from the increasing stand ages and tree densities caused, in part, by modern fire suppression. In general, under this alternative, habitat conditions would improve for species adapted to more open forest conditions, while reducing habitat quality for species that prefer dense, mature forest habitats.

Following proposed harvesting, the majority of the project area would remain as mature stands with a relatively open canopy. Additionally, selective harvest of diseased trees would not appreciably alter tree density on many previously harvested acres; stands would continue provide habitat characteristics that favor use by species utilizing open forest conditions comprised of large, scattered trees. Existing closed-canopy areas would remain unharvested adjacent (50 feet) to perennial streams within the Forrey Creek and Birch Creek parcels. Retention of mature forest along streams will assist in maintaining habitat connectivity. Numerous species, such as Canada lynx and fishers, use riparian areas as travel corridors (Ruediger et al. 2000). Field visits to this area, which as proposed would remain unharvested, confirmed evidence of wildlife use (e.g. black bear, white-tailed deer). No new roads would be constructed with the proposed action alternative. Efforts would be made to close unauthorized access points and obliterate ATV trails. Thus, moderate adverse direct and indirect effects to mature forested habitats and connectivity would be expected that could affect wildlife in the project area since: 1) harvesting would reduce tree density and existing cover on roughly 343 acres of mature forested stands; 2) minor changes to landscape connectivity would occur except for riparian areas; and 3) some changes to wildlife use would be expected proportional to the acreage affected.

Cumulative Effects of the No-Action Alternative on Mature Forested Habitats and Connectivity

Under this alternative no timber harvesting activities would occur. Thus, no cumulative effects to mature forested habitats and connectivity would be expected that could affect wildlife in the cumulative-effects analysis area since: 1) no changes to existing stands would occur; 2) no further changes to forest age, the distribution of dense forested cover, or landscape connectivity would be anticipated; and 3) no changes to wildlife use would be expected.

Cumulative Effects of the Action Alternative on Mature Forested Habitats and Connectivity

Past harvesting and private housing development in the cumulative effects analysis areas has reduced the amount of mature, forested habitats available while altering landscape connectivity. Reductions in mature, forested habitats associated with this alternative would be additive to losses associated with past harvesting activities and any ongoing activities on neighboring private lands. Across the cumulative-effects analysis area, a low percentage (9%) of closed-canopy, mature forested habitats would exist. Habitats for forested interior species and species associated with dense, mature stands, would be further reduced, and would remain low in the cumulative effects analysis area. After 10 to 20 years, wildlife species that use and prefer young forest stands would benefit from cumulative increases of such habitat that would be present the project area. Landscape connectivity of mature, closed-canopy forest would not be appreciably altered further given the existing compromised condition of the forested landscape due to past activities on neighboring ownerships. Some landscape connectivity would be maintained through forest retention along streams, but connectivity of mature forest would remain low within the cumulative effects analysis area. Overall, connectivity of young forests would increase while connectivity of mature forested habitats would decrease in the short term. However, future development of connected, mature forests could occur as ~7,000 acres of similarly-aged stands, including these stands proposed to be harvested with this alternative, would continue developing across the cumulative effects analysis area. Thus, moderate adverse cumulative effects to mature forested habitats and connectivity would be expected that could affect wildlife in the cumulative-effects analysis area since: 1) harvesting would alter mature stands, further reducing the amount of undisturbed forested cover in the cumulative-effects analysis area by 2%; 2) moderate changes to landscape connectivity and fragmentation would occur attributable to reduced connectivity of existing forest cover and reduced patch size of existing forest cover on the project area; and 3) minor cumulative changes to wildlife use would be expected.

Snags and coarse woody debris

Issue: Timber harvesting could reduce abundance of snags and coarse woody debris, which could lower habitat quality for species that depend on these structural attributes, and could alter their ability to survive and/or reproduce.

Introduction

Snags and coarse woody debris are important components of forested ecosystems. The following are 5 primary functions of snags and downed logs in forest ecosystems: 1) increase structural diversity, 2) alter the canopy microenvironment, 3) promote biological diversity, 4) provide important habitat substrate for wildlife, and 5) act as a storehouse for nutrient and organic matter recycling agents (Parks and Shaw 1996).

Snags and defective trees (e.g. partially dead, spike top, broken top) are used by a variety of wildlife species for nesting, denning, roosting, feeding, and cover. Snags and defective trees may be the most valuable individual component of Northern Rocky Mountain forests for wildlife species (Hejl and Woods 1991). Snags provide foraging sites for insectivorous species and offer opportunities for primary cavity-nesting species to excavate nests. The cavities created by primary excavators (i.e. woodpeckers) also provide habitat for secondary cavity users, including other birds and small to mid-sized mammals. Studies have characterized primary cavity nesters as keystone species in some systems, whose members generate the base of a "nest web" consisting of interdependent groups producing and benefiting from nest-cavity resources (Ripper 2002, Martin et al. 2004). Snags and defective trees can also provide nesting sites for secondary cavity users where cavities are formed by broken tops and fallen limbs. Larger, taller snags tend to provide nesting sites, while shorter snags and stumps tend to provide feeding sites (Bull et al. 1997). Many species that use smaller-diameter snags will also use large snags; however, the opposite is not true. Typically, older-aged stands will have greater numbers of large snags. The quantity, quality, and distribution of snags affect the presence and population size of many of these wildlife species relying on them.

Coarse woody debris provides food sources, areas with stable temperatures and moisture, shelter from the environment, lookout areas, and food-storage sites for several wildlife species. Single, scattered downed trees could provide lookout and travel sites for squirrels or access under the snow for small mammals and weasels, while log piles may provide foraging sites for weasels and secure areas for snowshoe hares. Several mammals rely on downed logs and snags for survival and reproduction. The size, length, decay, and distribution of woody debris affect the capacity of various species to meet their life requisites.

Analysis Area

Direct and indirect effects were analyzed on the six DNRC parcels making up the project area. Cumulative effects were analyzed on an area defined by the HUC12 watershed of Stoner Creek. Consisting of 25,476 acres, this cumulative analysis area includes parcels of various ownerships that surround the project area. The cumulative area is approximately 9% DNRC, 26% private industrial timberland, 64% other private owners, 0.5% tribal, and 0.5% Montana Fish, Wildlife and Parks. This scale of analysis would be large enough to support a diversity of species that use coarse woody debris resources, from birds to small mammals and meso-carnivores.

Analysis Methods

The abundance of snags and coarse woody debris were quantitatively estimated using 21 systematically placed plots in the proposed project area. Factors considered in the analysis included the level of proposed harvesting, risk of firewood collecting, and number of snags and coarse woody debris.

Existing Environment

Within sample plots, no large (>21" dbh) snags per acre were measured and few were observed with the proposed project area. All snags >8" dbh were more abundant (3.1/ac, range 0-13.2) and consisted of a variety of species. Average snag diameter of all snags >8" dbh was 11.4" (range 8-17"). Evidence of snag use for wildlife foraging and/or cavity building was observed in all harvest units. Coarse woody debris levels were also variable across the project area, with an average of 5 tons per acre (range 0-17.3 tons per acre). Condition of coarse woody debris varied from hard to fully decayed. Average diameter of all downed wood was small (4.9"). Similar to unaltered forested landscapes, snags and downed wood resources were not distributed evenly across the project area.

Overall, snag resources exist at current levels to meet or exceed DNRC's minimum-retention thresholds. Current snag sizes are smaller than preferred, however larger snag recruits (live trees) were present in acceptable amounts at almost all plots. The lack of larger snags at all sites can be attributed to harvest history and illegal firewood gathering. Snags and coarse woody debris are frequently collected for firewood, especially near open roads, and firewood cutting occurs in the cumulative-effects analysis area. Unauthorized motorized use on DNRC parcels in the project area has facilitated the removal of larger-sized snags. Coarse woody debris levels in the project area are currently below that recommended by Graham et al. 1994 for the habitat types examined. As most of the project area parcels are adjacent to private land with home sites, urban interface post-harvest cleanup could account for some sites having lower amounts of downed wood. Outside of the proposed project area, any ongoing harvesting on other ownerships could continue to alter snags, snag recruits, and coarse woody debris levels. Snag and coarse woody debris levels on surrounding parcels likely vary widely depending on ownership, harvest and wildfire history.

Environmental Effects

Direct and Indirect Effects of the No-Action Alternative on Snags and Coarse Woody Debris

No direct changes in the deadwood resources would be expected. Existing snags would continue to provide wildlife habitats, and new snags would be recruited as trees die. No direct and indirect effects would be expected to affect wildlife species requiring snags and coarse woody debris since: 1) no harvesting would occur that would alter present or future snag or coarse woody debris concentrations, and 2) no changes to human access for firewood gathering would occur.

Direct and Indirect Effects of the Action Alternative on Snags and Coarse Woody Debris

Present and future snags and large coarse woody debris would be reduced due to timber harvesting on 1,120 acres in the project area. Portions of the project area or in stands that lack larger snags would not see appreciable changes in the availability of large snags and/or coarse woody debris since these attributes are currently somewhat limited in those areas. Prescriptions call for two large snags and two snag recruits per acre (greater than 21 inches dbh where they exist, otherwise the next largest size class; additional large-diameter recruitment trees may be left if sufficient large snags are not present), and 10 to 20 tons of coarse woody debris per acre retention in the proposed harvest areas. However, some snags and/or recruit trees could be lost due to safety and operational concerns, but replacements would be identified in order to stay in compliance with *ARM 36.11.411*. Harvest prescriptions that call for retention of abundant large live trees in harvest units will provide for extra snag recruits, however it will likely be some time before they become available as snags. Future snag quality in the harvested areas would be enhanced with proposed silvicultural prescriptions that should lead to the reestablishment of shade-intolerant species like ponderosa pine and western larch that tend to provide important habitats, such as high-quality nesting structures and foraging habitats. Given the amounts, range of variability in sizes, and decay classes of snags and coarse woody debris present in the project area, prescriptions aiming to maintain a variety of these resources would help ensure that important attributes would be retained to support the suite of species that rely on these habitat components. Attempts would be made to close unauthorized motorized access routes and, therefore, decrease the potential future risk for snag and coarse woody debris loss due to firewood gathering. However, the abundance of private residences around the project area make continued illegal firewood gathering highly likely. Additionally, legal access through DNRC parcels would remain unaltered and continue

to be a source of snag loss. Thus, minor adverse direct and indirect effects to wildlife species that rely on snags and coarse woody debris would be anticipated that would affect wildlife species requiring these habitat attributes since: 1) harvesting would reduce snags, snag recruitment trees, and large coarse woody debris, 2) human access for firewood gathering would be slightly reduced, and 3) snags and future recruitment trees would be retained in all proposed treatment areas.

Cumulative Effects of the No-Action Alternative on Snags and Coarse Woody Debris

Snags and coarse woody debris would not be altered in the project area under this alternative. Thus, no cumulative effects to wildlife species using these resources would be anticipated since: 1) no further harvesting would occur that could affect existing snag and coarse woody debris abundance, and 2) no change in the level of firewood gathering would occur.

Cumulative Effects of the Action Alternative on Snags and Coarse Woody Debris

Some snags could be removed from the project area, whereas coarse woody debris amounts would likely remain at current levels or additional material may be recruited. Surrounding lands in the cumulative effects analysis area have experienced different management regimes by the differing owners through time, and within each of these management regimes, snags and coarse woody debris have received different levels of consideration; however, harvesting on all ownerships in the vicinity has reduced these attributes. The losses of snags associated with this alternative would be additive to the losses associated with past harvesting and any ongoing harvesting on neighboring ownerships. However, the project requirements to retain all western larch and Douglas-fir snags >16" dbh, 2 large snag recruits per acre (greater than 21 inches dbh where they exist, otherwise the next largest size class), and 10 to 20 tons of coarse woody debris per acre would mitigate additional cumulative effects associated with this project. Due to a lack of large snags and natural uneven distribution of those present, some areas could be largely snag deficient for 10+ years. No change in public access would be anticipated on surrounding ownership within the cumulative effects area; thus, no appreciable changes to the potential loss of snags and coarse woody debris resulting from firewood gathering would occur. Wildlife species that rely on snags and coarse woody debris in the cumulative-effects analysis area would be expected to persist at similar levels, albeit slightly lower numbers in proposed units following treatment. Thus, since: 1) 1,120 acres of the cumulative-effects analysis area would be harvested reducing snags and snag-recruit trees while increasing or maintaining coarse woody debris levels, 2) no appreciable changes in access for the general public and associated firewood gathering would be anticipated, and 3) there would be slightly increased representation of shade-intolerant species that could become snags in the long term, minor adverse effects to wildlife requiring snags and coarse woody debris would be anticipated that would affect these species in the cumulative effects analysis area for 30-100 years.

FINE-FILTER ANALYSIS

In the fine-filter analysis, individual species of concern are evaluated. These species include wildlife species listed as threatened or endangered under the *Endangered Species Act of 1973*, species listed as sensitive by DNRC, and species managed as big game by Montana FWP. ***TABLE W-2 – FINE FILTER*** summarizes how each species considered was included in the following analysis or removed from further consideration because suitable habitat does not occur within the project area or proposed activities would not affect their required habitat components.

TABLE W-2 – FINE FILTER. *Species considered in the fine-filter analysis for this proposed project.*

STATUS	Species/Habitat	Determination - Basis
Threatened &	Canada lynx	***Included*** – Potential lynx habitats occur within the project area

Endangered Species	Habitat: SF hab. types, dense sapling, old forest, deep snow zone	
	Grizzly bear Habitat: recovery areas, security from human activity	***Included*** – Although the proposed project area is outside of any federally designated grizzly bear recovery zones and occupied habitat as mapped by T. Wittinger (2002), Montana Fish, Wildlife and Parks has documented recent use of the area by several grizzly bears (Mace and Roberts, 2011)
Sensitive species	Bald eagle Habitat: late-successional forest <1 mile from open water	***Included*** –The nearest known bald eagle nest (Painted Rocks/Shelter island) occurs approximately 1-2 miles south of the proposed project area's southernmost border, placing it within the eagle's home range.
	Black-backed woodpecker Habitat: mature to old burned or beetle-infested forest	***Excluded*** – No recently (less than 5 years) burned areas are in the project area. Thus, no direct, indirect or cumulative effects to black-backed woodpeckers would be expected.
	Coeur d'Alene salamander Habitat: waterfall spray zones, talus near cascading streams	***Excluded*** – No moist talus or streamside talus habitat occurs in the project area. Thus, no direct, indirect, or cumulative effects to Coeur d'Alene salamanders would be expected.
	Columbian sharp-tailed grouse Habitat: grassland, shrubland, riparian, agriculture	***Excluded*** – No suitable grassland communities occur in the project area. Thus, no direct, indirect, or cumulative effects to Columbian sharp-tailed grouse would be expected.

	Common loon Habitat: cold mountain lakes, nest in emergent vegetation	***Excluded*** – Flathead Lake, which has a history of loon use, is situated within 500 feet of one of the proposed project parcels (Mary B). However, extensive shoreline housing development and lack of emergent vegetation patches in the area make use by nesting loons extremely unlikely. All proposed harvest units are located over 1,300 feet from the edge of Flathead Lake. Additionally, Montana Highway 93 lies between Flathead Lake and proposed harvest units, creating an area with high levels of vehicle traffic and disturbance. Thus no direct, indirect, or cumulative effects to common loons would be expected.
	Gray wolf Habitat: ample big game pops., security from human activity	***Excluded*** – No known wolf packs currently occur in the vicinity of the proposed project area. No wolf den or rendezvous sites are known to occur in the vicinity. Lack of known habitat attributes, rocky, steep topography and close proximity to a major highway and human residences discourage wolf presence.
	Fisher Habitat: dense mature to old forest <6,000 ft. elev. and riparian	***Included*** – Suitable or potential fisher habitat occurs within the proposed project area.
	Flammulated owl Habitat: late-successional ponderosa pine and Doug.-fir forest	***Included*** – Suitable mature dry ponderosa pine and Douglas-fir habitats occur within the proposed project area.
	Harlequin duck Habitat: white-water streams, boulder and cobble substrates	***Excluded*** – No suitable high gradient streams occur in the project area. Thus, no direct, indirect, or cumulative effects to harlequin ducks would be expected.
	Northern bog lemming Habitat: sphagnum	***Excluded*** – No suitable sphagnum bogs or fens occur in the project area. Thus, no direct, indirect, or cumulative effects to northern bog lemmings would be expected.

	meadows, bogs, fens with thick moss mats	
	Peregrine Falcon Habitat: cliff features near open foraging areas and/or wetlands	***Excluded*** – No potential habitat occurs in the project area. Thus, no direct, indirect, or cumulative effects to peregrine falcons would be expected.
	Pileated woodpecker Habitat: late-successional ponderosa pine and larch-fir forest	***Included*** – Potential habitat occurs in the proposed project area.
	Townsend's big-eared bat Habitat: caves, caverns, old mines	***Excluded*** – DNRC is unaware of any mines or caves in the project area or close vicinity that would be suitable for use by Townsend's big-eared bats. Thus, no direct, indirect, or cumulative effects to Townsend's big-eared bats would be anticipated.
Big Game Species	Elk	***Included*** – Year-round use by deer, elk, and moose is possible. Winter range for big game species is present within the proposed project area.
	Moose	
	Mule Deer	
	White-tailed Deer	

THREATENED AND ENDANGERED SPECIES

CANADA LYNX

Issue: Timber harvesting and associated activities could remove canopy closure or alter stand conditions, which could result in the reduction or modification of habitats preferred by Canada lynx, which could decrease the area's suitability for lynx.

Introduction

Canada lynx are listed as "threatened" under the Endangered Species Act. Canada lynx are associated with subalpine fir forests, generally between 4,000 to 7,000 feet in elevation in western Montana (Ruediger

et al. 2000). Lynx abundance and habitat use are strongly associated with snowshoe hare populations; thus conditions which decrease habitat quality for snowshoe hares can reduce the availability of prey for lynx. Lynx habitat in western Montana consists primarily of stands that provide habitat for snowshoe hares, either dense, young coniferous stands or dense, mature forested stands (Squires et al. 2010). Forest type, stem densities, natural disturbance history, and time since harvesting play important roles in shaping the suitablilty of young foraging habitat for lynx. Mature subalpine fir stands with abundant coarse woody debris also provide structure important for denning and cover for kittens, and dense cover used for for travel and security. These conditions are found in a variety of habitat types, particularly within the subalpine fir series (Pfister et al. 1977). Historically, northwest Montana contained a variety of stand types with differing fire regimes; this, combined with patchy elevation and snow-depth gradients preferred by lynx, likely formed a non-continuous mosiac of lynx and non-lynx habitats (Fischer and Bradley 1987, Ruggiero et. al. 1999).

Analysis Areas

Direct and indirect effects were analyzed for activities conducted within the 1,647 acre project area. Cumulative effects were analyzed on an 54,584 acre cumulative effects analysis area generally centered on the project area. This scale of analysis approximates the home range size of a male lynx (Ruediger et al. 2000).

Analysis Methods

To assess lynx habitat, DNRC SLI data were used to map specific habitat classes used by lynx. Lynx habitat (ARM 36.11.403(40)) was assigned to a stand if the SLI data indicated habitat types (Pfister et al. 1977) that are consistent with those reportedly used by lynx (Ruediger et al. 2000). Other parameters (stand age, canopy cover, and amount of coarse woody debris) were used in modeling the availability of the following 6 specific lynx habitat elements:

1) denning,

2) mature foraging,

3) denning/mature foraging

4) young foraging,

5) forested travel/other habitat, and

6) temporary non-lynx habitats.

Denning habitat provides important vegetative and woody structure needed to provide denning sites and security for juvenile lynx, while foraging habitat is important for the survival of both adult and juvenile lynx, however, it is not considered limiting for lynx in most forested landscapes in western Montana (USFS Northern Rockies Lynx Amendment ROD 2007). "Forested travel/other habitat" is a general habitat category that provides for secondary prey items and contains modest levels of forest structure usable by lynx. Temporary non-lynx habitat consists of non-forest and open forested stands that are not expected to be used appreciably by lynx until adequate horizontal cover reestablishes. Factors considered in the analysis include landscape connectivity and the amount DNRC-owned lands within the cumulative effects analysis area in denning, foraging, and unsuitable habitats.

EXISTING ENVIRONMENT

Approximately 62 acres (4%) of lynx habitat occurs in the 1,647 acre project area. All 62 acres occur within the Forrey Creek parcel. Forty-six acres of this habitat were identified as mature foraging habitat and 16 acres were identified as forested travel/other habitats (*TABLE W-3 – LYNX HABITATS*).

Administrative rules of Montana (ARM 36.11.435 (8)(a) & (b)(i)) require a minimum of 5 acres and 10 percent of the current project-scale lynx habitats on DNRC-managed lands to be in denning and foraging habitats, respectively. All classified lynx habitat in this parcel is below 3,500 feet in elevation, and thus near the lower elevational range for lynx use in northwestern Montana (Ruediger et al. 2000). At these elevations, warmer temperatures and shallow winter snow depths decrease habitat suitability for lynx. Connectivity within the project area is moderately good for the small amount of habitat present, and undisturbed forest along Forrey Creek is providing cover for travel and foraging. Because of widespread timber harvesting and unsuitable cover types on private lands directly adjacent to the parcel, however, connectivity of preffered lynx habitat outside of the DNRC parcel is poor. A narrow strip of riperian forest along Forrey Creek is the only source of mature forest connectivity in adjacent lands, and this habitat disappears approximately 2.5 miles to the west on recently harvested private land.

DNRC manages approximately 2,928 acres (5%) of the 54,584-acre cumulative effects analysis area (*TABLE W-3 – LYNX HABITATS*). Other land owners in the cumulative effects area are Plum Creek Timber (26%), USDA Forest Service (23%) and various private owners (44%). Historical records (Montana Natural Heritage Program) have documented Canada lynx once in the cumulative effects analysis area, located five miles northwest of the Forrey Creek parcel in higher elevations. DNRC-owned lynx habitats within the cumulative effects analysis area occur on 3 separate parcels and are dominated by forested travel/other habitat (*TABLE W-3 – LYNX HABITATS*). Denning habitat is not present, although small areas within stands may provide the structural features necessary for a lynx den. The lack of fire, including the effects of fire suppression, has likely led to a smaller proportion of young foraging habitat and a greater proportion of mature foraging habitat or forested travel/other habitats on DNRC lands than what was typically present pre-European settlement.

USDA vegetation data and interpretations of aerial photographs within the cumulative analysis area show approximately 8,343 acres (15%) as permenantly non-forested, 14,738 acres (27%) in early regenerating forest stands and 10,033 acres (18%) to be mature forest with a reasonably closed (>40%) canopy. The remaining 21,470 forested acres (40%) consist of low-elevation stands with more open overstory canopies that are not likely providing lynx habitats. USDA Forest Service lands (12,333 acres) in the northwest quarter of the cumulative effects analysis area (farthest from the project area) likely consist of the highest-quality habitat in the area: elevation is higher, average snow depth deeper, historic harvest levels were less intensive and habitat connectivity is high. Examination of aerial photography suggests much of the cumulative effects analysis area was harvested within the last 20 years, thus it is likely that most regenerating, non-mature forested stands are not preferred young foraging habitat for lynx due to low stem densities. Non-preferred cover types are prevelent in the cumulative effects analysis area . Additionally, connectivity at the cumulative effects analysis level has been compromised by widespread harvesting and road/home construction.

TABLE W-3 – LYNX HABITATS. Existing acres and proportions of lynx habitat elements on DNRC lands in the project area and cumulative effects analysis area.

	PROJECT AREA	CUMULATIVE EFFECTS ANALYSIS AREA	
			PERCENT OF TOTAL CUMULATIVE AREA

LYNX HABITAT ELEMENT	**ACRES** (PERCENT OF LYNX HABITATS)	**ACRES** (PERCENT OF DNRC LYNX HABITATS)	
Denning	0 (0)	0 (0)	0
Denning/Mature foraging	0 (0)	0 (0)	0
Mature foraging	46 (74)	165 (27)	0.3
Forested travel/other	16 (26)	400 (66)	0.7
Temporary non-habitat	0 (0)	45 (7)	0.08
Young foraging	0 (0)	0 (0)	0
Grand Total-Lynx Habitats	62 (100)	610 (100)	1.08
Permanently Unsuitable	1,584	2,317	4.2
Total Acres	1,646	2,928	5.4

Environmental Effects

Direct and Indirect Effects of the No-Action Alternative on Canada Lynx

Under this alternative, no changes in lynx habitat elements would be expected in the project area and landscape connectivity would not be altered. Thus, no direct indirect effects to lynx habitats would be expected to occur in the project area.

Direct and Indirect Effects of the Action Alternative on Canada Lynx

Approximately 56 acres of lynx habitats would be subject to harvesting with this alternative. Activities associated with active logging operations could temporarily displace any lynx using the area for 1-3 years. No additional roads would be built under the action alternative. Given that overall harvesting

levels would be expected to be minor, classified mature foraging lynx habitat within proposed units would remain suitable as forested travel/other habitat post-harvest. Lynx habitat along Forrey Creek would remain unharvested (6 acres, 10%) to conserve lynx foraging habitat addresses ARM 36.11.435 (8)(a) & (b)(i)), as well as maintain lynx habitat connectivity with an adjacent unharvested riperian forest upstream to the west. After harvest, the majority of the lynx habitats would likely fall within forested travel/other class (56 acres, 90%), with lesser amounts of mature foraging habitat (6 acres, 10%). In the proposed harvest units, 10 to 20 tons/acre of coarse woody debris would be retained to provide some horizontal cover and security structure for lynx. Growth and infill of retained mature trees and post-harvest conifer regeneration following harvest would increase habitat suitability over time. Collectively, since: 1) the amount of existing lynx habitat in the project area (62 acres, 5%) is very limited, 2) baseline probability of lynx use is extremely low due to unsuitable covertypes and low elevation, 3) mature foraging habitat would be retained to meet ARM 36.11.435 and maintain existing habitat connectivity, 4) minor amounts of lynx habitats would be converted into temporary non-lynx habitat category, and 5) lynx habitat within proposed harvest units would remain suitable forested travel/other habitats, minor adverse direct and indirect effects to habitat suitability for Canada lynx would be expected.

Cumulative Effects of the No-Action Alternative on Canada Lynx

No appreciable change in lynx habitats would occur under this alternative and no further changes in landscape connectivity would be anticipated due to DNRC activities at this time. Thus, no cumulative effects to lynx would be expected to occur.

Cumulative Effects of the Action Alternative on Canada Lynx

Under the action alternative, approximately 54 acres (0.1%) of the 54,583-acre cumulative effects analysis area would be altered and converted to forested travel/other habitat . Within the cumulative effects analysis area, suitable lynx habitats on DNRC lands (565 acres) would continue to persist. Reductions in mature foraging and increases in forested travel/other habitats in the proposed harvest units would not be expected to appreciably alter lynx use of the cumulative effects analysis area given that surrounding habitat suitability is very low. The cumulative effects analysis area contains roughly 6,366 acres (12%) of mature, closed canopy (>40%) forest located above 4,000 feet in elevation that likely serve as suitable lynx habitat, however these acres are separated from lynx habitats in the project area by large distances (>1.5 miles) of recently harvested (<10 years) forest. Landscape connectivity in the cumulative effects area would not be appreciably reduced with the proposed activities (see WILDLIFE- landscape connectivity), as existing connectivity of suitable lynx habitat would be maintained along Forrey Creek. Existing lynx habitat on DNRC-owned lands in the unharvested portion of the project area (6 acres) and larger cumulative effects area (565 acres) would be expected to persist in the absence of future timber harvesting or other natural disturbance that may influence lynx habitat quality. Additionally, modifications of lynx habitats could be possible with any management that may occur on industrial timberlands and other privately owned lands in the cumulative effects analysis area. Non-industrial private ownerships and housing developments (~15,700 acres) in the cumulative effects area will not likely provide lynx habitat in the future. Increased levels of motorized activities associated with the action alternative could temporarily displace lynx should they be present near the proposed project area and associated roads. Thus, since: 1) overall baseline habitat suitability and connectivity for lynx are quite low, 2) all currently suitable lynx habitat on DNRC lands would remain suitable, 3) existing habitat connectivity within the cumulative effects area would be minimally affected by proposed activities, 4) lynx displacement due to forest management activities would be short-term (1-3 years), and 5) the area of proposed harvest is extremely small compared to lynx home range size, negligible adverse cumulative effects to lynx habitat suitability would be expected as a result of proposed activities.

Grizzly Bear

Issue: Timber harvesting and associated activities could alter grizzly bear cover, reduce secure areas, and increase human access, which could adversely affect bears by displacing them from important habitats and/or increasing risk of human-caused bear mortality.

Introduction

Grizzly bears are generalist omnivores that use a diversity of habitats found in western Montana and are currently listed as "threatened" under the Endangered Species Act. Preferred grizzly bear habitats are meadows, riparian zones, avalanche chutes, subalpine forests, and big game winter ranges, all of which provide seasonal food sources. Within the project area, primary habitat components include meadows, riparian areas, and big game winter ranges. Primary threats to grizzly bears are related to human-bear conflicts, habituation to unnatural foods near high-risk areas, and long-term habitat loss associated with human development (Mace and Waller 1997). Forest-management activities may affect grizzly bears by altering cover and/or by increasing access to humans into secure areas by creating roads (Mace et al. 1997). These actions could lead to the displacement of grizzly bears from preferred areas and/or result in an increased risk of human-caused mortality by bringing humans and bears closer together and/or making bears more detectable, which can increase their risk of being shot illegally. Displacing bears from preferred areas may increase their energetic costs, potentially lowering their ability to survive and/or reproduce successfully.

Analysis Areas

Direct and indirect effects were analyzed for activities conducted within the 1,647 acre project area. Cumulative effects were analyzed on an 54,584 acre cumulative effects analysis area generally centered on the project area. This combined area was selected to approximate the home range size of a female grizzly bear in northwest Montana (Mace and Roberts 2011).

Analysis Methods

Field evaluations, aerial photograph interpretation, scientific literature and GIS analysis were the basis for this analysis. Within the cumulative effects analysis area, open road densities were calculated using a simple linear calculation method. Factors considered within this cumulative effects analysis area include level of human disturbance, availability of timbered stands for hiding cover and miles of open roads.

EXISTING ENVIRONMENT

The proposed project area is well outside of any grizzly bear recovery zone and non-recovery occupied habitat as mapped by T. Wittinger (2002). However, Montana Fish, Wildlife and Parks biologists documented recent use of the area by several grizzly bears, including females with young (Mace and Roberts, 2011). Radio tracking data indicated grizzly use of lands in and around the project area in 2010. There are few records of grizzly bears in the cumulative effects analysis area before 2005 (MNHP tracker data, Mace and Roberts, 2011).

Preferred bear habitats, such as avalanche chutes and berry patches, are not present in the proposed project area. Harvested areas from 1999-2003 (1,203 acres, 73%) within the project area contain scattered patches of dense regenerating conifers that currently provide cover for grizzly bears in these generally

open areas. Managing human access is a major factor in management for grizzly bear habitats. Presently, open road density in the proposed project area is approximately 1.2 miles/sq. mile (simple linear calculations) and total road density is 6.3 miles/sq. mile. Roughly 12 miles of DNRC restricted roads are periodically accessed by unauthorized motorized vehicles bypassing barriers and creating illegal trails. Montana Highway 93 passes through the Mary B parcel and within 1.2 miles of all other proposed project parcels. Although grizzly bears could use the project area at any time, moderate to high levels of human presence and disturbance, adjacent home sites, and relatively unrestricted vehicular access through much of the project area (including Highway 93), likely result in increased displacement and risk of human-grizzly bear conflicts in the area.

Based upon open road density, mature forest cover, and lack of home sites, the northwest portion of the cumulative effects analysis area likely receives lower levels of human use and associated disturbance than areas closer to the city of Lakeside and private lands near Flathead Lake. Agricultural and ranchland areas occur in the southern half of the cumulative effects analysis area (near the CSKT reservation border) on private ownerships. Livestock and pets in areas of active human use increase risk for bear conflicts and resulting management actions. Forest habitats across the cumulative effects analysis area are a combination of age classes, ranging from recently harvested stands to mature stands. Large portions of the cumulative effects analysis area (~15,000 acres, 25%) have undergone intensive timber harvested recently (<20 years), reducing available mature forest cover for bears. Reductions in vegetative cover can lower effective bear use of habitat and render bears more vulnerable to human-caused mortality (Servheen et al. 1999). Human disturbance levels and level of forest harvesting are both closely tied to road access. Open road density for the entire cumulative effects analysis area is approximately 5.2 miles/sq. mile and total road density is 6.4 miles/sq. mile. The high road density present in the cumulative effects analysis area is primarily a result of past timber management activities and private land development. Home sites, open roads, and Montana Highway 93 are within close proximity to the project area; make extensive use by bears less likely and risk factors higher than on more remote USDA Forest Service lands in the cumulative area's northwest quarter.

Environmental Effects

Direct and Indirect Effects of the No-Action Alternative on Grizzly Bears

No direct effects to grizzly bears would be expected. No changes to the level of disturbance to grizzly bears would be anticipated. No changes in open-road densities or hiding cover would be anticipated. Thus, since no changes in available habitats or level of human disturbance would be anticipated, no direct or indirect effects to grizzly bears would be anticipated.

Direct and Indirect Effects of the Action Alternative on Grizzly Bears

Should grizzly bears be present in the area at the time of harvest operations, they could be affected by increased road traffic, noise, and human activity, and by altered amounts of hiding cover and forage resources. Proposed activities in grizzly bear habitats would reduce grizzly bear security, possibly resulting in increased stress and/or energy expenditure to endure the disturbance or to move from the area, should they be present. These disturbances would only occur during harvesting operations (1-3 years). Contract requirements would help mitigate bear-human conflict risk by specifying that contractors are not permitted to carry firearms on the work site and that unnatural attractants must kept/disposed of in a bear-resistant manner. The temporary opening of currently restricted roads (11 miles) would occur for no more than four consecutive years to minimize activity in grizzly bear habitats. No new roads would be constructed. Opening of closed roads would contribute to open road density (5.5 miles/sq. miles) in the short term (1-3 years); increasing potential for disturbance to grizzly bears. In balance, after harvesting the action alternative would close access to roughly 12 miles

of road currently being used by motorized equipment illegally, thus reducing long-term risks associated with human/bear encounters. Additionally, approximately 1.7 miles of currently open DNRC road would be closed to motorized use after harvesting. Due to the prevelance of open roads, adjacent human dwellings and associated risk factors, and lack of preferred bear habitats, extended annual use of the proposed project area is unlikely. Overall, the proposed activities would occur in areas where appreciable levels of grizzly bear use would not be anticipated and would occur during a limited time frame (1-4 years), leading to minor increased risk of disturbance and displacement of grizzly bears.

Grizzly bear hiding cover, defined as vegetation that will hide 90 percent of a grizzly bear at a distance of 200 feet, could be reduced for 5-10 years on approximately 1,120 acres under the action alternative. Existing cover in old harvest units would be largely protected and overall levels of hiding cover would improve over time as shrub and tree regeneration proceeds. Current levels of cover in the form of brush, shrubs, and sub-merchantable trees would be retained where available and feasible. Closed roads that would be temporarly (1-3 years) opened with this alternative (11 miles), as well as unauthorized access points, would be closed in a manner to discourage motorized access after the proposed harvesting. Collectively, negligible changes in open road and total road densities would be anticipated. Thus, since 1) negligible disturbance and displacement would be anticipated, 2) hiding cover would be lost in the short-term, but would be expected to recovery fairly rapidly, 3) unauthorized motorized use would be reducted; and 3) short-term increases in open road densities would be anticipated, but long-term open road densities would be not be altered; minor adverse direct or indirect effects to grizzly bears in the project area would be expected in the short-term.

Cumulative Effects of the No-Action Alternative on Grizzly Bears

No cumulative effects to grizzly bears would be expected. No cumulative changes to the level of disturbance to grizzly bears would be anticipated. No cumulative changes in open-road densities or hiding cover would be anticipated. Thus, since no changes in available habitats or level of human disturbance would be anticipated, no cumulative effects to grizzly bears would be anticipated.

Cumulative Effects of the Action Alternative on Grizzly Bears

The increased use of road systems during the proposed project would temporarily increase human disturbance and displacement risk for grizzly bears within a portion of the cumulative effects analysis area, should they occur there. Proposed activities would occur in the portion of the cumulative effects analysis area already experiencing moderate levels of human disturbance, largely associated with open roads and private ownerships, and would be away from the more remote portions of the cumulative effects analysis area on USFS lands to the northwest that are more likely to be used by grizzly bears. Collectively, minor short-term (1-3 years) increases in human disturbance would be anticipated in the area and contract requirements would lessen risk of human-bear conflicts during active harvest operations (i.e. proper storage/disposal of unnatural attractants). Reductions in 1,120 acres of hiding cover would be additive to the reductions from past timber harvesting (roughly 15,000 acres) as well as more permanent land-cover changes associated with private housing developments in the cumulative effects analysis area. Harvesting within the last 20 years in the cumulative effects area has appreciably altered grizzly bear cover and habitat connectivity, however, bear monitoring work has indicated individuals have recently used the area. Early successional stages of vegetation occurring in harvest units could provide foraging opportunities that do not exist in some mature stands. Post-harvest, approximately 1.7 miles of currently open DNRC road and 12 miles of currently restricted roads would be closed to motorized use. Minimal reductions in long-term open-road densities would be expected (5.19 miles/sq. mile to 5.18 miles/sq. mile); a fairly extensive road system would persist and would continue to facilitate human access (and thus risk to grizzly bears) within the cumulative effects analysis area. Additionally, human activities and dwellings on 24,000 acres of private, non-industrial lands have decreased bear habitat suitability and serve as a source for a number of high-risk factors for bears (i.e. pets, livestock, garbage). Thus, since 1) minor, short-duration (1-3 year)

increases in human disturbance levels would be expected within the cumulative effects analysis area, 2) hiding cover would be lost in the short-term (5-10 years) on a small portion (2%) of the cumulative effects analysis area, but would be expected to recovery fairly rapidly, and 3) negligible changes (<1%) in long-term open road densities would occur; minor adverse cumulative effects to grizzly bears would be expected in the short-term (1-3 years) and minimal adverse cumulative effects over the long term.

SENSITIVE SPECIES

When conducting forest-management activities, the *SFLMP* directs DNRC to give special consideration to sensitive species. These species may be sensitive to human activities, have special habitat requirements, are associated with habitats that may be altered by timber management, and/or may, if management activities result in continued adverse impacts, become listed under the *Federal Endangered Species Act*. Because sensitive species usually have specific habitat requirements, consideration of their needs serves as a useful 'fine filter' for ensuring that the primary goal of maintaining healthy and diverse forests is met. A search of the *Montana Natural Heritage Database* documented no sensitive species in the vicinity of the project area. As shown in ***TABLE W-2.***

BALD EAGLE

Issue: The proposed activities could reduce bald eagle nesting and perching habitats and/or disturb nesting bald eagles.

Introduction

Bald eagles are diurnal raptors associated with significant bodies of water, such as rivers, lakes, and coastal zones. The bald eagle diet consists primarily of fish and waterfowl, but includes carrion, mammals, and items taken from other birds of prey. In northwestern Montana, bald eagles begin the breeding process with courtship behavior and nest building in early February; the young fledge by approximately mid-August, ending the breeding process. Preferred nest-stand characteristics include large emergent trees that are within site distances of lakes and rivers and screened from disturbance by vegetation.

Analysis Area

Direct and indirect effects were analyzed for activities conducted within the project area. Cumulative effects were analyzed on the Painted Rocks/Shelter Island bald eagle territory home range. This cumulative effects analysis area likely includes the areas used by the pair of eagles using the territory.

Analysis Methods

Effects were analyzed using a combination of field evaluations and aerial photograph interpretation within the bald eagle home range. Factors considered within this analysis include disturbance levels and availability of large, emergent trees with stout horizontal limbs for nests and perches.

Existing Environment

The project area is partially included in the Painted Rocks/Shelter Island bald eagle territory and observations of eagles nesting in the vicinity have been recorded since 1985. This territory has produced chicks in past years, although the nest site(s) have not found to be occupied by breeding eagles in 2009 or 2010 and current nest status is unknown. The aquatic habitat associated with this bald eagle territory is primarily Flathead Lake. The terrestrial habitat incorporated by the Painted Rocks/Shelter Island bald eagle territory is a mix of coniferous forest, meadows, orchards and housing

developments along the lakeshore and a combination of meadows and coniferous forests in the upland areas. Montana Highway 93 runs north-south through a portion of the territory and eagles have been observed in the area scavenging on road-killed ungulates. Within the present home range, large emergent conifers likely provide important nesting, roosting, and perching habitats.

Bald eagle habitat is managed at three spatial scales, according to *ARM 36.11.429*—the nest area (area within a 0.25-mile radius of the active nest tree or nest sites that have been active within five years), the primary use area (an area 0.25-0.50-miles from the nest tree), and the home range (area within 2.5 miles of all nest sites that have been active within five years). Approximately 475 acres of DNRC-managed lands occur within the bald eagle home range, with none of that area located in the nest site or primary use areas.

Human disturbance, including timber harvesting, residential development, agricultural clearing, and various forms of recreation are potential sources of disturbance to the nesting territory. Recreational boating and houses along the shoreline of Flathead Lake likely serve as the primary sources of disturbance in this eagle territory. Several large emergent trees are available across portions of the home range, but logging in the last 100 years has likely reduced some of these trees while others have experienced mortality and are declining in quality. Any harvesting that may be occurring on other ownerships in the home range could continue disturbing bald eagles or modifying their habitats.

Environmental Effects

Direct and Indirect Effects of the No-Action Alternative on Bald Eagles

No direct or indirect effects to bald eagles would be expected. Human disturbance would continue at approximately the same levels. No changes in available nesting habitats would occur. Thus, since: 1) no changes to human disturbance levels would occur; and 2) no changes in the availability of large, emergent trees would be expected, negligible direct and indirect effects would be expected to affect bald eagles using the territory.

Direct and Indirect Effects of the Action Alternative on Bald Eagles

Proposed harvesting would be carried out on approximately 416 acres (3%) of coniferous forest occurring within the home range of the Painted Rocks/Shelter Island territory. All harvest units are over 1 mile from the closest known nesting location. No seasonal restrictions exist on any of the proposed units in the home range and they could be harvested when appropriate soil conditions are met. Should those units in the home range be harvested when the eagles are not using the nest (August 16 – February 1), activities would be expected to have minimal effects to bald eagles and any harvesting during the nesting period (February 1 – August 15) would be expected to have minor effects to bald eagles, with a gradual decrease in effects as time progresses through the nesting period. The potential for displacement would only be expected to affect eagles during the activities and not beyond. Within the home range, prescriptions call for the retention of some large snags and emergent trees that could be used in the future as nest or perch trees as the stands develop around these resources. No changes to human access to the home range would occur, thus limiting potential for introducing additional human disturbance to this territory. Thus, minor direct and indirect effects to bald eagles would be anticipated since: 1) disturbance could be elevated within the territory during operations; 2) no change in human access within the project area would occur; 3) harvesting would occur on a small proportion (3%) of the outer home range, and 4) negligible changes in the availability of large, emergent trees would be expected.

Cumulative Effects of the No-Action Alternative on Bald Eagles

No harvesting would occur under the no-action alternative. Thus, no cumulative effects to bald eagles would be expected since: 1) no changes to human disturbance levels would occur; and 2) no changes in the availability of large, emergent trees would be expected.

Cumulative Effects of the Action Alternative on Bald Eagles

Nesting bald eagles would continue to experience varying levels of disturbance from the ongoing recreational use of the vicinity as well as disturbance associated with lakeshore developments and Highway 93. Additionally, new housing developments on private lands would continue to provide potential sources of disturbance to the territory. Any potential disturbance and/or noise from the proposed harvesting would be additive to any of these other forms of disturbance, however no changes in bald eagle behavior would be anticipated. Emergent trees exist across ownerships in the home range. Thus, minor cumulative effects to affect bald eagles would be anticipated since: 1) disturbance would be elevated within the territory during harvesting operations; 2) no changes in human access within the territory would occur; and 3) negligible changes in the availability of large, emergent trees would be expected.

FISHER

Issue: Timber harvesting could decrease canopy cover, snag abundance, and the amount of coarse woody debris, which could reduce habitat suitability for fishers.

Introduction

Fishers are generalist predators that prey upon a variety of small mammals and birds, as well as snowshoe hares and porcupines. They also take advantage of carrion and seasonally available fruits and berries (Foresman 2001). Fishers use a variety of forest successional stages, but are disproportionately found in low to mid elevation mature stands with dense canopies (Powell 1982, Johnson 1984, Jones 1991, Heinemeyer and Jones 1994) and avoid openings or young forested stands (Buskirk and Powell 1994). However, some use of openings does occur for short hunting forays or if sufficient overhead cover (shrubs, saplings) is present. Fishers appear to be highly selective of stands that contain resting and denning sites and tend to use areas within 150 feet of water (Jones 1991). Resting and denning sites are found in cavities of live trees and snags, downed logs, brush piles, mistletoe brooms, squirrel and raptor nests, and holes in the ground. Forest management considerations for fisher involve providing for resting and denning habitats near riparian areas while maintaining travel corridors.

Analysis Areas

Direct and indirect effects were analyzed on the six DNRC parcels making up the project area. Cumulative effects were analyzed on an area defined by the HUC12 watershed of Stoner Creek. Consisting of 25,476 acres, this cumulative analysis area includes parcels of various ownerships that surround the project area. The cumulative area is approximately 9% DNRC, 26% private industrial timberland, 64% other private owners, 0.5% tribal, and 0.5% Montana Fish, Wildlife and Parks. This scale includes enough area to approximate home ranges of male and female fishers (Heinemeyer and Jones 1994).

Analysis Methods

To assess potential fisher habitat and travel cover on DNRC managed lands in the cumulative effects analysis area, sawtimber stands within preferred fisher cover types (ARM 36.11.403(60)) below 6,000 feet in elevation with 40 percent or greater canopy closure were considered potential fisher habitat. DNRC manages preferred fisher cover types within 100 feet of Class 1 and 50 feet of Class 2 streams, so that 75 percent of the acreage (trust lands only) would be in the sawtimber size class in moderate to well-stocked density (ARM 36.11.440(1)(b)(i)). Fisher habitat was further divided into upland and riparian-associated areas depending upon the proximity to streams and based upon stream class. Direct and indirect effects were analyzed using field evaluations and GIS analysis of potential habitat. Cumulative effects were analyzed using field evaluations and GIS analysis of potential habitat and aerial photograph interpretation of potential habitat on all other lands within the cumulative effects analysis area. Factors considered include amount of suitable fisher habitats, landscape connectivity, and human access. Snags and coarse woody debris were assessed during site visits using 21 systematically placed plots in the proposed project area and reviewing past DNRC harvesting information. Factors considered within the analysis include the level of harvesting, number of snags, relative amounts of coarse woody debris, and risk level of firewood harvesting.

Existing Environment

The project area ranges from 3,000 to 4,680 feet in elevation (see **Table *W-1***). The proposed project area contains roughly 504 acres (45%) of potential fisher habitat, of which 18 acres (1.6%) are within 100 feet of Class 1 streams and 54 acres (4.8%) within 50 feet of Class 2 streams. Currently there are approximately 3 miles of open road (1.2 miles per square mile) on the project area. Of open roads within the project area, only Montana Hwy 93 is open year-round and it does not offer trappers convenient access to forested riparian areas. Snags and coarse woody debris, were quantified at sampling plots within proposed harvest units and found to be at the lower range of preferred levels (see *Snags and Coarse Woody Debris* section above). Stands within the project area that provide potential fisher habitat are densely forested patches that persist as islands surrounded by sapling stands of varied density on adjacent private industrial forest lands. Mature forested stands occur along Forrey Creek (class 1 stream) and offer habitat connectivity. Within uplands on the project area, most of the preferred fisher cover types are moderately or well-stocked and may support the structural features necessary for use as travel habitat, but not extensive fisher use due to their small patch size and isolation.

There no historical records of fisher occurring in the project or cumulative effects areas within the last 30 years (Montana Natural Heritage Program). Within the cumulative effects analysis area on 2,220 acres of DNRC managed lands, there are 1,007 acres of moderately or well-stocked fisher cover types. Of these potential habitats, approximately 81 acres would be considered riparian fisher habitat. Approximately 7.7 miles of perennial and 55.7 miles of intermittent streams occur on lands within the cumulative effects analysis area. The forested areas adjacent to these streams may contribute to the total riparian fisher habitats within the cumulative effects analysis area, although streams in this region are sometimes found to be absent from the landscape when ground-truthed. Of these 63 total stream miles, approximately 137 acres of mature forested habitat are within 100ft of perennial streams and 50ft of intermittent streams, while the rest are located in recently harvested or non-forested areas. Streams in harvested areas on private ownerships showed narrow strips of adjacent forest habitat, usually no wider than 200 total feet. These forested riparian strips could still provide habitat and connectivity for fishers, particularly in the form of travel corridors. It is possible that 1,559 acres of mature, closed-canopy (>40%) forest on private lands within the cumulative effects analysis area provide additional upland fisher habitats, however connectivity of these stands is poor (see *MATURE FOREST HABITATS AND CONNECTIVITY*). Within the cumulative effects analysis area there is a network of existing roads that may facilitate trapper access within the area, although most are not plowed, which prohibits motorized vehicle use during typical winter conditions. Within the cumulative effects analysis area, past harvesting has limited snag and coarse woody debris densities in

much of the area. Timber harvest and firewood gathering has reduced snag densities on adjacent lands to well below two snags per acres, and downed logs are relatively sparse and small (predominantly 8-16" maximum diameter).

Environmental Effects

Direct and Indirect Effects of the No-Action Alternative on Fishers

No change to the stands providing fisher denning and foraging habitats would be expected as no timber harvesting activities would occur under this alternative. Also, no changes in landscape connectivity would occur. Thus, since: 1) no changes to existing habitats would be anticipated, 2) landscape connectivity would not be altered, 3) no appreciable changes to snags, snag recruits, and coarse woody debris levels would be anticipated, and 4) no changes to human access or potential for trapping mortality would be anticipated, no direct or indirect effects to fishers would be anticipated in the project area.

Direct and Indirect Effects of the Action Alternative on Fishers

Approximately 301 of the 503 acres (60%) of current and potential upland fisher habitats in the project area would be included in proposed harvest units. Of these acres, 11.6 acres (16%) of riparian fisher habitats could receive some treatment. Approximately 102 acres of 503 acres (20%) are presently meeting structural requirements for fisher use. Upland fisher habitats within the project area are proposed to receive treatments that would likely render stands too open for appreciable fisher use. Harvest areas falling between 50-104 feet from class 1 streams (9.6 acres) and within 50 feet of class 2 streams (0.6 acres) would undergo a logging treatment which would leave stands moderately to well-stocked and still suitable for fisher travel (in compliance with ARM 36.11.440). Areas within 50 feet of class 1 streams would remain completely unharvested and continue to provide travel/foraging habitat for fishers. Harvest prescriptions call for retention of two snags and two snag recruits per acre (>21 in. dbh where they exist, otherwise the next largest size class), and 10-20 tons of coarse woody debris per acre within the proposed units. While the proposed harvest may reduce density of snags and snag recruits in the near future, the sustainability of snags in the area will be maintained by retention of appreciable numbers of leave trees and snag recruitment trees. Prescriptions call for retention of large snags larger and older age class trees, further improving the development and sustainability of large snags in the proposed project area. These large snags and trees could be a source for fisher denning and resting sites in the near future (10-20 years) if surrounding landscape conditions allow. Increased use of the area by trappers is not expected due to no long-term changes in open road density. Minor additional reductions in upland fisher habitat connectivity would be expected in this landscape where connectivity has already been compromised. Activities associated with active logging could temporarily displace fishers should they be using the area. Thus, since: 1) harvesting would reduce or remove preferred fisher cover types on 301 acres, 2) minor reductions in landscape connectivity would occur, 3) the overall likelihood of fisher use in the project area is inherently low due to existing low habitat quality, 4) harvesting would reduce snag levels, and 5) motorized human access levels would remain the same, minor adverse direct and indirect effects would be anticipated that would affect fisher habitat suitability in the project area.

Cumulative Effects of the No-Action Alternative on Fishers

No effects to riparian or upland fisher habitats on DNRC managed lands would be expected as no timber harvesting activities would occur under this alternative. Also, no changes to landscape connectivity within the cumulative effects analysis area would be expected. Thus, since: 1) no changes to existing habitats on DNRC ownership would occur, 2) landscape connectivity afforded by the stands on DNRC ownership would not change, 3) no changes to snags, snag recruits, or coarse woody debris levels would be expected, and 4) no changes to human access or potential for trapping mortality would be anticipated, no cumulative effects to fishers would be anticipated in the cumulative effects analysis area.

Cumulative Effects of the Action Alternative on Fishers

Approximately 301 acres of potential fisher habitats in the cumulative effects analysis area (1.1%) would be harvested. These reductions would be additive to the losses associated with past and current timber harvesting in the cumulative effects analysis area. Future harvest operations or natural disturbance on non-DNRC ownerships could affect fisher habitat on the larger landscape. Roughly 1,727 acres of the 25,476 acre cumulative effects area (6.78%) would remain in mature forested habitats, some of which could be suitable for fisher use. Minor reductions in landscape connectivity within the cumulative effects analysis area would occur, theses reductions would be additive to the losses associated with past timber harvesting. Activities associated with active logging could temporarily displace fishers should they be using the area, however disturbance would be expected to return to pre-harvest levels following treatment. Thus, since: 1) harvesting would alter tree density and structure in stands of preferred fisher cover types, but some upland habitats within the cumulative effects analysis area would persist, 2) no changes to preferred cover types or fisher habitats associated with the riparian areas in the cumulative effects analysis area would be anticipated, 3) minor reductions in landscape connectivity for fishers would be anticipated, 4) harvesting would partially reduce snags and snag recruits, while increasing the coarse woody debris levels, largely in the smaller-sized pieces, 5) no changes to motorized human access would occur, minor adverse cumulative effects would be anticipated that would affect fisher habitat suitability.

Pileated Woodpecker

Issue: Timber harvesting and associated activities could negatively affect pileated woodpecker habitat suitability by removing canopy cover and snags used for foraging and nesting.

Introduction

Pileated woodpeckers play an important ecological role by excavating cavities that are used in subsequent years by many other species of birds and mammals. Pileated woodpeckers excavate the largest cavities of any woodpecker. Preferred nest trees are western larch, ponderosa pine, cottonwood, and quaking aspen, usually 20 inches dbh and larger. Pileated woodpeckers primarily eat carpenter ants, which inhabit large downed logs, stumps, and snags. *Aney and McClelland (1985)* described pileated nesting habitat as..."stands of 50 to 100 contiguous acres, generally below 5,000 feet in elevation with basal areas of 100 to 125 square feet per acre and a relatively closed canopy." The feeding and nesting habitat requirements, including large snags or decayed trees for nesting and downed wood for feeding, closely tie these woodpeckers to mature forests with late-successional characteristics. The density of pileated woodpeckers is positively correlated with the amount of dead and/or dying wood in a stand (*McClelland 1979*).

Analysis Area

Direct and indirect effects were analyzed on the six DNRC parcels making up the project area. Cumulative effects were analyzed on an area defined by the HUC12 watershed of Stoner Creek. Consisting of 25,476 acres, this cumulative analysis area includes parcels of various ownerships that surround the project area. The cumulative area is approximately 9% DNRC, 26% private industrial timberland, 64% other private owners, 0.5% tribal, and 0.5% Montana Fish, Wildlife and Parks. This scale includes enough area to support multiple pairs of pileated woodpeckers if enough suitable habitat is present (Bull and Jackson 1995).

Analysis Methods

To assess potential pileated woodpecker nesting habitats on DNRC-managed lands in the cumulative effects analysis area, SLI data were used to identify sawtimber stands with more than 100 square feet basal area per acre, were older than 100 years old, and had greater than 40 percent canopy closure. Foraging habitats are areas that do not meet the definition above, but include the remaining sawtimber stands with greater than 40 percent canopy cover. Direct and indirect effects as well as cumulative effects were analyzed using a combination of field evaluation, aerial photograph interpretation, and these mapped potential habitats. Factors considered included the amount of potential habitat, degree of harvesting, and the amount of continuous forested habitat.

Existing Conditions

In the project area, there are approximately 124 acres of potential pileated woodpecker habitat. Potential pileated habitat consists of western larch and Douglas-fir stands in the Big Lodge and Birch Creek parcels. Many of these acres had been harvested in 1999-2003 and may be too open for appreciable use by pileated woodpeckers. Very few large snags and coarse woody debris occur in the project area and pileated woodpecker foraging evidence was not readily observed during field visits. Unauthorized motorized access has facilitated firewood gathering and the reduction of woodpecker nesting and foraging substrates. Given these observations, it is likely the majority of these acres have low habitat quality for pileated woodpeckers.

Presently, roughly 90 percent of the cumulative effects analysis area is not in mature, forested conditions due to road building, land clearing, firewood gathering and past harvesting, and thus is not likely providing pileated woodpecker habitats. Combined with the lack of adjacent mature forest stands on private ownership and the presumed lack suitable large snags, habitat suitability for pileated woodpeckers is considered low. Similarly, any harvesting that may be occurring on other ownerships in the cumulative effects analysis area could continue altering pileated woodpecker habitats.

Environmental Effects

Direct and Indirect Effects of the No-Action Alternative on Pileated Woodpeckers

No disturbance of pileated woodpeckers would occur as no timber harvesting activities would occur under this alternative. Thus, no adverse direct and indirect effects to pileated woodpeckers in the project area would be expected since: 1) no further harvesting would occur; 2) no changes in the amount of continuously forested habitats would be anticipated; 3) no changes to existing pileated woodpecker habitats would be anticipated.

Direct and Indirect Effects of the Action Alternative on Pileated Woodpeckers

Pileated woodpeckers tend to be tolerant of disturbance associated with human activities (*Bull and Jackson 1995*), but might be temporarily displaced by the proposed harvesting. Harvesting would reduce forested habitats for pileated woodpeckers and enlarge existing younger-aged stands. Roughly 121 acres (98%) of potential pileated woodpecker habitat in the project area would be altered harvest treatments and may be too open to be considered habitat following proposed treatments, although smaller portions of cutting units could retain enough large live trees and snags to maintain habitat characteristics preferred by pileated woodpeckers. In the stands proposed for treatment, potential pileated nesting and foraging habitats would be removed for 30 to 100 years. Elements of the forest structure important for nesting pileated woodpeckers, including snags (a minimum of 2 snags greater than 21 inches dbh per acre), coarse woody debris (10 to 15 tons per acre), large diameter leave trees, and snag recruits (a minimum of 2 trees per acre greater than 21 inch dbh where they exist) would be retained in the proposed harvest areas. Since pileated woodpecker density is positively correlated with the amount of dead and/or dying wood in a stand (*McClelland 1979*), pileated woodpecker habitat quality in the project area would be expected to be reduced on 121 acres. The silvicultural prescriptions would retain healthy western larch, ponderosa pine and Douglas-fir while promoting the regeneration of many of these same species, which would benefit pileated woodpeckers in the future by providing nesting, roosting, and foraging habitats. Low-quality habitat associated shade-tolerant tree species would likely be converted to a more desirable forest type, although it would take many years (~50-100) to mature into pileated habitat. Thus, minor adverse direct and indirect effects would be anticipated that would affect pileated woodpeckers in the project area since: 1) baseline habitat suitability appears to be low for pileated woodpeckers due to past harvesting and low abundance of snags/coarse woody debris, 2) harvesting would reduce the amount of continuous forested habitats available, 3) potential nesting and foraging habitats would be reduced; 4) several snags and snag recruits per acre would be removed; however, mitigation measures to retain a minimum of 2 snags per acre and 2 snag recruits per acre in most of the harvest areas would be included, and 5) harvest prescriptions would retain and promote seral species in the proposed harvest areas where pileated habitat is currently not present.

Cumulative Effects of the No-Action Alternative on Pileated Woodpeckers

No disturbance of pileated woodpeckers or their habitat would occur under this alternative as no timber harvesting activities would occur. Thus, no adverse cumulative effects to pileated woodpeckers in the cumulative-effects analysis area would be expected since: 1) no further changes to existing habitats would occur; and 2) no further changes to the amount of continuously forested habitats available for pileated woodpeckers would be anticipated.

Cumulative Effects of the Action Alternative on Pileated Woodpeckers

Under this alternative, further reductions in pileated woodpecker habitat would be expected in the cumulative effects analysis area which contains approximately 2,071 acres of potential habitat (193 acres on DNRC). Snags, coarse woody debris, and potential nesting trees would be retained in the project area; however, future recruitment of these attributes may be reduced in a portion of the area by the proposed activities and those on neighboring ownerships. Proposed harvesting could further reduce the quality of the cumulative effects analysis area for pileated woodpeckers by reducing the amount of the cumulative effects analysis area in mature forested conditions. Recently harvested stands and ongoing harvesting in the cumulative effects analysis area have reduced pileated woodpecker habitats; reductions associated with this action alternative would be additive to those reductions. Continued maturation of stands across the cumulative-effects analysis area is increasing suitable pileated woodpecker habitats through time. Thus, minor cumulative effects would be anticipated that would affect pileated woodpeckers in the cumulative-effects analysis area since: 1) proposed harvesting would occur on a small proportion (0.4%) of currently poor habitat within the cumulative area, 2) harvesting would further reduce the amount of continuous forested habitats available in the cumulative-effects analysis area, but small areas of more dense forested habitats would persist; 3) potential nesting and foraging habitats would be reduced; 4) some snags and snag recruits per acre would be removed in the proposed harvest areas; however, mitigation measures would retain

some of these attributes in the harvested area; and 5) harvest prescriptions would promote seral species in the proposed harvest areas.

Flammulated Owl

Issue: Timber harvesting could alter flammulated owl habitat by modifying forest structure and removing nest snags.

Introduction

Flammulated owls are small, migratory, forest owls that inhabit old, open stands of warm-dry ponderosa pine and cool-dry Douglas-fir forests in the western United States (McCallum, 1994). Flammulated owls are secondary cavity nesters, meaning they usually nest in cavities excavated by other birds, usually pileated woodpeckers or northern flickers. Nest snags are generally in 12-25" dbh aspen, ponderosa pine, or Douglas-fir. Flammulated owls forage for insects primarily via hawking or gleaning insects from vegetation, and thus require an open forest canopy for maneuvering. Without disturbance, Douglas-fir encroachment into ponderosa pine stands can increase stand density and result in decreased habitat quality for flammulated owls.

Analysis Area

Direct and indirect effects were analyzed on the six DNRC parcels making up the project area. Cumulative effects were analyzed on an area defined by the HUC12 watershed of Stoner Creek. Consisting of 25,476 acres, this cumulative analysis area includes parcels of various ownerships that surround the project area. The cumulative area is approximately 9% DNRC, 26% private industrial timberland, 64% other private owners, 0.5% tribal, and 0.5% Montana Fish, Wildlife and Parks. This scale includes enough area to support multiple pairs of flammulated owls (McCallum 1994).

Analysis Methods

To assess potential flammulated owl habitats on the project area, SLI data were used to identify stands in preferred habitat types (ARM 36.11.403(28)). Direct and indirect effects as well as cumulative effects were analyzed using a combination of field evaluation, aerial photograph interpretation, and a GIS analysis of available habitats. Snags were assessed during site visits using 21 systematically placed plots in the proposed project area and reviewing past DNRC harvesting information. Factors considered within the analysis include the stand size class and density, level of harvesting, number of snags, relative amounts of coarse woody debris, and risk level of firewood harvesting.

Existing Environment

The stands in the project area are largely Douglas-fir, western larch, and ponderosa pine. Within the project area there are approximately 1,317 acres of potential flammulated owl habitats. Of these potential acres, many currently contain moderately dense, closed-canopy forest likely unsuitable for foraging owls. The current conditions may be partially a result of the encroachment by shade-tolerant species in the past. Within old harvest units, foraging conditions are more suitable with a well-

developed shrub layer and scattered patches of dense regenerating conifers. During field visits, approximately 3.1 variably spaced snags per acre were observed in the project area, however snag diameters were generally too small (average 11.4" dbh) to be suitable for nesting flammulated owls. Vegetation plots within proposed harvest units did not locate any snags in the >21" dbh class and only two snags >15" dbh. Although their abundance was not captured in vegetation plots, some snags over 21" dbh were observed in the project area. Snags exhibited a large range of decay classes. Small snag sizes and low abundance could be partially attributed to illegal access and firewood gathering within the proposed project area.

In the cumulative effects analysis area, a portion of the area (roughly 9 percent) exists in relatively open forested conditions (<40% crown closure), which are primarily the result of recent forest management and timber harvesting activities. Additional acres of foraging habitat may be located within private industrial timberlands, depending on the cover type and size of retained trees. Largely, these areas are not currently useful for flammulated owl nesting (due to unsuitable cover types and/or snag limitations), but may serve as foraging habitats. Modern fire suppression has allowed conifer in-growth to create denser stands of mixed ponderosa pine and Douglas-fir in portions of the cumulative effects analysis area, which has reduced habitat quality for flammulated owls.

Environmental Effects

Direct and Indirect Effects of the No-Action Alternative on Flammulated Owls

Existing flammulated nesting habitats within the project area would continue maturing. In the long term, stands once with a mix of ponderosa pine could continue to be converted to Douglas-fir stands through succession, become densely stocked, and exist at high risk to insects, disease and stand-replacement fire. Therefore, habitat sustainability and quality for flammulated owls would continue to decline. Thus, since: 1) no harvesting would occur, 2) no changes to potential nesting habitats would be anticipated, and 3) there would be slight long-term, succession-related declines in foraging habitats coupled with advancing succession leading to denser stands, a moderate degree of adverse indirect effects would be expected to affect flammulated owls in the project area would be expected.

Direct and Indirect Effects of the Action Alternative on Flammulated Owls

Within the proposed project area, there are approximately 1,317 acres of potential flammulated owl habitat. The action alternative proposes harvesting on 959 acres (73%) of this potential habitat. Current forest conditions on many of these potential acres are denser than the open stands preferred by flammulated owls. Proposed harvesting would open up forest structural conditions, potentially creating more favorable habitat conditions for flammulated owls. As a secondary cavity-nesting species, flammulated owls are sensitive to large-diameter snag abundance. Harvesting would likely remove some snags, however prescriptions under DNRC rules require retaining 1-2 snags and snag recruits >21 inches dbh (or next largest size) per acre. These larger-diameter snags could serve as potential nesting substrates for owls in the present and future. Flammulated owls are tolerant of human disturbance (McCallum 1994), however the elevated disturbance levels associated with harvesting could negatively impact flammulated owls should they be using existing habitat during the nesting period (June-August). The more open stand conditions, the retention of fire adapted tree species, and

the maintenance of snags and large recruitment trees, which would remain following proposed treatments would move the proposed project area toward conditions more representative of those that would have predominantly occurred on these sites historically In western Montana, such conditions can provide preferred flammulated owl habitat (Wright et al., 1997). Thus, since: 1) harvesting would open up dense stands, 2) elements of forest structure (snags, snag recruits, and CWD) used for foraging and nesting by flammulated owl would be retained, 3) prescriptions would lead to more open stands with mature ponderosa pine present, and 4) prescriptions would promote future development of ponderosa pine and western larch within the harvest units, minor positive direct and indirect effects would be expected to affect flammulated owls in the project area for the next 30-50 years.

Cumulative Effects of the No-Action Alternative on Flammulated Owls

Portions of the cumulative effects analysis area have been harvested in the recent past, potentially improving flammulated owl habitats by creating foraging habitats and reversing a portion of shade-tolerant conifer encroachment. No harvesting would occur on DNRC lands and areas exhibiting mature forested conditions would be expected to persist and could provide flammulated owl nesting habitats. Other portions of the cumulative effects analysis area that are not currently providing flammulated owl habitats, due to encroachment of shade tolerant conifers, would not be expected to change over the next several decades in the absence of some natural disturbance. Collectively, stands would continue maturing and becoming more densely stocked, which would reduce habitat quality for flammulated owls. Thus, since: 1) no harvesting would occur on the project area, 2) no changes to potential nesting habitats would be anticipated, and 3) long-term, succession-related declines in foraging habitats coupled with advancing succession leading to denser stands, a low degree of adverse cumulative effects would be expected to affect flammulated owls in the cumulative effects analysis area.

Cumulative Effects of the Action Alternative on Flammulated Owls

Proposed harvesting would add 959 acres (6%) to the amount of the cumulative effects analysis area that has been harvested (~15,000 acres) within the last 20 years, which would add to the amount of foraging habitats available, but possibly reducing nest snags across the landscape. Although there would be reductions in tree density of mature forested stands, additional potential nesting habitats within the cumulative effects analysis area would not be expected to change in the near future. In the 25,476 cumulative effects analysis area, past/ongoing timber harvesting and firewood collecting has likely decreased snag levels, particularly along roads. Ponderosa pine and Douglas-fir stands on surrounding private and Forest Service lands could be providing preferred habitat for flammulated owls. The portions of the cumulative effects analysis area that are not currently providing flammulated owl habitats, due to encroachment of shade-tolerant species, would not be expected to change any time in the near future. Thus, since 1) harvesting would improve the quality of flammulated owl nesting and foraging habitats, and 2) a small increase (3%) in the amount of the cumulative effects analysis area that would be more representative of historic conditions would occur, minor beneficial cumulative effects would be expected to affect flammulated owls in the cumulative effects analysis area.

BIG GAME

Issue: Timber harvesting and associated activities could reduce habitat quality for big game, especially during the winter season.

Introduction

Timber harvesting can increase big game (e.g. elk) vulnerability by changing the size, structure, juxtaposition, and accessibility of areas that provide security during times of hunting pressure (Hillis et al. 1991). As visibility and accessibility increase within forested landscapes, elk and deer have a greater probability of being observed and, subsequently, harvested by hunters. Because the female segments of the elk and deer populations are normally regulated carefully during hunting seasons, primary concerns are related to a substantial reduction of the male segment and resulting decrease in hunter opportunity.

Dense (>30% crown closure), large (≥ 250 acres) forest patches at least ½ mile from an open road that would limit elk (and subsequently deer) visibility and hunter accessibility (Hillis et al. 1991) are considered security cover. It is expected that when elk security is substantially compromised, effects to deer can also be expected (albeit to a lesser degree than for elk).

Winter ranges enable big game survival by minimizing the effects of severe winter weather conditions at a time of year when nutritional limitations are greatest. In western Montana, winter ranges tend to be relatively localized areas below 5,500 feet in elevation that support concentrations of big game, which are otherwise widely distributed during the remainder of the year. Important forest stands that occur on winter ranges in western Montana are those having dense midstory and overstory coniferous canopy cover, which aid in reducing wind velocity, intercept snow, and moderating ambient temperatures. The snow-intercept capacity effectively lowers snow depths, which enables big game movement and access to forage. Snow depths differentially affect big game; deer are most affected, followed by elk, then moose (Jenkins and Wright, 1988).

Analysis Area

Direct and indirect effects were analyzed on the big game habitat in the project area. Cumulative effects were analyzed on a 54,584 acre cumulative effects analysis area generally centered on the project area. This scale of analysis approximates an area capable of supporting an elk herd home range in during the fall.

Analysis Methods

To assess big game habitats on the project area, SLI data were used to identify stands with habitat types and forest structure that could provide thermal and/or hiding cover for big game species. Additionally GIS

maps of big game winter range created by Montana FWP (2008) were analyzed. Direct and indirect effects as well as cumulative effects were analyzed using a combination of field evaluation, aerial photograph interpretation, and a GIS analysis of available habitats.

Given that areas within 0.5 mile of an open road do not provide elk security habitat (*Hillis et al. 1991*), existing open roads were buffered 0.5 mile and identified as areas not meeting elk security habitat criteria. Within the cumulative effects analysis area recent timber harvest activities were taken into account as they likely reduce the amount of secure habitat for elk. Additionally, elk security habitat patches need to be large forested blocks (>250 acres) with adequate cover (>40% crown closure) to afford elk security during the general big game hunting season, so areas failing to meet this criteria were also removed, leaving patches that were distant enough from open roads, were large enough to meet the minimum criteria, and had adequate forest cover density to provide elk security habitat (*Hillis et al. 1991*). Factors considered in the analysis include the amount of security habitat available and level of human access for recreational hunting.

Existing Environment

Within the project area, there are approximately 1,541 acres (94%), 924 acres (56%), and 766 acres (47%) of white-tailed deer, mule deer, and elk winter range, respectively. Additionally, there are approximately 260 acres (16%) of thermal cover within the project area. Elk security habitat (as defined by Hillis et al. 1991) is not present in the project area. Evidence of white-tailed deer and elk use was observed during field visits. Harvest units from the Rollins Chunk timber sale (1999-2003, 1,168 acres) provide more areas of open forest canopy and increased forage while small, dense patches of regenerating conifers are providing hiding cover in these units.

The project area is accessed relatively easily by adjacent landowners bypassing established barriers and creating trails into the parcels. Available access to the parcels is also possible through a sizable network of roads that occur on neighboring industrial forest lands. Open road density is 1.2 miles/sq. mile and total road density is (6.3 miles/square mile) within the proposed project area. Most restricted roads within the project area show evidence of periodic unauthorized motorized use. Moderate amounts of non-motorized human disturbance are also present, primarily during hunting season.

Within the cumulative effects analysis area, widespread timber harvesting, land clearing and road building has reduced big game habitat quality and connectivity. These recent harvests have reduced the quality and quantity of winter range within the area, but may have increased forage quality and abundance by opening up the canopy. Encroachment into recently opened areas by noxious weeds has likely offset much of the potential gain in foraging habitat. Mature forest cover is most prevalent on USDA Forest Service lands in the northwest portion of the cumulative effects analysis area; however these lands are also higher altitude and lack winter range as mapped by Montana Fish, Wildlife, and Parks. Montana Highway 93 runs north-south near Flathead Lake and is a source of direct mortality, disturbance, and break in habitat connectivity. Hunter access across the cumulative effects analysis area is facilitated by an extensive network of open and restricted roads. The highest amount of disturbance levels along roads likely occurs during the fall hunting season.

Environmental Effects

Direct and Indirect Effects of the No-Action Alternative on Big Game Habitat

No changes in big game habitat would be expected as no timber harvesting activities would occur. Existing cover would continue to contribute to winter range quality. Thus, since: 1) no changes to existing thermal cover would be anticipated and continued maturation of forest cover would improve thermal cover and snow intercept, 2) the level of human access would remain unchanged, no direct or indirect effects to big game habitat in the project area would be anticipated.

Direct and Indirect Effects of the Action Alternative on Big Game Habitat

Under the action alternative, approximately 210 acres (80%) of thermal cover could be altered, although selective harvest prescriptions would result in some areas with continued thermal cover characteristics (retention of many large trees). Motorized activities during harvest operations could temporarily displace big game, should they be using the area. Post-harvest, approximately 1.7 miles of currently open DNRC road and 12 miles of currently restricted roads would be closed to motorized use; however, restricted roads would be temporarily opened within the project area. During all phases of the project, any roads opened with project activities would be restricted to the general public and closed after completion of project activities. Overall, winter range quality would decrease due to removal of vegetation currently serving as thermal cover. Effects on big game from thermal cover removal would be most apparent during more severe winters and heavy snowfall. Additionally, longer sight distances and the reduction in hiding cover may increase big game vulnerability risk in the project area. Collectively, since: 1) minor changes in open roads or motorized access for the general public would be anticipated, 2) sizeable amounts of amounts of winter range habitat would be affected (210 acres), 3) small patches of dense conifer regeneration would be protected where possible, 4) elk security habitat would not be affected, and 5) habitat connectivity within the larger winter ranges would not be appreciably altered, minor adverse effects to winter range habitat would be anticipated that would affect big game in the project area.

Cumulative Effects of the No-Action Alternative on Big Game Habitat

No other changes in big game winter range quality, or disturbance and potential mortality due to hunting would be anticipated as no timber harvesting activities would occur under this alternative. Thus, since: 1) no changes in open roads, motorized access, or human access would be anticipated, and 2) no further reductions in hiding/thermal cover would occur, no cumulative effects to big game habitat or hunter opportunity would be anticipated.

Cumulative Effects of the Action Alternative on Big Game Habitat

Thermal cover could be removed from approximately 210 acres of winter range out of the much larger winter ranges within the cumulative effects area (28,504 acres white-tailed deer, 7,674 acres mule deer, 21,680 acres elk). The effect of this potential thermal cover/snow intercept removal would be expected to be somewhat greater as the winter range includes many habitats that are developed and do not provide these important habitat features. This reduction in thermal cover and snow intercept would be additive to past reductions on private, USFS, and DNRC ownerships from forest management. No changes in habitat connectivity with the larger winter range would be expected, although existing connectivity has been compromised by past timber harvesting, road building, and private land development. Harvesting on private lands could continue to displace wintering big game and reduce

available winter range habitats; displacement associated with this alternative could be additive to any displacement associated with ongoing timber harvesting. Maturation of harvested areas will continue to add to big game thermal cover and snow intercept in the future. Continued use of the winter range by big game would be expected. Thus, since 1) relatively short-term (1-3 years) logging activities would create disturbance in a small portion (>1%) of the cumulative effects analysis area, 2) a small percentage (>2%) of the winter range located in the cumulative effects analysis area would be altered, and 3) elk security habitat would not be affected, minor cumulative effects to big game habitat would be anticipated.

Wildlife Mitigations associated with the Action Alternative

- A DNRC biologist will be consulted if a threatened or endangered species is encountered to determine if additional mitigations that are consistent with the administrative rules for managing threatened and endangered species (*ARM 36.11.428* through *36.11.435*) are needed.

- Public access would be restricted at all times on restricted roads that are opened for harvesting activities; signs will be used during active periods and a physical closure (gate, barriers, equipment, etc.) will be used during inactive periods (nights, weekends, etc.).

- Roads and skid trails that are opened with the proposed activities will be reclosed to reduce the potential for unauthorized motor vehicle use.

- Prohibit contractors and purchasers conducting contract operations from carrying firearms while operating on restricted roads (ARM 36.11.432(1)(m)).

- Require DNRC employees and contractors to store any unnatural bear foods or attractants in a bear-resistant manner (contract clause requirement).

- Use a combination of topography, group retention, and roadside vegetation to reduce views into harvest units along open roads where feasible.

- Manage for snags, snag recruits, and coarse woody debris, particularly favoring western larch and Douglas-fir (ARM 36.11.439(1) (b)). Clumps of existing snags could be maintained where they exist to offset areas without sufficient snags.

- A red-tailed hawk nest with young-of-the-year was located during a field visit to the project area in 2011. This nest is protected under the Migratory Bird Treaty Act. This species typically lays eggs in April, with incubation lasting about a month. Young typically fledge in June or July when 6 to 7 weeks old, but still remain associated with the nest in late July. The recommended mitigations include:

    - Prohibit harvest operations within 1/2 mile of active nests between April 1 and August 15.

    - Retain nest tree.

    - Retain several perch trees within 100 yards of the nest tree for use by roosting adults and

fledglings.

- Manage for patches of advanced regeneration and dense understory where possible.

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Attachment III - Prescription
Rollins Area Sanitation Harvest

Sanitation Harvest

Sale Name: Area will have multiple sales/permits **Unit Number(s):**

Location: S 8 T25N R20W **Acres:** 222 **Vol Est:** 500 MBF;

S 16 T25N R20W **Acres:** 255 **Vol Est:** 200 MBF;

S 18 T25N R20W **Acres:** 153 **Vol Est:** 150 MBF;

S 20 T25N R20W **Acres:** 160 **Vol Est:** 175 MBF;

S 30 T25N R20W & S 36 T25N R21W **Acres:** 330 **Vol Est:** 200 MBF

Elevation: 3,100 to 4,000 feet **Slope**: 15% to 45% **Aspect:** northeast to southeast

Habitat type: PSME/PHMA; ABGR/CLUN; PSME/SYAL

Timber productivity is considered moderate.

Current Cover Type: WL/DF **Appropriate Cover Type:** WL/DF

Soils:

Water: Forrey Creek and Birch Creek

Treatment Objectives: Commercial Thin/Improvement Cut

1. Sanitize stand by removing Douglas-fir and western larch infected with dwarf mistletoe.
2. Commercially thin to an approximate 20 foot stem spacing between leave trees.
3. Protect soil and site productivity by: minimizing soil displacement, compaction, and erosion during logging; and retaining logging slash on site for woody debris recruitment and nutrient cycling of foliage and fine fuels.

Prescribed Treatment: Sanitize stand by removing dwarf mistletoe infected trees. Commercially thin trees to improve overall health and vigor of stand.

Harvest Method: Remove trees infected with dwarf mistletoe. Other trees infected with stem rots, root disease, or insects may be removed with approval of the forest officer.

Hazard Reduction & Site Preparation: The *purchaser will be required* to treat slash resulting from logging, and felling non-merchantable material, that is damaged by logging. Slash treatment must meet requirements of fire hazard reduction law and in this case includes “high standard” along private property boundaries and open roads. Slash treatment will include piling landings and decking areas, lopping and scattering or trampling non-merchantable material in skid trails or temporary roads, whole tree skidding, and spot piling heavy concentrations. State shall burn piles resulting from Purchaser’s hazard reduction and site preparation work.

Regeneration: Not an objective for this entry.

Attachment IV - Mitigations

Mitigation Measures for Action Alternative

The following mitigations would be required under the action alternative:

Vegetation

- Grass seed new and disturbed roads and landings; spot spray new weed infestations
- Washing logging equipment prior to use.
- Trample slash in skid trails
- Treating existing weed populations along or within roads with herbicide spray.

Water Resources and Soils

- Upgrade roads to incorporate Forestry Best Management Practices (BMPs)
- Limit timber harvest activities to time when ground is frozen or soil moisture is below 20%
- Apply all applicable Forestry Best Management Practices (including Streamside Management Zone Law and Rules).

Wildlife

- A DNRC biologist will be consulted if a threatened or endangered species is encountered to determine if additional mitigations that are consistent with the administrative rules for managing threatened and endangered species (ARM 36.11.428 through 36.11.435) are needed.
- Public access would be restricted at all times on restricted roads that are opened for harvesting activities; signs will be used during active periods and a physical closure (gate, barriers, equipment, etc.) will be used during inactive periods (nights, weekends, etc.).
- Prohibit contractors and purchasers conducting contract operations from carrying firearms while operating on restricted roads (ARM 36.11.432(1)(m)).
- Require DNRC employees and contractors to store any unnatural bear foods or attractants in a bear-resistant manner (contract clause requirement).
- Maintain a minimum of 2 snags and 2 snag recruitment trees over 21 inches dbh per acre, on average, for all harvest units. If unavailable, retain the next largest size class. Additional snag resources could be retained within the harvest units.
- Retain 10-15 tons CWD post harvest.
- If a wolf den or rendezvous site were identified, operations would be suspended within 1 mile or 0.5 mile, respectively.
- A red-tailed hawk nest with young-of-the-year was located during a field visit to the project area in 2011. This nest is protected under the Migratory Bird Treaty Act. This species typically lays eggs in April, with incubation lasting about a month. Young typically fledge in June or July when 6 to 7 weeks old, but still remain associated with the nest in late July. The recommended mitigations include:
  - Prohibit harvest operations within 1/2 mile of active nests between April 1 and August 15.
  - Retain nest tree.
  - Retain several perch trees within 100 yards of the nest tree for use by roosting adults and fledglings.

Attachment V - Preparers and Consultants

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