Fourmile Timber Sale

Environmental Assessment

March 13, 2012
Montana Department of Natural Resources and Conservation
Southwestern Land Office
Missoula Unit

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FOURMILE TIMBER SALE

An interdisciplinary team (ID Team) has completed the Environmental Assessment (EA) for the Fourmile Timber Sale prepared by the Montana Department of Natural Resources and Conservation (DNRC). After review of the EA, project file, public correspondence, Department Administrative Rules, policies, the State Forest Land Management Plan (SFLMP), and the MTDNRC Habitat Conservation Plan (HCP), I have made the following decisions:

1. ALTERNATIVE SELECTED

Two alternatives were presented and the effects of each alternative were fully analyzed in the EA:

1. The No Action Alternative (Alternative A)
2. The Action Alternative (Alternative B)

The Action Alternative proposes to harvest approximately 4.5 million board feet (MMBF) of timber on 585 acres. The No Action Alternative does not include the harvest of any timber. Subsequent review determined that the alternatives, as presented, constituted a reasonable range of potential activities.

For the following reasons, I have selected the Action Alternative without additional modifications:

a) The Action Alternative meets the Project Need and the specific Objectives of the Proposed Action (Desired Outcomes and Conditions) as described on page 3 of the EA. The Action Alternative would produce an estimated $585,000 ($130/MBF) return to the State of which $263,250 would benefit the Common School (CS) Trust and $321,750 would benefit the State Normal School (SNS) Trust. In addition, implementation of the Action Alternative would provide a mechanism whereby the existing timber stands would be moved towards conditions more like those which existed historically.

b) The analysis of identified issues did not disclose any reason compelling the DNRC to not implement the timber sale.

c) The Action Alternative includes mitigation activities to address environmental concerns identified during both the Public Scoping phase and the project analysis.

2. SIGNIFICANCE OF IMPACTS

For the following reasons, I find that implementing the Action Alternative will not have significant impacts on the human environment:

a) **Water Quality –** There would be a low risk of direct or indirect impacts to water quality or downslope beneficial uses within the watershed. Implementation of the proposed action would be expected to have low risk of direct and in-direct impacts to water quality from sedimentation based on the absence of stream connectivity to other waters, including the Clark Fork River, and implementing BMP's, and Forest Management Rules.

b) **Cumulative Watershed Effects –** Estimated increases in annual water yield for the proposed action have been determined to be negligible by the DNRC Hydrologist. Increases in sediment yield are expected to be negligible due to the lack of streams within the project parcels that have downslope connectivity to the Clark Fork River, the amount of area treated, location along the landscape, and inclusion of mitigations designed to minimize erosion.

c) **Noxious Weeds –** Equipment will be cleaned prior to entering the project area, which will reduce the likelihood of weed seeds being introduced onto treated areas. The DNRC will spray weeds, monitor the project area for two years after harvest and will use an Integrated Weed Management strategy to control weed infestations should they occur.

d) **Forest Conditions and Forest Health –** Implementation of the Action Alternative would move stand conditions towards those which were more common historically. Silvicultural systems would emulate appropriate natural disturbance regimes (primarily mixed severity and stand replacing fire) as required by ARM 36.11.408. Disturbances of this nature would likely result in more open stands dominated by large ponderosa pine and western larch. Implementation of Alternative B will bring approximately 130 acres of previously untreated stands into active management. Prescriptions will convert approximately 100 acres of the project area to the appropriate cover type, promote recruitment of seral species and balance the age class distribution toward younger age classes.

e) **Aesthetics-** Noise from logging equipment and log hauling and the appearance of fresh slash, stumps and skid trails will temporarily reduce the aesthetic quality of harvest units for 2-4 years. These impacts would

decline as vegetation reestablishes and slash decomposes. Post-harvest, the project area would likely appear very similar to management patterns on adjacent lands. Retention of open stands of large western larch and Ponderosa pine could potentially improve the aesthetics where a dense Douglas-fir and lodgepole pine understory currently limits visibility to a few feet.

f) **Economics and Project Revenue-**Approximately $263,250 in net revenue (est. at $130/MBF) would be generated in support of the Common School Trust and $321,750 in net revenue would be generated in support of the State Normal School Trust from the sale of approximately 4.5 million board feet (4.5 MMBF) of sawtimber. The amount of Forest Improvement (FI) revenue generated by the project is estimated at $103,421. FI expenditures associated with this project may include weed spraying, tree planting and pre-commercial thinning.

g) **Dust and Truck Traffic-**Operation of commercial trucks for transporting equipment and logs could create a temporary traffic hazard as a result of the implementation of Alternative B. Posted truck speed limits, dust abatement and warning signs should reduce the potential hazard. Portions of the haul route are administered by the Lolo National Forest to provided disabled hunter access behind locked gates. Motorized vehicle use will be restricted on these roads during periods of active logging to address traffic and firearm safety issues.

h) **Forested Habitat Connectivity and Wildlife Movement-**Proposed harvesting will reduce the amount of forested habitats that may be serving as corridors or suitable habitats within larger linkage zones, however, the proposed planting and pre-commercial thinning should improve the future quality of those areas. Across the cumulative effects analysis area, a variety of stands provide for wildlife movements. The proposed activities would not appreciably alter the ability of the linkage zone to meet habitat needs for those wildlife species that need linkage zones. Negligible reductions in visual screening in a small portion of the cumulative effects analysis area will occur. Thus, a minor risk of adverse cumulative effects to forested habitat connectivity and wildlife movements would be expected.

i) **Grizzly Bears-**Implementation of Alternative B is expected to result in a minor risk of adverse cumulative effects to grizzly bears since:

1. Minor increases in human disturbance levels in the short-term are limited to a small portion of the cumulative effects analysis area, this would largely occur during the denning period.

2. Hiding cover will be removed in the short-term on a small portion of the cumulative effects analysis area; however, this is expected to recover fairly rapidly.

3. No changes in long-term open road density will occur.

4. No changes to security habitats are expected.

j) **Canada Lynx-**Approximately 397 acres of lynx habitats (48% of lynx habitats in the project area) will be altered through the implementation of the Action Alternative. Roughly 343 acres of winter foraging habitats and 22 acres of summer foraging habitats will be removed by the proposed treatments. These habitats will be converted to other suitable lynx habitats (230 acre increase) and temporary non-suitable habitats (135 acre increase). Within the cumulative-effects analysis area, lynx habitats will continue to persist. Reductions in winter foraging (12.6%) and summer foraging (0.8%) coupled with the increases in other suitable (8.4%) and temporary non-suitable (5.0%) habitats on the portions of the cumulative effects analysis area managed by DNRC could slightly decrease the quality of the lynx habitats in the cumulative effects analysis area. Thus, a minor risk of adverse direct, indirect and cumulative effects to Canada lynx is expected since:

    1. Adequate winter foraging habitats would persist.

    2. Summer foraging habitats should continue developing for the next 10 to 30 years.

    3. Moderate amounts of lynx habitats will be in the temporary non-lynx habitat category, meaning most of the lynx habitats will be in a usable state for lynx.

    4. Negligible alterations in landscape connectivity will not prevent lynx movements.

k) **Bald Eagle-**Implementation of Alternative B is expected to result in a negligible risk of direct, indirect and cumulative effects to bald eagles since:

a) Disturbance will be slightly elevated within the home range during operations.

b) No change in human access within the project area will occur.

c) No changes in the availability of large, emergent trees are expected.

l) **Fisher-**No riparian habitats would be altered with the implementation of Alternative B. Approximately 459 of the 1,024 acres (44.8%) of upland fisher habitats in the project area will receive treatments; roughly 245 acres will receive an overstory removal with reserves treatment and an additional 150 acres will receive a shelterwood treatment, both of which will result in stands that are too open for appreciable fisher use following proposed treatments. Additionally, roughly 76 acres will be pre-commercially thinned and another 53 acres will be planted, which should improve future habitat quality for fisher. Therefore, a minor risk of adverse direct and indirect effects to fisher is anticipated since:

1. Harvesting will avoid riparian areas.

2. Harvesting will reduce or remove upland fisher habitats.

3. Negligible reductions in landscape connectivity will occur; however, those areas associated with riparian areas will remain unaffected.

4. Harvesting will reduce snags and snag-recruitment trees while increasing coarse woody debris levels; however, some of these resources will be retained.

5. No appreciable changes in motorized human-access levels are anticipated.

In addition, a minor risk of adverse cumulative effects to fisher is anticipated since:

1. Harvesting will remove upland fisher habitats, but considerable upland habitats will persist.

2. No appreciable changes in landscape connectivity are anticipated, connectivity in riparian areas will not be altered.

3. Harvesting in a relatively small portion of the cumulative-effects analysis area will partially reduce snags and snag recruits, while increasing the coarse woody debris levels, largely in the smaller-sized pieces.

4. No appreciable changes to motorized human access are anticipated.

m) **Flammulated Owls-**The more open stand conditions, the retention of fire adapted tree species, and the maintenance of snags resulting from implementation of Alternative B should move the proposed project area toward historical conditions, which are preferred flammulated owl habitat. Thus, minor positive direct and indirect effects for flammulated owls are expected since:

1. Harvesting would open denser stands up.

2. Elements of forest structure used for foraging and nesting by flammulated owl would be retained.

3. Prescriptions would lead to more open stands with scattered mature ponderosa pine.

4. Proposed thinning and planting would promote future development of ponderosa pine within the units.

n) **Big Game-** The proposed harvest operations present a minimal likelihood of negative impacts to Big Game Species. Those potential impacts that do exist have been mitigated to levels within acceptable thresholds.

3. PRECEDENT SETTING AND CUMULATIVE IMPACTS

The project area is located on State- owned lands, which are "principally valuable for the timber that is on them or for growing timber or for watershed" (**MCA 77-1-402**). The proposed action is similar to past projects that have occurred in the area. Since the EA does not identify future actions that are new or unusual, the proposed timber harvest is not setting precedence for a future action with significant impacts.

Taken individually and cumulatively, the identified impacts of the proposed timber sale are within established threshold limits. Proposed

timber sale activities are common practices and none of the project activities are being conducted on fragile or unique sites.

The proposed timber sale conforms to the management philosophy adopted by DNRC and is in compliance with existing laws, policies, guidelines, and standards applicable to this type of action.

4. SHOULD DNRC PREPARE AN ENVIRONMENTAL IMPACT STATEMENT (EIS)?

Based on the following, I find that an EIS does not need to be prepared:

1. The EA adequately addressed the issues identified during project development, and displayed the information needed to make the pertinent decisions.

2. Evaluation of the potential impacts of the proposed timber sale indicates that significant impacts to the human environment will not occur as a result of the implementation of The Action Alternative.

3. The ID Team provided opportunities for public review and comment during project development and analysis.

_/s/ Jonathan Hansen_____
Jonathan Hansen
Missoula Unit Manager-Decision Maker
DATE May 17, 2012

1.0 Purpose and Need

1.1 Introduction

The Montana Department of Natural Resources and Conservation (DNRC) is proposing to harvest timber and perform forest improvement on school trust lands approximately 3.5 miles southeast of St. Regis, Montana. The proposed project area is composed of approximately 1,176 acres of Common School(CS) Trust land in Sections 5, 9 and 10 T17N R27W, 456 acres of State Normal School Trust(SNS) land in Section 32, T18N R27W and 960 acres of State Normal School Trust Land in Sections 4 and 10, T17N R27W (figure 1.1 Project Vicinity).

Under the proposed action, the DNRC would harvest approximately 4.5 million board feet (MMBF) of sawlogs from 585 acres (figure 2.1 Proposed Harvest Units). 76 acres would be precommercially thinned and reforestation planting would occur on 52 acres (figure 2.2 Proposed Forest Improvement). Approximately 0.4 miles of new road would be constructed. Herbicide would be applied to control noxious weeds on roads, skid trails and landings.

The proposed action could be implemented as early as June, 2012 and could continue until September, 2016. The school trust lands involved in the proposed project are within the administrative boundaries of the DNRC Missoula Unit, located in Missoula, MT.

1.2 Project Need

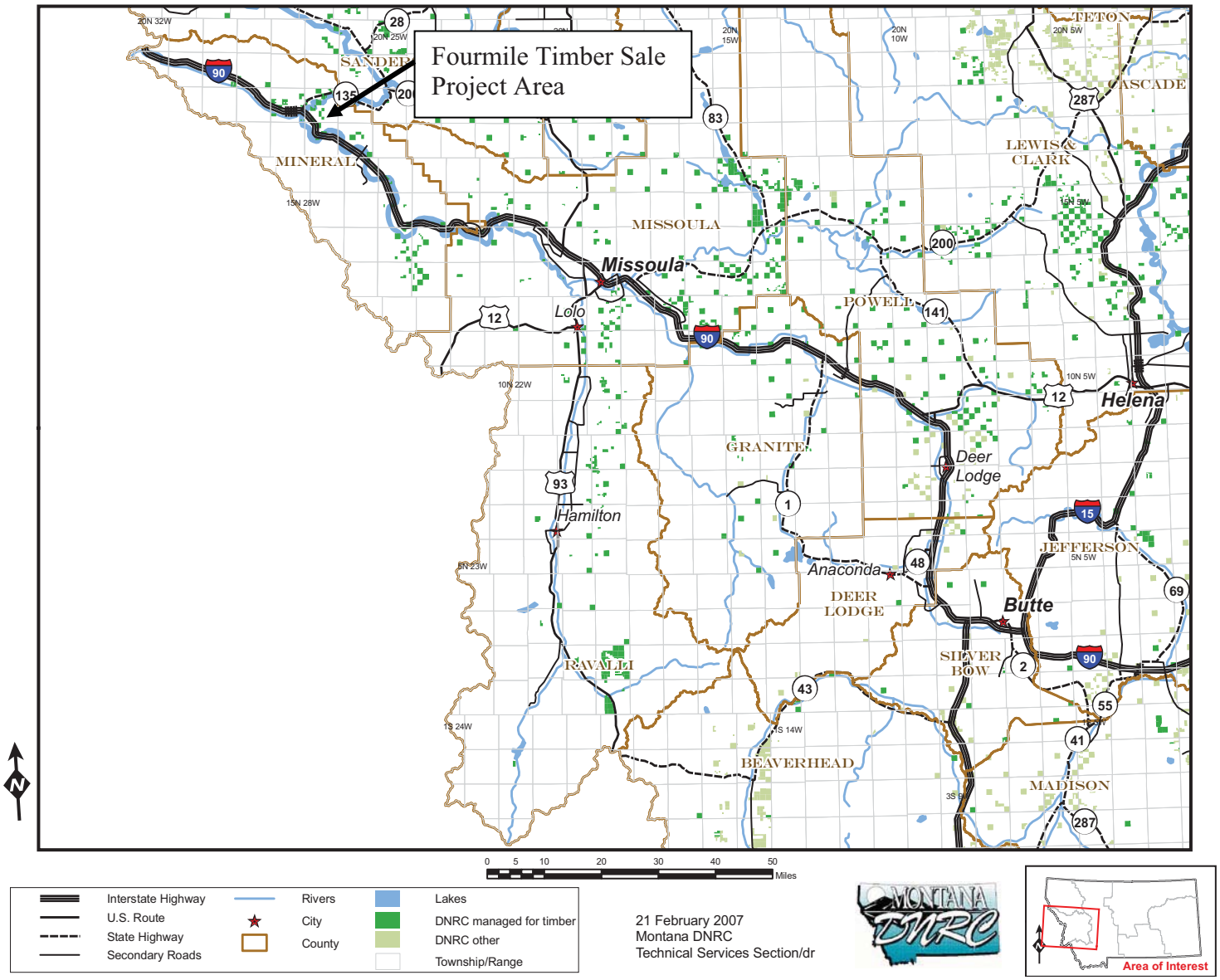
The lands involved in the proposed project are held in trust by the State of Montana for the support of specific beneficiary institutions. These include public schools, state colleges and universities, and other specific state institutions such as the School for the Deaf and Blind (Enabling Act, February 22, 1889; 1972 Montana Constitution, Article X, Section 11). The Board of Land Commissioners(Land Board) and the DNRC are required by law to administer these Trust Lands to produce the largest measure of reasonable and legitimate long term advantage for the beneficiary institutions (Section 77-1-202, MCA). All forested lands involved in the proposed project would be managed in accordance with DNRC's State Forest Land Management Plan (SFLMP), the Montana DNRC Forested State Trust Land Habitat Conservation Plan (HCP), Administrative Rules for Forest Management (ARMs: ARM 36.11.401 – 456) and other applicable state and federal law.

Many of the stands identified for treatment have never been thinned and are overstocked, resulting in poor growth and tree vigor. Lodgepole pine stands are experiencing significant mortality due to mountain pine beetle and sequoia pitch moth infestations.

On May 30, 1996, the DNRC released the Record of Decision on the State Forest Land Management Plan (SFLMP). The Land Board approved the implementation of the SFLMP on June 17, 1996. The DNRC will manage the lands involved in this project according the philosophy outlined in the SFLMP, which states:

> "Our premise is that the best way to produce long-term income for the trust is to manage intensively for healthy and biologically 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 (DNRC, SFLMP Record of Decision 1996 [ROD-1])."

Figure 1.1 Project Vicinity



1.3 Objectives of the Proposed Action (Desired Outcomes and Conditions)

In order to fulfill the management philosophy adopted through the SFLMP and the ARM's for Forest Management, the DNRC has set the following specific project objectives:

- Harvest sufficient timber volume to generate revenue for the CS and SNS Trust grants.
- Promote recruitment of seral timber species in project area stands.
- Maintain stand productivity by reducing competition in overstocked stands.
- Reduce the incidence of lodgepole pine mortality and associated hazardous fuel loading.

1.4 Decisions to be made

The following analysis will be performed by the Decision Maker and incorporated into the Finding at the beginning of this document:

- Determine if alternatives meet the project objectives.
- Determine which alternative should be selected.
- Determine if the selected alternative would cause significant effects to the human environment, requiring the preparation of an Environmental Impact Statement (EIS).
- Determine the economic and logistical feasibility of the project.

1.5 Relationship to the State Forest Land Management Plan, Administrative Rules for Forest Management and Montana DNRC Forested State Trust Lands HCP

The management direction provided in the SFLMP comprises the framework for the project planning and forest management activities. DNRC's Administrative Rules for Forest Management (ARM's) are the specific legal resource management standards and measures under which DNRC implements the SFLMP and subsequently its forest management program.

In December 2011, the Land Board approved the Record of Decision (ROD) for the Montana Forested State Trust Lands HCP. Approval of the ROD was followed by the issuance of an Incidental Take Permit (Permit) by the U.S. Fish and Wildlife Service (USFWS). The HCP is a required component of an application for a Permit which may be issued by the U.S. Fish and Wildlife Service or National Marine Fisheries Service to state agencies or private citizens in situations where otherwise lawful activities might result in the incidental take of federally-listed species. The HCP is the plan under which DNRC intends to conduct forest management activities on select forested state trust lands while implementing specific mitigation requirements for managing the habitats of grizzly bear, Canada lynx, and three fish species: bull trout, westslope

cutthroat trout, and Columbia redband trout on project area lands covered under the HCP where these species may be affected.

The proposed action is limited to specific management activities that are needed to implement the project and provide resource protection. This Environmental Assessment (EA) documents site-specific analysis and is not a general management plan or programmatic analysis of the area. The scope of this EA was determined through DNRC interdisciplinary analysis and public involvement.

1.6 History of the Planning and Scoping Process

The public scoping process, which begins during the initial stage of an EA, is used to inform the public that a state agency is proposing an action. The public has the opportunity to express their comments or concerns about the possible effects of the project.

Public scoping was initiated in February, 2009 with notices published in the *The Mineral Independent*. Notices were also mailed to adjacent landowners and to individuals, organizations and agencies that have expressed interest in DNRC activities. The comment period was open for 6 months. Three written comments were received in response to public scoping. Issues identified through the scoping process are included in section *1.9 Issues and Concerns* of this EA.

1.7 Other Environmental Assessments (EA's) Related to this Project

Several other projects are either recently completed, in progress or are in development in proximity to the proposed Fourmile Timber Sale. Table 1.1 displays the name of the proposed activity, the year when the activity would be initiated or became active and the type of activity proposed.

Table 1.1: OTHER DNRC ACTIVITIES				
Project Name	**Approximate Air Miles from Fourmile Project Area**	**Year of Proposed Activity**	**Status**	**Description of Activity**
Fourmile Thinning	.5	2005	Completed	Precommercial Thinning, Timber Harvest
Timber Creek Timber Sale	17	2007	Completed	Timber Harvest
Roman Thinning II	55	2009	In Progress	Precommercial Thinning
Tarkio Timber Sale	27	2011	In Progress	Timber Harvest
West Fork Timber Creek Timber Sale	17	2012	Proposed	Timber Harvest
Rivulet Peak Timber Sale	24	2013	Proposed	Timber Harvest
Henderson Hill Timber Sale	17	2013	Proposed	Timber Harvest

1.8 Other Agencies with Jurisdiction/Permit Requirements

DNRC is classified as a major open burner by the Montana Department of Environmental Quality (DEQ), and is issued a permit from the DEQ to conduct burning activities on State lands managed by the DNRC. As a major open burning permit holder, DNRC agrees to comply with all of the limitations and conditions of the permit.

DNRC is a member of the Montana/Idaho Airshed Group, which regulates prescribed burning, including both slash and broadcast burning, related to forest management activities done by DNRC. As a member of the Airshed Group, DNRC agrees to burn only on days approved for good smoke dispersion as determined by the Smoke Management Unit in Missoula, MT.

Incidental Take Permit - In December 2011, the USFWS issued an Incidental Take Permit under Section 10 of the Endangered Species Act. The Permit applies to select forest management activities affecting the habitat of grizzly bear, Canada lynx, and three fish species — bull trout, westslope cutthroat trout, and Columbia redband trout - — on project area lands covered under the HCP where these species may be affected.

1.9 Issues Studied in Detail

1.9.1 Soil Resources

There is a concern that the proposed management activities could adversely affect soil resources through displacement or compaction.

1.9.2 Water Quality

There is a concern that the proposed action may cause impacts to water quality and quantity and result in cumulative watershed effects.

1.9.3 Noxious Weeds

Noxious weeds negatively influence surface cover, erosion and native species. Disturbance events such as timber harvest activities could result in the invasion and spread of noxious weeds within the proposed project area.

1.9.4 Economic Benefits and Project Revenue

Concern has been raised that the proposed project may not be economically viable.

1.9.5 Dust and Truck Traffic

Heavy truck traffic associated with the project may cause a potential traffic hazard on public roads. Dust created by trucks may become a nuisance to adjacent residents during periods of dry weather.

1.9.6 Aesthetics

Timber harvesting and road construction associated with the proposed action could adversely affect the aesthetic value of this area. Roads, skid trails and canopy openings may appear unnatural. Untreated logging slash, damaged trees, stumps and uniform tree spacing may detract from the natural appearance associated with unmanaged forests.

1.9.7 Wildlife

Forested Habitat Connectivity and Wildlife Movement

There is concern that the proposed activities could alter forested connectivity, wildlife corridors and or habitats within linkage zones, which could affect wildlife movements across the landscape.

Grizzly Bears

There is concern that the proposed activities could alter cover, increase access, and reduce secure areas, which could affect grizzly bears by displacing them from important habitats and/or increasing risk to bears of human-caused mortality.

Canada Lynx

There is concern that the proposed activities could negatively affect Canada lynx by altering lynx summer foraging habitat, winter foraging habitat, and other suitable habitat, rendering it unsuitable for supporting lynx.

Bald Eagles

There is concern that the proposed activities could negatively affect bald eagles by reducing nesting and perching structures and/or disturbing nesting bald eagles.

Fishers

There is concern that the proposed activities could reduce the amount and/or quality of fisher habitat, which could alter fisher use of the area.

Flammulated Owls

There is concern that the proposed activities may alter flammulated owl habitat by reducing canopy closure and increasing tree spacing, and could remove snags needed by flammulated owls for nesting.

Pileated Woodpeckers

There is concern that the proposed activities could reduce suitable nesting and foraging habitat for pileated woodpeckers, which could alter pileated woodpecker use of the area.

Big Game

There is concern that the proposed activities could remove forest cover on big game winter range, which could reduce the carrying capacity of the winter range.

1.10 Issues Eliminated from Further Study

1.10.1 Old Growth

No Old Growth stands were identified in the Project Area. As a result, Old Growth was eliminated from further analysis.

1.10.2 Wildlife

The following species were considered but eliminated from detailed study due to lack of habitat present: Black-backed woodpecker, Coeur d'Alene Salamander, Columbian Sharp-tailed Grouse, Common Loon, Gray Wolf, Harlequin Duck, Mountain Plover, Northern Bog Lemming, Peregrine Falcon, and Townsend's Big-eared Bat. Thus there would be a low risk of adverse direct, indirect, or cumulative effects as a result of either alternative.

1.10.3 Fisheries

There are no streams or surface waters supporting fish in or adjacent to the proposed harvest areas, or on the access route. The haul route would use existing roads and there are no stream crossings proposed that would affect sedimentation. As a result, this issue is eliminated from further analysis.

1.10.4 Water Yield

The project area has a low average precipitation of 18-22 inches/year, mainly as snow and runoff is unlikely. There are no streams or surface waters within the proposed harvest units of sections 32, 4, 9 and the proposed shelterwood, overstory removals and

thinning would maintain at least 40-60% of current tree cover on the project is unlikely to increase runoff or water yield measurably. As a result, there is very low risk for direct, indirect or cumulative effects to water yield from the proposed harvest and this issue is eliminated from further analysis.

2.0 Alternatives Including the Proposed Action

2.1 Introduction

Chapter 2 describes the alternatives developed and considered in this EA. Summaries and comparisons are included for the activities associated with each alternative. The potential environmental consequences of these activities are included for comparison. Information regarding alternatives is presented in greater detail in chapters 3 and 4.

2.2 Development of Alternatives

Public scoping was initiated in February, 2009. Written responses were received from Montana Fish Wildlife and Parks (FW), Defenders of Wildlife and F.H. Stoltze Land & Lumber Company. In June of 2011, a DNRC Interdisciplinary Team (IDT) began project area analysis and internal review to develop a management plan. Public comment and IDT input were used to identify issues and develop alternatives to address those issues. Issues identified during the scoping process are summarized in Chapter 1: Purpose and Need.

2.3 Description of Alternatives

2.3.1 Alternative A: Deferred Harvest (No Action)

Activities associated with Alternative B: Harvest would not occur in the project area at this time. No revenue would be generated for the Common School and State Normal School Trusts from the specific lands in the project area and proposed forest improvement would not occur at this time. DNRC approved activities would continue in the project area.

2.3.2 Alternative B: Harvest

Alternative B: Harvest was developed to address relevant issues, comply with applicable regulations and laws, provide effective mitigation for potential impacts and achieve project objectives. The proposed harvest would include removal of approximately 4.5 million board feet (MMBF) of primarily Douglas-fir and lodgepole pine sawlogs from 585 acres through a combination of commercial thinning, shelterwood and overstory removal prescriptions (figure 2.1). Healthy mature ponderosa pine, western larch and Douglas-fir would be retained on a variable spacing depending on prescription. A minimum of two snags and two snag recruits per acre or one snag and one snag recruit per acre would be retained on site depending on habitat type group as required by the Montana Administrative Rules for Forest Management (ARM 36.11.411).

Slash would be piled and burned or lopped and scattered. Some slash would be retained to facilitate nutrient cycling and provide coarse woody debris (ARM 36.11.409 and 36.11.414).

The proposed action would include Forest Improvement activities to improve or maintain resource values in the project area (figure 2.2). These activities would include thinning overstocked stands of sub-merchantable lodgepole pine and Douglas-fir to reduce competition and hazardous fuels, planting of nursery seedlings in previously treated stands and herbicide treatment of noxious weeds.

Stands were identified for treatment based on field reconnaissance by project IDT. Tree health, vigor, stocking level and quality of potential leave trees for residual stands drove prioritization for treatment. Harvest prescriptions and treatments are identified in Table 2.1.

Figure 2.1 Proposed Harvest Units

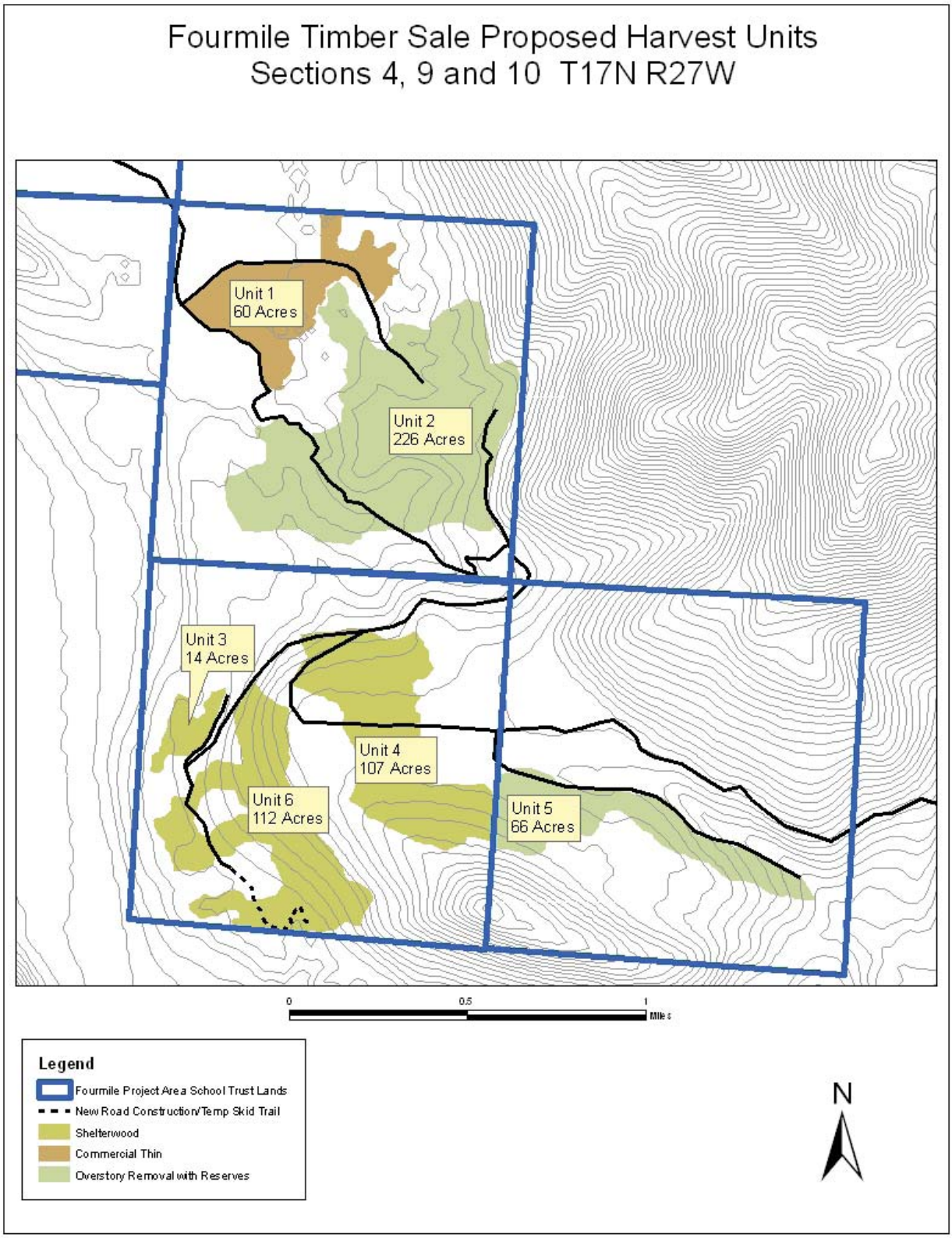


Figure 2.2 Proposed Forest Improvement

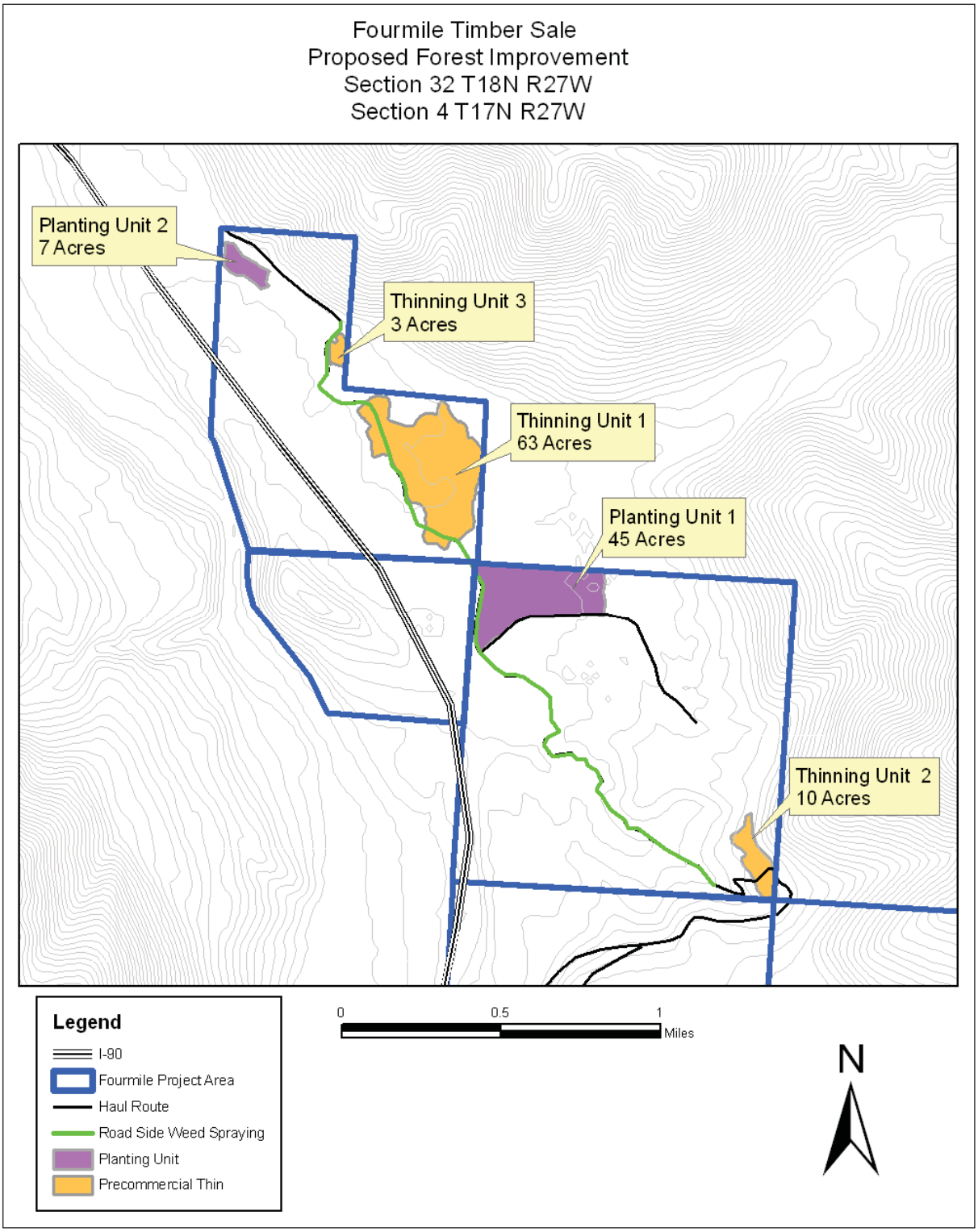


Table 2.1 Summary of Proposed Silvicultural Treatments			
Prescription	**Description**	**Proposed Units**	**Acres**
Overstory Removal (OR) with Reserves	The understory in previously thinned stands is heavily stocked with Douglas-fir. An OR prescription in these stands would remove approximately 60% of mature sawtimber prior to understory thinning treatments to reduce competition. Mature western larch and ponderosa pine would be retained to provide a seed source for future regeneration treatments.	Harvest Units 2 and 5	292
Shelterwood (SW)	SW treatments applied to previously unharvested even-aged stands dominated by Douglas-fir would reduce competition, improve stand productivity and encourage regeneration of seral species. 40-50% of mature sawtimber would be removed and ponderosa pine and western larch would be favored for retention.	Harvest Units 3,4 and 6	233
Commercial Thin (CT)	Overstocked stands of lodgepole pine would be thinned to reduce mortality and promote seral species. These stands are generally in poor condition, suffering from western pine beetle and Sequoia pitch moth infestation. 95% of mature and understory ponderosa pine and western larch would be retained.	Harvest Unit 1	60
Pre-Commercial Thin (PCT)	Thinning overstocked stands of sub-merchantable lodgepole pine and Douglas-fir would reduce competition, fire hazard and favor seral species.	Thinning units 1,2 and 3	76
Planting	Ponderosa pine and western larch nursery stock would be planted in previously harvested areas and landings where natural regeneration has been unsuccessful.	Planting Units 1,2 and road side landings	52

2.4 Mitigation Measures of Alternative B: Harvest

Mitigations would be incorporated into project design, as a contract stipulation or may be implemented programmatically. The following discussion will address mitigation actions associated with the project.

2.4.1 Water Quality, Soils and Cumulative Watershed Effects Mitigations

- Logging and hauling operations would be limited to periods when soils are relatively dry, (less than 20%), frozen or snow covered to minimize soil compaction and rutting and to maintain drainage features.

- Dispersed skidding would be avoided unless on snow or frozen ground.

- Skid trails would be limited to 15% or less of the harvest unit area and existing skid trails would be used where available.

- Ground based skidding would be limited to slopes less than 40% on the short steep slopes in the east ½ of section 4 and parts of section 9. Harvesters may be allowed to work on slopes up to 45% as long as turning is minimized to prevent excessive disturbance and displacement.

- Scarification to promote natural regeneration would be limited to 30-40% of harvest units.

- Tractor piling would be prohibited on wet sites or slopes over 35%.

- 10-15 tons of fine litter and large woody debris per acre would be retained for nutrient cycling.

- Road drainage would be maintained through maintenance blading, spot gravel surfacing or turnpiking to comply with BMP's.

- Water bars, slash filters or other erosion control features would be constructed on trails and roads where needed.

2.4.2 Noxious Weed Mitigations

- All road construction and harvest equipment would be cleaned of plant parts, mud and weed seed prior to arrival on site to prevent the introduction of noxious weeds.

- Equipment would be subject to inspection by the sale administrator prior to arriving on site.

- Newly disturbed road cuts, fills and disturbed soils would be grass seeded immediately after harvest or construction.

- Weed spraying may be required as a contract stipulation.

- Monitoring of the project area would continue to determine the need for future weed control treatments.

2.4.3 Aesthetics Mitigations

- Snags, snag recruits and crop trees would be retained in harvest units.
- Harvest units would be designed to mimic patterns of natural disturbance on the landscape.

2.4.4 Truck Traffic and Dust Mitigations

- Trucks would be required to obey posted speed limits on all public roads.
- As a contract stipulation, dust control may be required on unpaved roads near residences.
- Motorized recreation may be restricted on haul roads during periods of active logging.

2.4.5 Wildlife Mitigations

- A DNRC biologist would 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.
- Motorized public access would be restricted at all times on restricted roads that are opened for harvesting activities; signs would be used during active periods and a physical closure (gate, barriers, equipment, etc.) would be used during inactive periods (nights, weekends, etc.). These roads and skid trails would be reclosed to reduce the potential for unauthorized motor vehicle use.
- Snags, snag recruits, and coarse woody debris would be managed according to *ARM 36.11.411* through *36.11.414*, particularly favoring western larch and ponderosa pine. Clumps of existing snags could be maintained where they exist to offset areas without sufficient snags. Coarse woody debris retention would emphasize retention of downed logs of 15-inch diameter or larger.
- Contractors and purchasers conducting contract operations would be prohibited from carrying firearms while on duty.
- Food, garbage, and other attractants would be stored in a bear-resistant manner.
- Small shade-tolerant trees, such as grand-fir, would be retained in the pre-commercial thinning unit 2 to facilitate the development of multi-storied stands.
- Retention of patches of advanced regeneration of shade-tolerant trees, such as grand-fir, in units 2, 3, and 6 would break-up site distances, provide horizontal cover, and provide forest structural attributes preferred by snowshoe hares and lynx.

- Provide connectivity for fisher, Canada lynx, grizzly bears, and a host of other species by maintaining corridors of unharvested and/or lighter harvested areas along riparian areas, ridge tops, and saddles.

2.5 Description of Relevant Past, Present and Reasonably Foreseeable Future DRNC Activities Not Part of the Proposed Action

2.5.1 Past Relevant Actions

Lands in Section 9, N½ Section 5 and N½ Section10 T17N R27W were acquired by the DNRC from the Lolo National Forest in 2011 as part of the Lolo Land Exchange. Some stands in these parcels were actively managed under previous ownership, with the most recent entry occurring in NW¼ Section 10 in 2008. These units were planted with ponderosa pine nursery stock in 2010.

Stands in Sections 32 T18N R27W and Sections 4 and 10 T17N R27W have been actively managed for the past 100 years. Most recently, commercial thinning and salvage harvest of lodgepole pine occurred in these stands in 2004 and 2005.

2.5.2 Present Relevant Actions

Lands in the project area are currently under lease for cattle grazing. Montana FWP and the Lolo National Forest manage these lands for handicapped hunter motorized access behind locked gates during the Montana general big game season. The Montana Department of Transportation maintains Interstate 90 and associated Right of Way vegetation within the project area. No other activities are currently under permit by the DRNC.

2.5.3 Future Relevant Actions

Timber Management

The DNRC would likely continue to manage timber stands in the project area. Other permitted activities such as grazing and recreation would likely continue.

2.6 Summary Comparison of Alternatives

Table 2.2 Summary Comparison of Alternatives

Project Attribute	Alt. A: No Action	Alt. B: Harvest
Estimated Volume Harvested (Million Board Feet)	0	4.5
Estimated Gross Revenue to the State (est. stumpage rate of $130/mbf + Forest Improvement Income of $22.72/mbf)	$0	$695,181
Estimated Net Revenue to the Common Schools Trust (est. stumpage rate of $130/mbf)	$0	$243,100
Estimated Net Revenue to the State Normal School Trust	$0	$348,660
Estimated Forest Improvement Income ($22.72/mbf)	$0	$103,421

Table 2.2 Continued		
Project Attribute	**Alt. A: No Action**	**Alt. B: Harvest**
Estimated Forest Improvement Expenditures	$0	$40,000
Total Acres Treated in the Project Area	0	713
Tractor Yarding (acres)	0	585
New Road Construction (miles)	0	0.4
Existing Road to be Improved or Maintained (miles)	0	1.3

2.7 Predicted Achievement of the Project Objectives

Alternative B: Harvest was designed to meet project objectives while providing for resource protection. Approximately $520,000 in net revenue would be generated to benefit the Common School and State Normal School trusts. Slash removal associated with the project would reduce fuel accumulations in the wildland/urban interface. A summary is provided in table 2.3.

Table 2.3 Predicted Achievement of Project Objectives			
Project Objective	**Indicator of Attainment**	**Alternative A: Deferred Harvest (No Action)**	**Alternative B: Harvest**
Harvest sufficient timber volume to generate revenue for the Common School and State Normal School Trust.	Net revenue generated through harvest.	No revenue would be generated.	Approximately $591,760 in net revenue would be generated.
Promote regeneration and recruitment of seral species.	Acres treated with prescriptions favoring regeneration and recruitment of seral species.	No stands would be treated in association with the proposed project.	Harvest, thinning and planting prescriptions would promote seral species on 713 acres.
Maintain stand productivity by reducing competition in overstocked stands.	Acres of overstocked stands treated to reduce competition.	No stands would be treated in association with the proposed project.	Thinning and harvest would reduce stocking to desirable levels on 369 acres
Reduce lodgepole pine mortality and associate dead fuel accumulations in the project area	Acres treated to reduce mortality and fuel accumulations.	No Acres would be treated.	Fuel reduction would occur on approximately 60 acres.

2.8 Predicted Environmental Effects of Alternatives

Table 2.4 Summary Comparison of Predicted Effects of Alternatives		
Issue	**Alternative A: Deferred Harvest (No Action)**	**Alternative B: Harvest**
Soil Resources	No effects to soil resources would be expected.	With the implementation of BMP's and the recommended mitigation measures, the proposed harvest operations present a low risk of detrimental impacts to soils.
Water Quality	Minimal effects to water quality would be expected.	There would be low risk of direct or indirect impacts to water quality or down slope beneficial uses. There is very low risk of cumulative impacts to water quality or beneficial uses from increases in water yield or sediment delivery.
Noxious Weeds	Potential for gradual increase in noxious weeds over time from adjacent infestations.	Potential increase in noxious weed density and occurrence due to soil disturbance and decreased tree canopy coverage. Integrated weed management efforts would occur. Control efforts would emphasize treatment of any new noxious weeds.
Forest Conditions	No immediate change from existing conditions would be expected. Mortality and natural disturbance could alter stand conditions.	Proposed harvest treatments would result in improved stand productivity and reduced dominance by shade tolerant species. Stand densities and canopy cover would be reduced significantly in harvest units.
Aesthetics	No change from existing conditions would be expected.	New road construction, reduced stocking levels, fresh slash and skid trails could affect the appearance of the project area. Impacts would likely be minor and temporary in nature.

Table 2.4 Continued		
Issue	**Alternative A: Deferred Harvest (No Action)**	**Alternative B: Harvest**
Dust and Truck Traffic	No change from existing conditions would be expected	Operation of equipment and log trucks could present a temporary increase in noise, dust and traffic for the duration of the proposed action. Dust control and speed limits could be incorporated as a contract stipulation to minimize impacts.
Wildlife Habitat Connectivity and Wildlife Movement	No change from existing conditions would be expected.	With the implementation of wildlife mitigations including retention of movement corridors, visual screening and motorized access restrictions, there would be low risk of direct, indirect or cumulative effects to wildlife habitat and wildlife movement.
Grizzly Bears	No change from existing habitat conditions would be expected.	There would be a minor risk of direct, indirect or cumulative effects to Grizzly Bears due to human disturbance associated with the project and hiding cover removal on a small portion of the analysis area. No changes in open road densities or security habittat would be expected.
Canada Lynx	No change from existing habitat conditions would be expected.	There would be a minor risk of effects to Canada Lynx due to reduction in foraging habitats, increase in non-suitable Lynx habitat and reduction in connectivity. Retained foraging habitat and movement corridors are expected to adequate.
Bald Eagle	No change from existing habitat conditions would be expected.	There would be a negligible risk of effects to Bald Eagle habitat due to minor disturbance from logging activity. No change in motorized access or availability of large snags would be expected.

Table 2.4 Continued		
Issue	**Alternative A: Deferred Harvest (No Action)**	**Alternative B: Harvest**
Fisher	No change from existing habitat conditions would be expected.	There would be a minor risk of effects to Fisher habitat due to reduced cover in proposed harvest units. No change in connectivity or motorized access would be expected.
Flammulated Owls	No change from existing habitat conditions would be expected.	There would be minor positive effects to Flammulated Owl Habitat due to reduced stand densities and retention of seral species in harvest units.
Pileated Woodpeckers	No change from existing habitat conditions would be expected.	There would be a minor risk of effects to Pileated woodpecker habitat due to reduction of potential foraging habitat and nesting habitat in harvest units. Snags/snag recruits would be retained to provide nesting habitat.
Big Game	No change from existing habitat conditions would be expected.	There would be a minor risk of adverse effects to big game habitat due to reduction in thermal cover and snow intercept habitat in harvest units.

3.0 Affected Environment

3.1 Introduction

Chapter 3: Affected Environment describes the relevant resources that would be affected by the alternatives if they were implemented. This chapter also describes the existing environment and includes effects of past and ongoing management activities within the analysis area that might affect project implementation.

3.2 Description of Relevant Resources

3.2.1 Geology and Soils

Analysis Area and Methods

The analysis area for geologic and soil resources are the proposed harvest and thinning units and roads used for hauling principally in Sections 4,9,and 10 T17N, R27W & Section 32 T18N, R27W.

The soils impacts analysis includes assessment of soils that may be affected by soil displacement, compaction, erosion or loss of surface organic materials compared to monitoring of soils effects on previous DNRC timber sales (DNRC 2005). The cumulative effects analysis considers the combination of impacts from past management and the proposed action. The analysis uses general soil descriptions and management interpretations for each soil type derived from the St Regis Soil Survey 1972 and Lolo Landtype Survey. Proposed harvest units and haul roads were reviewed on aerial photos and GIS maps. Field reviews were completed to verify soil conditions and to assess past impacts from displacement, compaction and erosion and to determine historic levels of woody debris. Observations were used to develop mitigation measures to minimize direct, in-direct and cumulative effects to soils.

Existing Conditions

The proposed project would occur on broad gently sloping terraces and footslopes above and east of the Clark Fork River. There is no especially unique or unstable terrain in the project area. The terrace deposits are formed of deep silts and sands (lacustrine) from ancient glacial Lake Missoula and old river alluvium of gravels and cobbles.

The footslopes and mountain sideslopes up to approximately 4400 ft. in elevation have been scoured by the floodwaters of Lake Missoula resulting in shallower soils on the steeper sideslopes in section 10 and deep lakebed deposits on the valley floor. Fractured argillite bedrock is exposed on the steeper mountain sideslopes in section 4, 9 and 10. All material on the proposed road route is common excavation. Existing erosion is minor with a few spots of rilling noted on haul road surfaces and no sediment delivery noted off-site. There is a gravel pit of good quality material for road surfacing in the NE ¼ of Section 9 that is not currently in use.

Primary soils on Section 32 T18N, R27W 32, 4, & 9 T14N, R25W are deep Lake Missoula silts (Half-Moon soils) with mixed deposits of alluvial sandy loams (McCaffery soils) and alluvial cobbly loams that form the flat to moderately sloping terraces and mountain footslopes (figure 3.1 and table 3.1). The steeper mountain sideslopes in sections 9 and 10 are a complex of Tamely silt loam soils and more shallow rocky sites and talus.

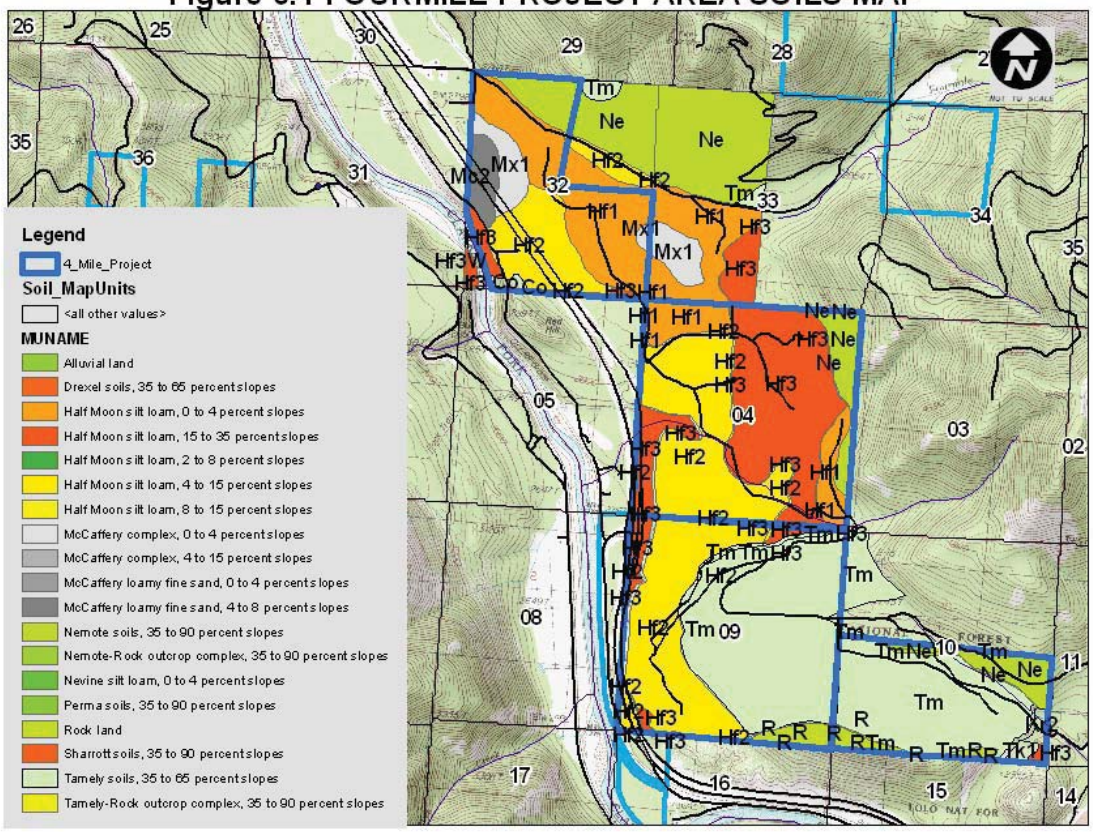
Half Moon silty clay loam soils have a silt loam surface (4-10") over deep silty clay subsoils from glacial Lake Missoula sediments. These soils are very productive, supporting larch, ponderosa pine, Douglas-fir and some grand-fir sites. The fine silt surfaces also support competitive understory vegetation of grasses and shrubs that reduce surface erosion. Soil fertility and moisture holding capacity are relatively high, yet the south exposures can be droughty. The gentle slopes less than 20% have poor bearing strength when wet, due to high clay (35-50%) content subsoils and are very susceptible to compaction and rutting if operated on when wet. Erosion potential is low to moderate on the gentle slopes. The most sensitive soils to displacement and subsequent erosion are the short steep slopes over 40% that occur within the Half Moon 3 map unit.

Soils in section 9 and 10 are a complex of Tamely gravelly silt loam soils on moderate to steep slopes. There is a higher component of gravel and rock in this area than typical and there are included areas of cobbly loams and shallow rock residual soils on the steeper slopes and convex slopes. These soils are well drained, and include drier sites of convex knolls and mountain sideslopes. The Tamely soils have a low to moderate risk of erosion and moderate risk for compaction and displacement and are well suited to ground based operations up to 45%.

McCaffery deep sandy loams are a minor soil in section 32 of the project area on flat slopes of 0-10% where thinning operations are planned. These deep sandy loams are well drained and have fewer limitations on conifer regeneration or equipment operations. The materials have low rock content and bearing strength when wet that limits spur road use. The main road has been graveled and is in good condition for traffic.

Table 3.1 Project Area Soil Types						
Map Unit	**Mapping Unit Name**	**Soil Description**	**Erosion Potential**	**Displacement hazard**	**Compaction Hazard**	**Notes**
HF	Half Moon Silt loams on 0-15% slopes	Deep silty clay loams from Lake Missoula	Low / Mod	Mod	High if wet	Moist productive soil, Avoid displacement of surface by season of use & skid trail planning.
HF3	Half Moon Silt loams with short steep slopes15-50%	Deep silty clay loams from Lake Missoula	Mod to high on slopes >40%	Mod to high on slopes >40%	High if wet	Moist productive soil, Avoid displacement of surface by season of use & skid trail planning.
MC	McCaffery Deep loamy fine sand on 0-8% slopes	Deep sands from alluvium	Low	Mod	Low / Mod	Droughty productive soil. Avoid displacement of surface by season of use & skid trail planning.
TM	Tamely very gravelly silt loams & rubble lands, 30 to 65 % slopes	Mod deep gravelly silts and colluvium, common rock outcrop on steeper slopes	Low to Moderate, Gravelly	Mod to high on slopes >45%	Mod	Limit ground skid to slopes less than 45% Steeper slopes and south aspects have more shallow soil depth and rocks.

Figure 3.1 FOURMILE PROJECT AREA SOILS MAP



Effects of Past Management

There have been previous harvest entries into this area that included selective, seed tree and shelterwood harvests that occurred in 1970 and 1998. DNRC recognized the concern for soil effects on the sensitive steeper slopes on the east half of section 4 (Half Moon soils) and implemented mitigation measures during the last harvest that included designated skid trails, slope restrictions, and strict season of use limits. A DNRC BMP audit was completed in 1999 during on-going operations and it was determined that the mitigations for the sensitive soils were effective, skid trails were stable and vegetated and operations had minimal effect on the ground. Soil displacement and compaction were principally limited to skid trails on up to10-15 % of the area. Surface litter, duff and coarse woody debris provide both moisture holding properties and nutrients for plant growth. Historic skid trails have lower levels of organic materials and duff and affect up to 10% of the proposed harvest areas. On over 90% of the harvest area, existing coarse woody debris levels are average compared to historic ranges (Graham et.al. 1994) and there are well established surface organic layers of needles and duff.

3.2.2 Effected Watershed

Analysis Methods and Area

Watershed analysis evaluates and discloses the potential for direct, in-direct and cumulative effects to water quality, based on the risk of sediment delivery to streams from the proposed harvest units and haul roads. A coarse filter watershed analysis was completed by a DNRC hydrologist for the proposed sale area consistent with ARM 36.11.42 and DNRC Habitat Conservation Plan requirements.

The water quality analysis includes a review of existing inventories for soils and water resources (NRIS 2012, MTDEQ/CWAIC 2012), and reference to previous DNRC projects as noted in the soil analysis section. Several field reviews were completed for the proposed harvest units, access roads and associated streams. Field observations, information and data were integrated into the watershed analysis and design of project mitigations.

Water Quality Regulations

All the watershed areas listed in this report are classified as B-1 in the Montana Surface Water Quality Standards. The water quality standards for protecting beneficial uses in B-1 classified watersheds are described in ARM 17.30.623. The B-1 classification applies to multiple use waters suitable for domestic use after conventional treatment, growth and propagation of cold-water fisheries and associated aquatic life and wildlife, agricultural, and industrial uses. Other criteria for B-1 waters include; no increases are allowed above naturally occurring concentrations of sediment, which will prove detrimental to fish or wildlife. Naturally occurring includes conditions or materials present from runoff or percolation on developed land, where all reasonable land, soil, and water conservation practices have been applied. Reasonable conservation practices include methods, measures, or practices that protect present and reasonably anticipated beneficial uses. The State has adopted Forestry Best Management Practices through its Non-point Source Management Plan as the principle means of controlling non-point source pollution from silvicultural activities. DNRC provides further protection of water quality and fish through implementation of the Streamside Management Zone (SMZ) Laws and Forest Management Rules, but in this case, the Action Alternative does not include harvest adjacent to SMZ's.

Water Quality Limited Waterbodies & Beneficial Uses

Below the project area, the Clark Fork River (MT76M001-010) from Fish Creek to the Flathead River has been identified as partially impaired, within the larger Clark Fork River-Cold Creek and Clark Fork River-Sloway Gulch drainages. The Clark Fork River flows along the SW boundary of section 4, T17N, R27W. The partial impairment designation is for cold water fisheries and aquatic life in the 2012 303(d) listing on the MTDEQ website. Listed impairments are nutrients and heavy metals. Probable sources are mining and municipal point source discharges. A Total Maximum Daily Load (TMDL) Analysis has been completed for the nutrients nitrogen and phosphorus. A TMDL has not been completed for the heavy metals, copper and lead. The downslope beneficial uses in the area and principally on the Clark Fork River include: domestic surface water rights, recreation, cold-water fisheries, agriculture, industry, wildlife and livestock watering. Water rights in the DNRC project area include a domestic well in the west ½ of section 32, T18N, R27W, that would not be affected by this project.

There is an irrigation point of use for a hayfield in the southeast corner of section 10 on an unnamed tributary of Sloway Gulch.

Existing Watershed Conditions

Proposed harvest units in sections 32, 4 and 9 are located on high, broad terraces and footslopes east of the Clark Fork River. Interstate I-90 is located between the Clark Fork River and the western boundary of the DNRC project area. The proposed harvest unit in section 10 is located within a small intermittent drainage of Sloway Gulch.

There are no streams crossing the DNRC parcels in sections 32, 4, or 9 and no road crossings of streams on the proposed haul route. This is a relatively dry landscape and average annual precipitation is 19-22 inches/year in the project area. On a yearly basis, most precipitation is received as snow and infiltrates into the ground with little or no surface runoff. Fourmile Creek ends above the project sections. There is a tributary of Fourmile Creek across section 4 indicated on the topography maps, however, the graphic segment on the map is not a stream on the ground and there is no channel to contribute surface runoff or sediments downslope. Section 9 has a convex terrain that drains towards the Clark Fork River. There are no streams and no visible signs of runoff from the proposed harvest units, and no water quality impacts from sedimentation were noted in or adjacent to the proposed harvest area.

The Section 10 parcel is drained by an intermittent stream that flows toward Sloway Gulch, but goes subsurface and does not deliver flow to Sloway Gulch. The intermittent stream originates near a wetland and flows east into a steep draw that has segments of erosion and gullying. There is minor erosion and sedimentation from an abandoned road/ford crossing that is revegetated. The existing access road is over 200 feet from the stream segment and no sites of sediment delivery occur from the access road.

The designated access haul road route does not cross any streams and no sediment sources were identified. The project would be accessed by existing roads that have functional drainage with road segments that have minor rilling and require maintenance grading.

Existing water quality effects in the Lower Clark Fork River, and Sloway Gulch drainages are associated with past and current management activities that include timber harvest, grazing, road and railroad construction, wildfire, fire suppression and recreation. There is no indication of increased surface runoff from previous harvests in the DNRC project parcels.

3.2.3 Noxious Weeds

Houndstongue and spotted knapweed are present along haul roads in the project area, mostly in old landing locations and sites heavily grazed by livestock. Weed infestations have been treated with herbicide repeatedly. Landing locations where infestations are most prevalent are scheduled to be planted with western larch and ponderosa pine seedlings in the spring of 2012.

3.2.4 Forest Conditions

Multi-aged stands dominated by ponderosa pine occupy most of the project area. Designated harvest units are largely unmanaged stands or stands that have been commercially thinned within the last two decades. The majority of these are in reasonably good health with the exception of overstocked lodgepole pine stands in harvest unit 1. Most other stands in the project area not identified for harvest have been treated within the last 20-30 years and are in good condition. Some stands that would benefit from treatment were deferred from harvest under the Action Alternative to maintain wildlife thermal/hiding cover and movement corridors.

The understory in previously thinned stands (harvest units 2 and 5) is heavily stocked with Douglas-fir regeneration approximately 4-8 feet tall, 1000- 2000 stems/acre. The understory in other harvest units is either lightly stocked with shade tolerant species or unstocked.

The DNRC is directed to maintain biodiversity by managing for appropriate stand structures and compositions on state lands (ARM 36.11.404). Appropriate stand cover types are determined by a site specific model (ARM 36.11.405) that considers the ecological characteristics of the site such as habitat type, current stand conditions, climate and disturbance regime. Approximately 71% of the stands on the Missoula Unit currently exist as appropriate cover types (table 3.2) and 65% of stands in the Project Area currently exist as appropriate cover types (table 3.3) as identified by the DNRC Forest Management Bureau SLI.

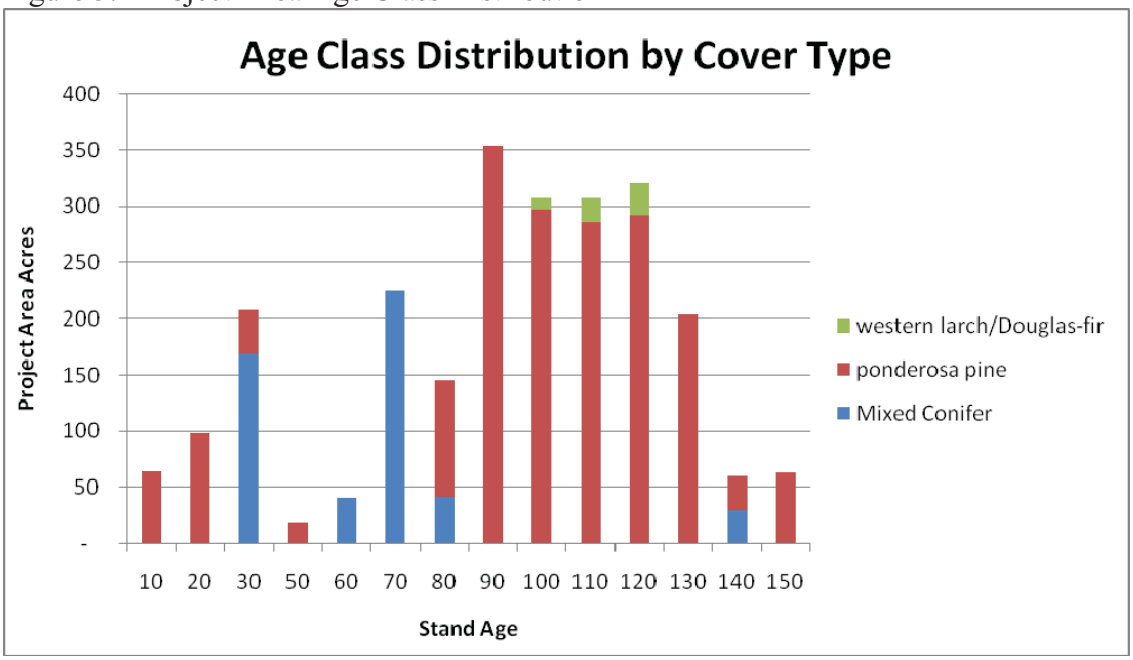
Table 3.2 Current Cover Type Conditions on the Missoula Unit

Cover Type	Acres Currently Identified as Appropriate Cover Type	Acres Currently Identified as Other Cover Types	Percent of Missoula Unit Currently Identified as Appropriate Cover Type	Percent of Missoula Unit Currently Identified as Other Cover Types
Douglas-fir	7,776	877	90%	10%
Hardwoods	445	52	90%	10%
lodgepole pine	2,291	920	71%	29%
Mixed Conifer	174	353	33%	67%
Non-Forest	3,524	0	100%	0%
ponderosa pine	43,873	11,200	80%	20%
subalpine fir	1,732	0	100%	0%
western larch/Douglas-fir	7,325	12,737	37%	23%
western white pine	155	774	17%	83%
Total	67,295	26,913	71%	29%

Table 3.3 Cover Type Conditions within the Project Area			
Cover Types Present	**Current Acres of Cover Type**	**Appropriate Acres of Cover Type**	**Surplus or Deficit Acres of Cover Type**
Mixed Conifer	504	46	458
Non-Forest	130	130	0
ponderosa pine	1,945	2,152	-207
Western larch/Douglas-fir	61	285	-224
Lodgepole pine	0	27	-27

The DNRC considers the role of all stand age classes in maintaining biodiversity. Age class distribution was calculated for the project area based on SLI data (figure 3.1).

Figure 3.1 Project Area Age Class Distribution



3.2.5 Aesthetics

Recreation occurs in the project area mostly in the form of hunting during fall seasons. Some very limited hiking and equestrian activity may occur. The project area provides no access to parks, wilderness or designated recreation areas. A small portion of the project area excluded from any harvest unit is visible from Interstate 90.

3.2.6 Wildlife

3.2.6.1 Forested Habitat Connectivity and Wildlife Movement

Connectivity of forest cover between adjacent patches is important for promoting movements of species that are hesitant to cross non-forested areas and other openings. Effective corridors tend to be those that are relatively wide, unfragmented, diverse, and associated with riparian areas (Fischer and Fischenich 2000). Width of the travel corridor tends to determine the efficacy of the corridor for individual species. In general, a wider corridor would be more effective and provide for more species than a narrower one. Riparian areas and ridges often play an important role in providing connective corridors. Expanding on this, linkage zones are areas "between larger blocks of habitat where animals can live at certain seasons and where they can find the security they need to successfully move between these larger habitat blocks" (Servheen et al. 2003). Linkage zones are important because they provide for dispersal and gene flow among larger areas of suitable habitats. As such, both corridors and linkage zones can become compromised through human management and environmental changes (e.g., fires or floods).

The project area currently contains approximately 1,514 acres of mature stands (100-plus years in age) of ponderosa pine, Douglas-fir, Douglas-fir/western larch, and mixed conifer stands that have a reasonably closed canopy. Currently, forested areas cover most of the project area, facilitating some use by those species requiring connected-forested conditions. The project area is part of the Fourmile/Dry Creek wildlife movement area (Clough 2003). The project area is also included in a potential linkage zone that provides broad-scale landscape connectivity for forest carnivores (grizzly bear, Canada lynx, and wolverine) from the Cabinet/Yaak area to the Selway-Bitterroot Mountains, and was specifically identified as an area for linkage across Highway 90 (Servheen et al. 2003, C. Servheen comments, February 2, 2010). Within these linkage zones, Servheen recommends the following to maintain the effectiveness of these areas for wildlife movement:

1. No additional site developments such as campgrounds, boat ramps or trailheads where human activity and human-related attractants like garbage and foods are concentrated.
2. No increase in motorized access routes or motorized use areas.
3. Maintenance or enhancement of visual cover in these areas so as to make wildlife more secure when they move through such areas.

3.2.6.2 Threatened and Endangered Species

Grizzly Bear

Grizzly bears are native generalist omnivores that use a diversity of habitats found in western Montana. Preferred grizzly bear habitats are meadows, riparian zones, avalanche chutes, subalpine forests, and big game winter ranges, all of which provide seasonal food sources. The search for food drives grizzly bear movements, with bears moving from low elevations in spring to higher elevations through the summer and early fall, as fruits ripen throughout the year. Primary habitat components in the project area 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 human access 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 the risk of bears being illegally shot. Displacing bears from preferred areas may increase their energetic costs, which may, in turn, lower their ability to survive and/or reproduce successfully.

The project area is approximately 17 miles south of the Cabinet-Yaak grizzly bear recovery area, which is known to have a small grizzly bear population. Additionally, the project area is outside of the 'occupied habitat' area as mapped by grizzly bear researchers and managers to address increased sightings and encounters of grizzly bears in habitats outside of recovery zones (Wittinger 2002). Grizzly bears have not been documented in the project area, but use of the project area is possible. Grizzly bears generally use different habitats relative to season. The project area primarily provides habitat for grizzly bears in the spring, due to the lower elevations where vegetation greens up earlier in the spring, and the presence of big game winter range that may provide carrion. Summer or autumn habitat values are fairly low in the area. The cumulative effects analysis area is approximately 31,308 acres and includes the area bounded by the Clark Fork River west of Keystone Creek to Keystone Peak to Ferry Landing Fishing Access. DNRC manages approximately 24% (7,609 acres) of the cumulative effects analysis area.

Managing human access is a major factor in management for grizzly bear habitat. Open road densities in the project area (1.51 mi/sq. mi., simple linear calculation) and cumulative effects analysis area (1.32 mi. /sq/ mi., simple linear calculation) are fairly high due to the proximity to Interstate 90 and the various frontage roads and other roads in the area. Similarly, proximity to open roads precludes the project area from providing security habitats for grizzly bears, but some security habitats do exist in the larger cumulative effects analysis area. Hiding cover exists within both the project area and cumulative effects analysis area. Additionally, timber harvesting and human development that is occurring or has occurred on other ownerships likely altered grizzly bear habitats and/or human disturbance levels.

Canada Lynx

Canada lynx are associated with subalpine forests, generally between 4,000 to 7,000 feet in elevation in western Montana (Ruediger et al. 2000). The proposed project area ranges from approximately 2,640 to 4,040 feet in elevation and is dominated by ponderosa pine, Douglas-fir/western larch, and mixed conifers. 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. Lynx in western Montana preferred mature, multi-storied stands with dense horizontal cover year-round; during the summer lynx also selected earlier successional stands with a high horizontal cover (Squires et al. 2010). For denning sites, the primary component appears to be abundant large woody debris, particularly in the form of downed logs, root wads, slash piles, and live trees (Squires et al. 2008). These conditions are found in a variety of climax vegetation habitat types, particularly within the subalpine fir series (Pfister et al. 1977). Historically, high intensity, stand-replacing fires of long fire intervals (150 to 300 years) occurred in continuous dense forests of lodgepole pine, subalpine fir, and

Engelmann spruce. These fires created extensive even-aged patches of regenerating forest intermixed with old stands that maintained a mosaic of snowshoe hare and lynx habitat.

Approximately 828 acres of lynx habitat occur in the project area. Much of this habitat was identified as winter foraging (630 acres), with lesser amounts of summer foraging (94 acres) and other suitable habitats (largely forested lands that provide cover to facilitate movement; 104 acres). Connectivity of forested habitats in the project area is relatively intact. The cumulative effects analysis area is approximately 31,308 acres and includes the area bounded by the Clark Fork River west of Keystone Creek to Keystone Peak to Ferry Landing Fishing Access. DNRC manages approximately 24% (7,609 acres) of the cumulative effects analysis area. Potential lynx habitats exist on roughly 2,723 acres of DNRC-managed lands in the cumulative effects analysis area, including 1,995 acres (73.3%) of winter foraging habitats, 94 acres (3.4%) of summer foraging, 402 acres (14.8%) of other foraging habitats, and 232 acres (8.5%) of temporary non lynx habitats. On other ownerships in the cumulative effects analysis area, habitats are largely a mix of ponderosa pine and Douglas-fir types with some western larch, lodgepole pine, and mixed conifers with a moderate amount of open types (herbaceous, shrub, sparse vegetation, water). In general, the cumulative effects analysis area contains marginal to poor lynx habitats and limited use would be anticipated.

3.2.6.3 Sensitive Species

Bald Eagle

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 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.

The project area is partially within the St. Regis bald eagle territory. This territory has been rather productive with an average of 1.6 chicks produced annually over the last 5 years. Direct, indirect, and cumulative effects were analyzed on the home range of the bald eagle territory. The aquatic habitat associated with the bald eagle territory includes the Clark Fork River, St. Regis River, and numerous smaller streams. Aquatic and terrestrial prey species are fairly common in the home range. The terrestrial habitat incorporated by the St. Regis bald eagle territory is a coniferous/deciduous mixture along the lakeshores and riparian areas, with coniferous forests in the upland areas. Within the present home range, black cottonwood is the deciduous tree of primary importance to bald eagles, while large emergent conifers also provide important nesting, roosting, and perching habitats.

Human disturbance, including timber harvesting, the town of St. Regis, the Interstate 90 corridor, and various forms of recreation are potential sources of disturbance to the nesting territory. Numerous large emergent trees are available across portions of the

home range, but logging and other human developments in the last 100 years has likely reduced some of these attributes while others have experienced mortality and are declining in quality.

Fisher

Fishers are a mid-sized forest carnivore whose prey includes small mammals such as voles, squirrels, snowshoe hares, and porcupines, as well as birds (Powell and Zielinski 1994). They also take advantage of carrion and seasonally available fruits and berries (Foresman 2001). Fishers use a variety of successional stages, but are disproportionately found in 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 may 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.

There are approximately 1,024 acres of potential upland fisher habitats and no riparian habitats in the project area. The cumulative effects analysis area is approximately 31,308 acres and includes the area bounded by the Clark Fork River west of Keystone Creek to Keystone Peak to Ferry Landing Fishing Access. The cumulative effects analysis area includes roughly 50 miles of Class 1 and 53 miles of Class 2 streams. Within the cumulative effects analysis area, there are roughly 29,512 areas that would be classified as upland (more than 100 ft from Class 1 and more than 50 feet from Class 2 streams) and 1,796 acres that would be classified as riparian that are associated with the 103 miles of streams in the cumulative effects analysis area. DNRC manages approximately 24% (7,609 acres) of the cumulative effects analysis area, including 7,490 acres of upland habitats and 119 riparian acres. Potential fisher habitats exist on approximately 2,380 acres (2,372 upland and 9 riparian acres) of DNRC-managed lands; likely some additional habitats exist on a portion of the mature forest on adjacent ownerships in the cumulative effects analysis area, particularly along portions of those riparian areas. Additionally, roughly 397 acres of preferred covertypes exist on DNRC-managed lands that currently lack sufficient structure to meet habitat needs for fishers, which could develop into potentially suitable fisher habitats in the future. Similarly, on other ownerships in the cumulative effects analysis area, stands in preferred covertypes that are lacking sufficient structure to be suitable fisher habitats could development those attributes through time.

Flammulated Owl

Flammulated owls are tiny, migratory, insectivorous forest owls that inhabit old, open stands of warm-dry ponderosa pine and cool-dry Douglas-fir forests in the western United States and are secondary cavity nesters. In general, preferred habitats have open to moderate canopy closure (30-50 percent) with at least 2 canopy layers, and are often near small clearings. They usually nest in cavities excavated by pileated woodpeckers or northern flickers in 12-25" dbh ponderosa pine, Douglas-fir, or aspen. Without disturbance, Douglas-fir encroach upon ponderosa pine stands resulting in increased

stand density and decreased habitat quality for flammulated owls. Periodic, low-intensity underburns can increase habitat suitability and sustainability by reducing the density of understory seedlings and saplings, stimulating shrub growth, and by protecting large dominant trees from ladder fuels and competition with other mature trees.

There are approximately 1,544 acres of potential flammulated owl habitats in ponderosa pine and dry Douglas-fir stands across the project area. The cumulative effects analysis area encompasses the project area and lands within a one mile radius. Within the cumulative-effects analysis area, approximately 2,596 acres of potential flammulated owl habitats exist on DNRC-managed lands. Additionally, some suitable habitats likely exist on a portion of the 4,694 acres of open and closed forested habitats on other ownerships in the cumulative effects analysis area. A portion of both the project area and cumulative effects analysis area have been harvested in the recent past, potentially improving flammulated owl habitat by creating foraging areas and reversing a portion of the Douglas-fir encroachment and opening up stands of ponderosa pine.

Pileated Woodpecker

The pileated woodpecker is one of the largest woodpeckers in North America and excavates the largest cavities of any woodpecker. Preferred nest trees are large diameter western larch, ponderosa pine, cottonwood, and quaking aspen trees and snags, 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 stands (McClelland 1979).

In the project area, potential pileated woodpecker nesting habitat exists on approximately 192 acres. These nesting habitats are dominated by Douglas-fir types. Additionally, 1,183 acres of sawtimber stands dominated by ponderosa pine, Douglas-fir/western larch and mixed conifers exist in the project area, which are potential foraging habitats. Pileated woodpeckers have been seen and/or heard throughout the project area during several field visits and may be nesting on the parcel. The cumulative effects analysis area encompasses the project area and lands within a one mile radius. In the cumulative effects analysis area, a total of 284 acres of potential pileated nesting habitats exist on DNRC-managed lands; potential lower quality foraging habitats exists on roughly 2,728 acres of sawtimber stands on DNRC-managed lands in the cumulative effects analysis area. Potential pileated woodpecker nesting and foraging habitats likely exist on much of the 2,755 acres of forested habitats on other ownerships in the cumulative effects analysis area. Of the 1,939 acres of open forest, young forest, and recently harvested stands on other ownerships in the cumulative effects analysis area, much is likely too open to be useful to pileated woodpeckers.

3.2.6.4 Big Game

Big Game Winter Range

Winter ranges enable big game survival by minimizing the effects of severe winter weather conditions. Winter ranges tend to be relatively small areas that support large numbers of big game, which are widely distributed during the remainder of the year. These winter ranges have adequate midstory and overstory to reduce wind velocity and intercept snow. The effect is that temperatures are moderated and snow depths are lowered, which enables big game movement and access to forage with less energy expenditure than in areas with deeper snow and colder temperatures. Snow depths differentially affect big game; white-tailed deer are most affected, followed by mule deer, elk, and then moose. Thus, removing cover that is important for wintering big game through forest management activities can increase their energy expenditures and stress in winter, but may increase forage production for use on summer range. Reductions in cover could ultimately result in a reduction in winter range carrying capacity and subsequent increases in winter mortality within local big game herds.

Montana Department of Fish, Wildlife, and Parks identified white-tailed deer (2,549 acres), mule deer (437 acres), and elk (2,549 acres) winter range in the project area. These winter ranges are part of larger winter ranges in the area. Mature Douglas-fir, ponderosa pine, and mixed conifer stands in the project area are providing attributes facilitating use by wintering big game. Evidence of non-winter use by deer and elk was noted throughout the project area during field visits.

A variety of stands across the 205,962-acre winter range, used for the cumulative effects analysis area, is presently providing thermal cover and snow intercept for big game. In the recent past, harvesting within this area has reduced thermal cover and snow intercept; ongoing harvesting across the winter range could continue altering these attributes while potentially disturbing wintering big game. Portions of the cumulative effects analysis area have been converted to agriculture and other human developments and would not be expected to provide thermal cover or snow intercept in the future. Human disturbance within the winter range is associated with residential development, agricultural clearing, recreational snowmobile use, commercial timber management, and the numerous highways and secondary roads.

4.0 Environmental Consequences

4.1 Introduction

This Chapter describes the environmental effects of each alternative on the resources described in Chapter 3 and provides a scientific and analytic basis for the comparison of alternatives found in Chapter 2. This chapter is also designed to provide the analytic process used to evaluate impacts.

4.2 Predicted Effects of Alternatives on Relevant Resources

4.2.1 Soil Resources

Alternative A: Deferred Harvest (No Action) – Direct and Indirect Effects

The No Action Alternative would have little effect on soil resources over the existing conditions. No harvest or thinning would occur.

Alternative B: Harvest – Direct and Indirect effects

Harvest would include commercial thinning, overstory removal and shelterwood prescriptions and could remove approximately 4.5 million board feet (MMBF) of saw timber from 585 acres distributed across sections 4, 9, and 10. Standard BMP's and Forest Management Rules would be applied. This project presents a low to moderate risk of impacts to soils from ground based harvest on silty soils on a sensitive portion of the harvest area. Precommercial thinning operations would occur on 76 acres across sections 32 and 4. Thinning operations in sections 32 and 4 would include hand felling or mechanical masticating and present low risk of soil impacts from ground disturbance, compaction or erosion. Thinning slash would be retained onsite for coarse woody debris and nutrient cycling. 0.4 miles of new road construction on gentle terrain would impact less than 1.5 acres of the project area.

The primary risks of timber harvest impacts to soils are displacement, erosion, and compaction of surface soils from equipment operation and road construction. Skid trail planning would be used to control the area of surface soils that can be displaced, compacted or subject to erosion. Erosion is more of a concern where soils on steeper slopes are disturbed and surface litter is removed. Emphasis would be placed on using existing landings and skid trails as feasible to reduce area affected and improves skidding efficiency. Ground based skidding equipment would be limited to slopes less than 40% in the Half Moon soil areas unless on existing approved trails. Ground based skidding up to 45% would be suitable on the more rocky sideslopes in the section 10 parcel. Season of use would be limited to adequately dry, frozen or snow covered conditions to reduce soil disturbance and compaction. Skid trails would be stabilized by installing surface drainage where needed or slashing skid trails to control erosion.

Harvest operations and slash disposal would limit the amount of surface disturbance to the minimum required for silvicultural goals and retain a proportion of organic fine litter and 5-15 tons/acre of woody debris. Maintaining the litter layer by limiting displacement and retaining organic fine litter and woody debris would help prevent

erosion and aid in moisture retention, and support root mycorrhizae and for nutrient cycling. Mycorrhizae fungus colonizes the host plant's roots and extends the root systems ability to uptake moisture and soil nutrients.

The proposed access would use existing roads with only minor spur road construction of 0.4 miles on gentle terrain, and partly on an old road location. Roads are generally in good condition, yet would require some maintenance grading. The main access road through sections 32 and 4 is graveled. Road use on spur roads during dry conditions could create dust and they may become impassible when wet. Dust would be expected to carry only a short distance and would have minor effects off-site to area residences or Interstate 90, due to the prevalent wind directions and the distance of proposed landings from these locations. Operations during winter are unlikely to create dust. These limitations can be generally overcome by limiting the season of use to dry, frozen or snow covered conditions.

In summary the proposed logging operations and minor road construction are expected to have low to moderate risk of direct and in-direct soil impacts based on implementing BMP's, mitigation measures and compared to soil monitoring on similar sites (DNRC 2005)

Cumulative Effects of Alternative B: Harvest to Soils

Cumulative effects to soils could occur from additive impacts of repeated entries into the harvest area that is estimated at 10% of the 585 acres. The risk of cumulative effects would be low to moderate based on limiting harvest effects of soil compaction and displacement to not exceed 20% of the area, by using the existing skid trails, landings and skid trail planning, limiting operations on steep slopes and use of existing roads. This would be accomplished by timber sale administration to monitor conditions during operations.

4.2.2 Water Quality

Alternative A: Deferred Harvest (No Action) – Direct, Indirect and Cumulative Effects

The No Action Alternative would be similar to existing conditions and have no effect on sediment delivery to streams or beneficial uses of water resources. There are no streams, surface waters or wetlands on the proposed harvest areas or haul roads. There would be no change in cumulative effects to water quality or quantity from existing conditions.

Alternative B: Harvest – Direct and Indirect Effects

Timber harvest would occur on 6 units of 585 acres across sections 4, 9, and 10. Thinning operations would occur on 66 acres in section 32 and about 10 acres in section 4. Thinning operations would be hand felling and distributing slash and have low risk of direct and in-direct impacts to water quality from sedimentation. There are no streams, surface waters or wetlands in the proposed harvest areas.

The proposed harvest would use existing haul roads with only minor new road construction of 0.4 miles on gentle terrain with no potential for off-site sedimentation.

The main access road is in good condition and portions are graveled, yet there are some road segments with minor surface erosion. Existing roads would have adequate drainage installed and be maintained consistent with BMP's

There are no streams in the project parcels that have downslope connectivity to the Clark Fork River to the west. The only stream segment near the proposed harvest is the intermittent stream in Section 10 that does not deliver to Sloway Gulch. An SMZ along this intermittent segment would be 100 ft. in width, and the proposed harvest boundary is over 100 feet from the stream and there is low potential for sediment delivery downslope.

In summary, the proposed action would be expected to have low risk of direct and indirect impacts to water quality from sedimentation based on the absence of stream connectivity to other waters, and implementing BMP's, and Forest Management Rules.

Alternative B: Harvest - Cumulative Watershed Effects

There is low risk for additional cumulative effects to water quality from the implementation of this alternative compared to the No Action Alternative based on the following:

1. There are no streams in the project parcels that have downslope connectivity to the Clark Fork River to the west.
2. The proposed project would consist of moderate intensity shelterwood and overstory removal harvest that would retain 40-50% of vegetative cover and it is unlikely that there would be measurable runoff or sedimentation from the harvest areas.
3. Soil disturbance would be minimized to that needed for silvicultural goals and implementation of soils mitigations would reduce the risk of surface erosion or potential sedimentation.
4. The Action Alternative would use existing roads and have surface drainage restored and maintained concurrent with operations. The minor 0.4 miles of new road construction on gentle terrain would not contribute to sedimentation offsite.

4.2.3 Noxious Weeds

Assessment Area and Methods

The noxious weed analysis area includes the access roads and proposed harvest areas of this project. This analysis will consider the types and location of existing noxious weeds and anticipated effects of the alternatives on noxious weeds.

Existing Noxious Weeds

Knapweed occurs along portions of existing access roads mainly on drier southerly aspects and droughty sites. Knapweed, and houndstongue occur in the area (DNRC and adjacent lands) and will likely increase without treatment and may displace native plants on open areas and the higher risk habitats of Douglas fir snowberry, pinegrass and bunchgrasses. Houndstongue is being spread by animals. Noxious weeds along the

road systems in sections 32 and 4 were treated with herbicide in 2007 and 2011 to reduce current weeds and spread.

Alternative A: Deferred Harvest (No Action) – Direct, Indirect and Cumulative Effects.

Under the No Action Alternative, noxious weeds will continue to spread along open roads and onto dry habitats and animals and wind will carry seeds through the area. The competitive nature of native vegetation has limited weed spread. DNRC would treat roadside edges and provide bio-control as funding is available. The grazing licensee would be required to implement weed control measures consistent with the lease agreement, which should provide long term weed control.

Impacts of noxious weeds within the project areas are moderate. Weeds have spread through the drainage across ownerships over time and are prone to more dispersal along open roads. Weeds also have spread by multiple uses from wind, traffic, forest management and wildlife. Current weed infestations are mainly limited to roadsides within the project parcel and open forest sites. As tree density and vegetation increase, weeds are reduced through vegetative competition.

Alternative B: Harvest – Direct and Indirect Effects

Implementing the Action Alternative would involve ground disturbing activities that have the potential to introduce or spread noxious weeds in susceptible habitat types, and animals and wind will carry seeds through the area. Within the Action Alternative, a combination of integrated weed management measures including prevention, revegetation, biocontrol and herbicide application on spot outbreaks are considered the most effective weed management treatments. Where noxious weeds are currently limited to portions of existing roads, mainly on road edges, DNRC would use herbicide treatments for effective control on a site specific basis to reduce existing weeds. Even with these efforts we expect noxious weeds may increase where adjacent lands are not treated. Larger infestations would be good candidates for biocontrol.

There would be a moderate risk of stable or increased weeds with the proposed action and the combination of mitigations should hold weeds near current conditions and efforts would be made to reduce current infestations. Mitigations would include limiting disturbance to the targets needed for silvicultural goals, requiring clean equipment, grass seeding roads, treating roads and infestations with herbicides. DNRC would monitor the sites for 2 years to evaluate the effectiveness of weed control measures that were implemented and to determine if any new noxious weeds establish that were not previously identified.

Cumulative Effects of Alternative B: Harvest

Currently, the impacts of noxious weeds within the project areas are moderate. Weeds have spread through the drainage across ownerships over time mainly along roadsides and open forest sites with multiple uses and by seed dispersal from wind, traffic and wildlife. Timber harvest throughout these drainages has increased grass growth and the risk for noxious weeds to spread though ground disturbance. Within the project area, overall cumulative effects of increased noxious weeds are expected to be low to moderate, based on herbicide treatments of existing weeds along roads and

implementing prevention measures to reduce new weeds by cleaning equipment and planting grass on roads to compete against weeds.

4.2.4 Forest Conditions

Alternative A: Deferred Harvest (No Action) – Direct, Indirect and Cumulative Effects

No immediate changes to forest conditions would be expected. Lodgepole pine stands would likely experience continued mortality and subsequent accumulation of heavy fuels, resulting in increased potential for catastrophic fire in a wildland urban interface setting. Shade tolerant species would likely continue to become dominant in the absence of disturbance.

Alternative B: Harvest – Direct and Indirect Effects

Implementation of the proposed action would alter stand conditions considerably. Silvicultural systems would emulate appropriate natural disturbance regimes (primarily mixed severity and stand replacing fire) as required by ARM 36.11.408. Disturbance of this nature would likely result in more open stands dominated by large ponderosa pine and western larch.

Shelterwood and Overstory Removal prescriptions would result in stands of fairly consistent stocking and species composition due to tree marking guidelines. These prescriptions would reduce stocking by approximately 45-60 percent. Commercial thinning would reduce mid-level stocking by approximately 60 percent, while retaining advanced understory regeneration and large seed trees.

Cumulative Effects of Alternative B: Harvest

The proposed harvest would bring approximately 130 acres of previously untreated stands into active management. Prescriptions would convert approximately 100 acres of the project area to the appropriate cover type, promote recruitment of seral species and balance the age class distribution toward younger age classes.

4.2.5 Aesthetics

Alternative A: Deferred Harvest (No Action) – Direct, Indirect and Cumulative Effects

No immediate effects to aesthetics would be expected. Mortality of lodgepole pine would likely continue or accelerate, increasing the potential for subsequent stand replacing fire. Recreation that occurs in the project area would not likely be effected in the absence of management.

Alternative B: Harvest – Direct and Indirect Effects

Noise from logging equipment and log hauling and the appearance of fresh slash, stumps and skid trails would temporarily reduce the aesthetic quality of harvest units for 2-4 years. These impacts would decline as vegetation reestablishes and slash

decomposes. 0.4 miles of new road construction is not expected to impact aesthetics due to the remote location that is hidden from the surrounding landscape by topography. Disturbed soils on this site would be grass seeded concurrent with construction.

Harvest and thinning units would have a much more open appearance post-harvest. Typically the largest trees are selected for retention as seed and crop trees which would reduce potential visual impacts. Commercial Thinning could result in openings of up to ¼ acre due to areas of mountain pine beetle mortality in lodgepole pine. Reforestation planting would improve the appearance of previously treated stands and log landings where natural regeneration has been inadequate.

Cumulative Effects of Alternative B: Harvest

Post-harvest, the project area would likely appear very similar to management patterns on adjacent lands. Retention of open stands of large western larch and Ponderosa pine could potentially improve the aesthetics where a dense Douglas-fir and lodgepole pine understory currently limits visibility to a few feet.

4.2.6 Economics and Project Revenue

Alternative A: Deferred Harvest (No Action) – Direct and Indirect Effects.

Harvesting would not take place. No new revenue would be generated for the support of the Common Schools Trust or for the DNRC Forest Improvement Account. No personal income would be generated through the work of logging or road building contractors or local sawmills.

Alternative B: Harvest – Direct and Indirect Effects

Approximately $243,100 in net revenue (est. at $130/mbf) would be generated in support of the Common School Trust and $348,660 in net revenue would be generated in support of the State Normal School Trust from the sale of approximately 4.5 million board feet (4.5 MMBF) of sawtimber. Responsibility for development costs associated with the project would be assigned to the purchaser and administered by the DNRC Forest Officer.

The amount of Forest Improvement (FI) revenue generated by the project is estimated at $103,421. The current FI fee rate collected on projects administered by the DNRC Southwest Land Office is $22.72/MBF. FI funds would be applied to forest improvement projects in the project area and on other School Trust Lands. FI expenditures associated with this project may include weed spraying, tree planting and pre-commercial thinning and may require an investment of up to $40,000 in the next decade.

Cumulative Effects of Alternative B: Harvest

If implemented, the proposed project would provide work and income for road building and logging contractors and their employees. The forest products would likely be processed in local mills, supporting mill employees and contributing to local, state and

federal tax revenues. Similar benefits from the retail sale of forest products would be realized.

4.2.7 Dust and Truck Traffic

Alternative A: Deferred Harvest (No Action) – Direct and Indirect Effects

No change from current conditions would be expected. No dust or increased traffic would occur as a result of the proposed action.

Alternative B: Harvest – Direct and Indirect Effects

Commercial trucks could temporarily produce a significant amount of noise and dust on unpaved roads as a result of the proposed action. There are few residences along unpaved portions of the proposed haul route that would be affected by noise and road dust. Dust abatement on portions of the haul route adjacent to inhabited residences may be required as a contract stipulation.

Operation of commercial trucks for transporting equipment and logs could create a temporary traffic hazard as a result of the proposed action. Posted truck speed limits and warning signs would reduce the potential hazard. Portions of the haul route are administered by the Lolo National Forest to provided disabled hunter access behind locked gates. Motorized vehicle use would be restricted on these roads during periods of active logging to address traffic and firearm safety issues.

Cumulative Effects of Alternative B: Harvest

Due to the temporary nature of truck operation associated with the proposed action, there would be low risk of cumulative effects.

4.2.8 Forested Habitat Connectivity and Wildlife Movement

Alternative A: Deferred Harvest (No Action) – Direct, Indirect and Cumulative Effects

No appreciable changes to existing stands would be anticipated. Stands providing forested cover that may be functioning as corridors, including riparian areas, saddles, and ridgelines, would not be altered. Similarly, no changes in habitats within the linkage zone would be anticipated. No changes in human developments, motorized access, or visual screening would occur. No changes in wildlife use would be expected. Past harvesting has reduced the amount of mature, forested habitats in portions of the cumulative effects analysis area; however, continued successional advances are moving stands toward mature forests.

This alternative would continue to contribute to the mature forested stands in the cumulative-effects analysis area. Thus, no direct, indirect or cumulative effects to forested habitat connectivity and wildlife movements would be expected since:

1. No changes to existing stands would occur.
2. No changes to human developments, motorized access, or visual screening would occur.

3. No alterations to existing corridors or habitats within linkage zones would be anticipated.

Alternative B: Harvest – Direct and Indirect Effects

Approximately 458 acres of mature western larch/Douglas-fir and ponderosa pine stands with a closed canopy would be harvested. The majority of those acres would receive either a shelterwood or overstory removal with reserves type treatment, which would reduce habitat for those species relying on mature, closed-canopied forested habitats. Although these treatments would create fairly open stands that would not likely be used by wildlife species that use mature stands to move through the landscape, functional corridors, particularly along ridges, draws, and other topographic features, would be retained. Proposed planting and pre-commercial thinning could lead to the re-establishment of mature stands that could function as corridors in the future. The proposed treatments could also modify suitable habitats in the larger linkage zone, but would not be expected to appreciably affect use of the linkage zone by those wildlife needing those resources. The proposed activities would largely occur during the winter period when many of the wildlife needing linkage zones would not likely be using those habitats in the linkage zones. Additionally, the only permanent human development constructed would be roughly 0.4 mi of new restricted road, but this would not be expected to concentrate human activity beyond the proposed activities. Furthermore contract stipulations would minimize the presence of human-related attractants during the duration of the proposed activities. No changes in motorized human access would occur in the project area. Some changes in visual screening would occur within individual units, but the combination of irregular-shaped units, topography, and considerable unharvested patches throughout the project area would minimize the effect of the reductions in visual screening. The addition of early successional habitats intermixed in the linkage zone could create additional foraging resources for several of the species while also increasing visual screening on those areas in the near-term. Thus, a minor risk of adverse direct and indirect effects to forested habitat connectivity and wildlife movements would be expected since:

1. Proposed activities could reduce forested cover in a portion of the project area, but functional corridors would be retained.

2. Minor changes in human developments would occur, but no changes in human developments that would concentrate human activity or human-related attractants would occur.

3. No changes to motorized human access would occur.

4. Visual screening in portions of the project area would be reduced, but considerable visual screening would be retained across the project area.

Cumulative Effects of Alternative B: Harvest

Proposed harvesting would reduce forested habitats that may be serving as corridors or suitable habitats within larger linkage zones, but proposed planting and pre-commercial thinning could improve future quality of those areas. Across the cumulative effects analysis area a variety of stands are providing for wildlife movements. The proposed activities would not appreciably alter the ability of the linkage zone to meet habitat

needs for those wildlife species that need linkage zones. No appreciable changes in the presence of human developments would occur, particularly no changes in the presence of human-related attractants or concentrations of human activities beyond the short duration of proposed activities. No changes to motorized access to the cumulative effects analysis area would occur. Negligible reductions in visual screening in a small portion of the cumulative effects analysis area would occur. Thus, a minor risk of adverse cumulative effects to forested habitat connectivity and wildlife movements would be expected since:

1. Proposed activities could reduce forested cover in a small portion of the cumulative effects analysis area, but functional corridors would exist.
2. Negligible changes in human developments would occur, but no changes in human developments that would concentrate human activity or human-related attractants would occur.
3. No changes to motorized human access would occur.
4. Visual screening in a small portion of the cumulative effects analysis area would be reduced, but considerable visual screening would persist across the cumulative effects analysis area.

4.2.9 Threatened and Endangered Species

Grizzly Bears

Alternative A: Deferred Harvest (No Action) – Direct, Indirect and Cumulative Effects

No direct or indirect effects to grizzly bears would be anticipated since:

1. No disturbance or displacement would be expected.
2. No appreciable changes in hiding cover would occur.
3. Security habitat would not be altered.
4. No changes in long-term open-road densities would be anticipated.

No appreciable changes to existing habitats would be anticipated; advances in succession within those recently harvested stands could improve hiding cover and potentially foraging habitats for grizzly bears. Use of the cumulative effects analysis area by grizzly bears would not be expected to change from present levels. Thus, no further adverse cumulative effects to grizzly bears would be anticipated since:

1. No changes in human disturbance levels would be expected.
2. No changes to open road density would occur.
3. No further modifications to hiding cover would occur.
4. No changes to security habitats would be expected.

Alternative B: Harvest – Direct and Indirect Effects

This alternative might affect grizzly bears directly through increased road traffic, noise, and human activity, and indirectly by altering the amount of hiding cover and forage resources. Activities in grizzly bear habitats reduce grizzly bear security, possibly resulting in increased stress and/or energy expenditure to endure the disturbance or to move from the area. These disturbances would only be present during harvesting operations; therefore, the season of disturbance is important in addressing effects to grizzly bears. Much of the proposed activities would likely occur during the denning period, which would likely have no direct effects to grizzly bears. Some disturbance of grizzly bears would be possible with any activities that may occur during the non-denning period. Use of the project area by grizzly bears would likely be the greatest during the spring, and efforts to avoid harvesting during the spring period (April 1 – June 15) would further reduce the likelihood of disturbing and displacing grizzly bears. Overall, the proposed activities would occur in areas where low levels of grizzly bear use would be anticipated or would occur during the time periods when grizzly bears would not be expected to be using the area, leading to negligible disturbance and displacement of grizzly bears.

Hiding cover, defined as vegetation that will hide 90 percent of a grizzly bear at a distance of 200 feet, would be reduced on roughly 306 acres. Some hiding cover in the form of brush, shrubs, and sub-merchantable trees would persist in several of the units, albeit at a reduced level from the existing condition; hiding cover would increase through time as young trees and shrub regeneration proceeds over the next 5 to 10 years. Proposed planting and pre-commercial thinning could increase hiding cover in the near-term. Security habitat would not be entered or altered with this alternative.

Up to 0.4 miles of new, restricted roads would be constructed with the proposed activities. No changes in open road density or motorized public access would be anticipated. Some increases in non-motorized human access could occur on the newly constructed road. Thus, a minor risk of adverse direct or indirect effects to grizzly bears would be anticipated since:

1. Negligible disturbance and displacement would be anticipated.

2. Hiding cover would be reduced in a portion of the project area, but would remain in portions of the project area, and would be expected to recover in the short-term.

3. No changes to security habitats would be expected.

4. No changes to long-term open road density would be anticipated.

Cumulative Effects of Alternative B: Harvest

The increased use of road systems during the proposed project could temporarily increase human disturbance to grizzly bears within a portion of the cumulative effects analysis area. Proposed activities would occur in the portions 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 that are more likely to be used by grizzly bears. Furthermore, the majority of the activities would likely occur during

the denning period, which wouldn't affect grizzly bears. Collectively, minor short-term (2-4 years) increases in human disturbance would be anticipated in the cumulative effects analysis area, but again would largely occur during the periods when bears would not be using the area. Continued use of the cumulative effects analysis area by grizzly bears would be anticipated at levels similar to present. Reductions in hiding cover would be additive to the reductions from past timber harvesting, ongoing harvesting, as well as more permanent land-cover changes in the cumulative effects analysis area; however, appreciable amounts of the cumulative effects analysis area are currently providing hiding cover. Early successional stages of vegetation occurring in harvest units as well as areas proposed for planting could provide foraging opportunities that do not exist in some mature stands. No changes in long-term open-road density would be anticipated; a slight increase in non-motorized access to a small portion of the cumulative effects analysis area would occur. Thus, a minor risk of adverse cumulative effects to grizzly bears would be anticipated since:

1. Minor increases in human disturbance levels in the short-term would be expected within a small portion of the cumulative effects analysis area, but would largely occur during the denning period.

2. Hiding cover would be removed in the short-term on a small portion of the cumulative effects analysis area, but would be expected to recovery fairly rapidly.

3. No changes in long-term open road density would occur.

4. No changes to security habitats would be expected.

Canada Lynx

Alternative A: Deferred Harvest (No Action) – Direct, Indirect and Cumulative Effects

In the short-term, no changes in lynx habitat elements would be expected in the project area. In the longer-term, barring any major natural disturbances, natural succession would advance several classes forward, generally improving several classes of lynx habitats; however, summer foraging habitats would continue to be a minor component of the project area and would gradually transition into either winter foraging or other suitable habitats. Winter foraging habitats would be expected to remain at similar levels, or increase in the future, as shade-tolerant trees develop in the understory and coarse woody debris accumulates through time due to natural events. Landscape connectivity would not be altered. Thus, a negligible risk of adverse direct and indirect effects to Canada lynx would be expected since:

1. Existing winter foraging habitats would persist.

2. Summer foraging habitats would gradually disappear without disturbance.

3. The amount of temporary non-suitable habitats would not increase.

4. Landscape connectivity would not be altered.

No appreciable change in lynx habitats in the cumulative effects analysis area would occur, except the continued maturation of stands. Winter foraging habitats would be expected to improve in the future as shade-tolerant trees continue to develop in the understory, coarse woody debris accumulates through time due to natural events, and, in general, stands continue maturing out of summer foraging and other suitable habitats. No appreciable changes to landscape connectivity would be anticipated. Thus, a negligible risk of adverse cumulative effects to lynx would be expected since:

1. Winter foraging habitats would persist in the cumulative effects analysis area.

2. Summer foraging habitats would continue maturing and longer-term availability of summer foraging habitats would likely decline without disturbance.

3. No changes in the amount of temporary non-suitable habitat would occur.

4. Landscape connectivity would not be altered.

Alternative B: Harvest – Direct and Indirect Effects

Approximately 397 acres of lynx habitats (48% of lynx habitats in the project area) would be altered with proposed activities. Roughly 343 acres of winter foraging habitats and 22 acres of summer foraging habitats would be removed with the proposed treatments. These habitats would be converted to other suitable lynx habitats (230 acre increase) and temporary non-suitable habitats (135 acre increase). The younger-aged stands created with this alternative would provide summer foraging habitats into the future, as tree seedlings and shrubs recover and begin providing habitats for snowshoe hares. Proposed planting would also contribute to summer foraging habitats in the near-term. To facilitate the development of multi-storied forest canopies, small shade-tolerant trees such as grand-fir would be retained in the pre-commercial thinning unit 2, because this unit occurs in mapped lynx habitats. Similarly, retention of patches of advanced regeneration of shade-tolerant trees, such as grand-fir, in units 2, 3, and 6, would break-up site distances, provide horizontal cover, and provide forest structural attributes preferred by snowshoe hares and lynx. The total amount of lynx habitats in the project area that are in the temporary non-lynx habitat class would increase to roughly 16%. Forest connectivity could be slightly decreased, but would be maintained with several corridors being retained along riparian areas, draws, ridges, and other topographic features. Collectively, a minor risk of adverse direct and indirect effects to Canada lynx would be expected since:

1. Winter foraging habitats would be reduced.

2. Some summer foraging habitats would be removed, but some future summer foraging habitats would be created.

3. The amount of the project area in the temporary non-suitable lynx habitat category would increase to roughly 16%.

4. Connectivity could be slightly decreased, but effective corridors would be maintained.

Cumulative Effects of Alternative B: Harvest

Within the cumulative-effects analysis area, lynx habitats would continue to persist. Reductions in winter foraging (12.6%) and summer foraging (0.8%) coupled with the increases in other suitable (8.4%) and temporary non-suitable (5.0%) habitats on the portions of the cumulative effects analysis area managed by DNRC could slightly decrease the quality of the lynx habitats in the cumulative effects analysis area. Near-term increases in summer foraging habitats would be anticipated with the proposed planting and harvesting within a portion of the cumulative effects analysis area. Anticipated reductions in lynx habitats would be additive to past losses from timber harvesting and any ongoing modifications in the cumulative-effects analysis area; likewise, increases in temporary non-lynx habitats would be additive to recently converted lynx habitats due to timber harvesting. A moderate amount (13.5%) of the DNRC-managed lands in the cumulative effects analysis area would be in the temporary non-lynx habitats, meaning most of the lynx habitats would be in a usable state for lynx. Forest connectivity would not be appreciably altered within the cumulative effects analysis area. Thus, a minor risk of adverse cumulative effects to Canada lynx would be expected since:

5. Adequate winter foraging habitats would persist.

6. Summer foraging habitats would continue developing for the next 10 to 30 years.
7. Moderate amounts of lynx habitats would be in the temporary non-lynx habitat category, meaning most of the lynx habitats would be in a usable state for lynx.

8. Negligible alterations in landscape connectivity would not prevent lynx movements.

4.2.10 Sensitive Species

Bald Eagle

Alternative A: Deferred Harvest (No Action) Direct, Indirect and Cumulative Effects

No direct or indirect effects to bald eagles would be anticipated since:

1. No changes to human disturbance levels would occur.

2. No changes in the availability of large, emergent trees suitable for perching or nesting would be expected.

No cumulative effects to bald eagles would be anticipated since:

1. No changes to human disturbance levels would occur.

2. No changes in the availability of large, emergent trees would be expected.

Alternative B: Harvest – Direct and Indirect Effects

None of the proposed mechanical harvesting would occur in the home range associated with the bald eagle territory; roughly 52 acres of pre-commercial thinning and 6 acres of hand planting would occur in the home range. Should the proposed activities occur during the nesting (February 1 – August 15) period, negligible disturbance to bald eagles could occur due to the distance from the nest. Conversely, should those activities be conducted during the non-nesting period, no disturbance to bald eagles would be anticipated. No changes in availability of large snags or emergent trees that could be used as nest or perch trees would occur in the home range. No changes to human access to the home range would occur, thus limiting potential for introducing additional human disturbance to this territory. Thus, a negligible risk of direct and indirect effects to bald eagles would be anticipated since:

1. Disturbance could be slightly elevated within the home range during operations.

2. No change in human access within the project area would occur.

3. No changes in the availability of large, emergent trees would be expected.

Cumulative Effects of Alternative B: Harvest

Nesting bald eagles would continue to experience varying levels of disturbance. 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. No changes in emergent trees or snags would occur. Thus, a negligible risk of cumulative effects to bald eagles would be anticipated since:

1. Disturbance would be slightly elevated within the territory during harvesting operations.

2. No changes in human access within the territory would occur.

3. No changes in the availability of large, emergent trees would be expected.

Fisher

Alternative A: Deferred Harvest (No Action) Direct, Indirect and Cumulative Effects

Minimal changes to the stands providing fisher habitats would be expected. Habitats that are conducive to fisher denning and travel may improve in time due to increases in tree growth and canopy closure. Thus, no direct and indirect effects would affect fishers in the project area since:

1. No changes to existing habitats would be anticipated.

2. Landscape connectivity would not be altered further.

3. No appreciable changes to snags, snag recruits, and coarse woody debris levels would be anticipated.

4. No changes to human access or the potential for trapping mortality would be anticipated.

No further cumulative effects to fishers would be anticipated in the cumulative-effects analysis area since:

1. No changes to existing habitats on DNRC-managed land would occur.

2. Landscape connectivity afforded by the stands on DNRC-managed lands would not change appreciably.

3. No changes to snags, snag recruits, or coarse woody debris levels would be expected.

4. No changes to human access or the potential for trapping mortality would be anticipated.

Alternative B: Harvest – Direct and Indirect Effects

No riparian habitats would be altered with this alternative. Approximately 459 of the 1,024 acres (44.8%) of upland fisher habitats in the project area would receive treatments; roughly 245 acres would receive an overstory removal with reserves treatment and an additional 150 acres would receive a shelterwood treatment, both of which would result in stands that are too open for appreciable fisher use following proposed treatments. Additionally, roughly 76 acres would be pre-commercially thinned and another 53 acres would be planted, which could improve future habitat quality for fisher. No changes in open roads would be anticipated, which would not likely alter trapping pressure and the potential for fisher mortality. Negligible reductions in landscape connectivity could occur with the proposed activities, but activities would avoid riparian areas. Thus, a minor risk of adverse direct and indirect effects to fisher would be anticipated since:

6. Harvesting would avoid riparian areas.

7. Harvesting would reduce or remove upland fisher habitats.

8. Negligible reductions in landscape connectivity would occur, but those areas associated with riparian areas would remain unaffected.

9. Harvesting would reduce snags and snag-recruitment trees while increasing coarse woody debris levels; however, some of these resources would be retained.

10. No appreciable changes in motorized human-access levels would be anticipated.

Cumulative Effects of Alternative B: Harvest

Since no changes in riparian habitats would occur, no changes in the amount of the preferred riparian fisher cover types meeting structural requirements for fishers at the

cumulative-effects analysis area would occur. Roughly 459 acres of potential upland fisher foraging and travel habitats would be harvested; upland foraging and travel habitats would continue to be present on DNRC-managed lands in the cumulative effects analysis area as well as across the larger cumulative-effects analysis area. These reductions would be additive to the losses associated with past timber harvesting in the cumulative-effects analysis area. No appreciable changes to landscape connectivity would be anticipated, but activities would avoid riparian areas commonly used by fisher. No appreciable changes in human disturbance and potential trapping mortality would be anticipated. Thus, a minor risk of adverse cumulative effects to fisher would be anticipated since:

5. Harvesting would remove upland fisher habitats, but considerable upland habitats would persist.

6. No appreciable changes in landscape connectivity would be anticipated, but connectivity in riparian areas would not be altered.

7. Harvesting in a relatively small portion of the cumulative-effects analysis area would partially reduce snags and snag recruits, while increasing the coarse woody debris levels, largely in the smaller-sized pieces.

8. No appreciable changes to motorized human access would occur.

Flammulated Owls

Alternative A: Deferred Harvest (No Action) – Direct, Indirect and Cumulative Effects

Existing flammulated owl habitats in the project area would persist. With advancing succession, stands could continue to 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, a negligible risk of adverse direct and indirect effects to flammulated owls would be anticipated since:

1. No harvesting would occur.

2. No changes to potential nesting habitats would be anticipated.

3. Long-term, succession-related declines in foraging habitats coupled with advancing succession leading to denser stands.

Existing flammulated owl habitats would persist. Recent timber management across the cumulative effects analysis area has potentially improved flammulated owl habitats by creating foraging habitats and reversing a portion of the Douglas-fir encroachment, however retention of large ponderosa pine and/or Douglas-fir was not necessarily a consideration in some of these harvest units, thereby minimizing the benefits to flammulated owls. Areas exhibiting mature forested conditions would be expected to persist and could provide flammulated owl nesting habitats into the future. Thus, a negligible risk of adverse cumulative effects to flammulated owls would be anticipated since:

1. No harvesting would occur.

2. No changes to potential nesting habitats would be anticipated.

3. Long-term, succession-related declines in foraging habitats coupled with advancing succession leading to denser, less suitable foraging conditions.

Alternative B: Harvest – Direct and Indirect Effects

Flammulated owls are tolerant of human disturbance (McCallum 1994), however the elevated disturbance levels associated with proposed activities could negatively affect flammulated owls should activities occur during the nesting season, but the majority of activities would not occur in the nesting period. Proposed timber harvest would open the canopy while favoring western larch, ponderosa pine, and Douglas-fir. Elements of the forest structure important for nesting flammulated owls, including snags, coarse woody debris, numerous leave trees, and snag recruits would be retained in the proposed units. Proposed planting could improve foraging habitats in the near-term. The more open stand conditions, the retention of fire adapted tree species, and the maintenance of snags would move the proposed project area toward historical conditions, which is preferred flammulated owl habitat. Thus, minor positive direct and indirect effects would be expected to flammulated owls since:

1. Harvesting would open denser stands up.

2. Elements of forest structure used for foraging and nesting by flammulated owl would be retained.

3. Prescriptions would lead to more open stands with scattered mature ponderosa pine.

4. Proposed thinning and planting would promote future development of ponderosa pine within the units.

Cumulative Effects of Alternative B: Harvest

Proposed harvesting would increase the amount of the cumulative-effects analysis area that has been recently harvested, which would add to the amount of potential habitat available, but possibly at the expense of losing valuable snags and large trees important for nesting. Overall a slight improvement in habitat quality at the cumulative-effects analysis level could be realized with this alternative. The portions of the cumulative-effects analysis area not currently providing flammulated owl habitats would not be expected to change any time in the future. Collectively, stands would continue maturing and become more densely stocked, which would reduce habitat quality for flammulated owls. Thus, negligible beneficial cumulative effects to flammulated owls would be expected since:

1. Harvesting would improve the quality and sustainability of flammulated owl habitat on a small number of acres.

2. A small increase in the amount of the cumulative-effects analysis area would be more representative of historic conditions.

Pileated Woodpeckers

Alternative A: Deferred Harvest (No Action) Direct, Indirect and Cumulative Effects

No disturbance of pileated woodpeckers would occur. Forest succession and natural disturbance agents would continue to bring about changes in existing stands. Thus, a negligible risk of adverse direct and indirect effects to pileated woodpeckers 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 appreciable changes to existing pileated woodpecker habitats would be anticipated.

4. Long-term, succession-related declines in the abundance of shade-intolerant tree species, which are valuable to pileated woodpeckers, would be anticipated.

Continued use of the cumulative-effects analysis area by pileated woodpeckers would be expected at similar levels as presently occurring. Thus, a negligible risk of adverse cumulative effects to pileated woodpeckers would be expected since:

1. No further changes to existing habitats would occur.

2. No further changes to the amount of continuously forested habitats available for pileated woodpeckers would be anticipated.

3. Long-term, succession-related changes in the abundance of shade-intolerant tree species, which are valuable to pileated woodpeckers, would occur.

Alternative B: Harvest – Direct and Indirect Effects

Pileated woodpeckers tend to be tolerant of human activities (Bull and Jackson 1995), but might be temporarily displaced by the proposed harvesting and any other activities that may occur during the nesting period. Harvesting would reduce continuously-forested habitats for pileated woodpeckers. Roughly 47 acres of the potential nesting habitat would be removed. Meanwhile, an additional 524 acres of potential foraging habitats would be modified, most to the point of being temporarily unusable for pileated woodpeckers following proposed treatments. Potential pileated woodpecker habitats would be reduced for 30-100 years, depending on the density of trees retained. Elements of the forest structure important for nesting pileated woodpeckers, including snags, coarse woody debris, numerous leave trees, and snag recruits 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 densities in the project area would be expected to be reduced on 530 acres. The silvicultural prescriptions would retain healthy western larch, ponderosa pine, and Douglas-fir while promoting the growth and/or regeneration of many of these same species, which would benefit pileated woodpeckers in the future by providing

nesting, roosting, and foraging habitats. Thus, a minor risk of adverse direct and indirect effects to pileated woodpeckers would be anticipated since:

1. Harvesting would reduce the amount of continuous-forested habitats available.

2. Some potential nesting habitats would be removed and moderate reductions in potential foraging habitats would be anticipated.

3. Snags and snag recruits would be removed; however, mitigation measures to retain a minimum of 1-2 snags and snag recruits per acre would be included.

4. Proposed treatments would promote seral species in the project area.

Cumulative Effects of Alternative B: Harvest

Minor changes in pileated woodpecker habitats and further reductions in the amount of continuously forested habitats available for pileated woodpeckers would occur. Several 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. The loss of pileated woodpecker habitats under this alternative would be additive to habitat losses associated with past harvesting; continued use of the cumulative-effects analysis area would be expected. Additionally, continued maturation of stands across the cumulative-effects analysis area is increasing suitable pileated woodpecker habitats. Thus, a minor risk of adverse cumulative effects to pileated woodpeckers would be anticipated since:

1. Harvesting would reduce the amount of continuous forested habitats available in the cumulative-effects analysis area, but forested habitats would persist.

2. Potential nesting and foraging habitats would be reduced, but habitats would persist in the cumulative-effects analysis area.

3. Snags and snag recruits would be removed; however, mitigation measures would retain some of these attributes.

4. Proposed treatments would promote seral species in the project area.

4.2.11 Big Game

Alterative A: Deferred Harvest (No Action) – Direct, Indirect and Cumulative Effects

No direct or indirect effects to big game winter range would be anticipated since:

1. Subtle changes in thermal cover due to mortality and successional advances increasing canopy densities would be anticipated.

2. The amount of mature forested habitats on the winter range would not change appreciably.

3. The levels of human disturbance would remain similar.

Continued winter use of the larger winter range would be expected. No further changes in thermal cover and snow intercept would be anticipated. Human disturbance levels would be anticipated to continue at similar levels. Thus, minor positive cumulative effects to big game winter range would be anticipated since:

1. Subtle changes in thermal cover due to advances in succession that would increase canopy densities would be anticipated over time.

2. The amount of mature forested habitats on the winter range would not change.

3. The levels of human disturbance would remain similar.

Alternative B: Harvest – Direct and Indirect Effects

Some displacement would be expected as a result of the proposed activities occurring largely during the winter period. However, winter logging provides felled tree tops, limbs, and slash piles that could concentrate feeding deer during nighttime and quiet periods when logging operations are shut down. Increasing short-term forage availability in this manner may partially offset some of the effects associated with temporary displacement caused by logging disturbance. This short-term benefit would not be expected to offset effects associated with removal of thermal cover over the long-term (several decades). The shelterwood and overstory removal with reserves prescriptions on approximately 583 acres of the winter range would create open stands that would be largely too open to function as thermal cover or snow intercept, thus eliminating habitat attributes that would enable concentrated winter use by deer and elk. Similarly, the proposed commercial thinning on roughly 70 acres would reduce stand density, which would reduce snow intercept and thermal cover attributes in that portion of the project area as well. Collectively, the reductions in thermal cover and snow intercept would require 40-60 years for suitable sized trees (>40 ft. tall) to develop in the stand. Proposed planting and pre-commercial thinning could improve future thermal cover and snow intercept capacities. Proposed timber harvesting would not prevent big game movement through the project area appreciably in winter and could stimulate browse production within the units. Thus, a minor risk of adverse direct or indirect effects to big game winter range would be anticipated since:

1. The relatively short-term that logging activities could create disturbance in this area.

2. Harvesting would remove a portion of the mature forested habitats that are providing thermal cover and snow intercept habitats for big game species.

3. A moderate amount of the winter range in the project area would be altered.

Cumulative Effects of Alternative B: Harvest

Displacement associated with this alternative would be additive to any displacement associated with ongoing activities in the cumulative effects analysis area and any other disturbances that may be affecting wintering big game. Similarly, any harvesting that may be occurring on other ownerships in the cumulative effects analysis area could continue altering big game winter range and/or disturbing big game. Reductions in thermal cover and snow intercept in the project area would further reduce the amount of

the larger winter range providing these attributes for big game. Thus, a minor risk of adverse cumulative effects to big game would be anticipated since:

1. The relatively short-term that logging activities would create disturbance in a small portion of the cumulative effects analysis area.

2. A small percentage of the larger winter range would be altered.

3. Availability of lower-quality cover in the vicinity that provides some opportunity for big game should they be displaced.

5.0 List of Individuals and Groups Associated with the Project

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