ENVIRONMENTAL ASSESSMENT

FOR THE

SHILOH ROAD TIMBER SALE

PREPARED BY

David Olsen, Forest Management Supervisor

Plains Unit, Northwestern Land Office

Montana Department of Natural Resources and Conservation

April 14, 2009

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MEMORANDUM

To: Dave Olsen, Forest Management Supervisor, Plains Unit

From: Larry Ballantyne, Plains Unit Resource Program Manager

Date: December 15, 2008

RE: Shiloh Road Timber Sale Objectives

Primary Objective

The primary objective of the Shiloh Road Timber Sale is to generate income for the Public Building (PB) trust. The land parcel involved in this proposed project is located in Section 10 T21N, R26W. This project would provide an estimated 750 MBF of merchantable timber toward the Northwestern Land's FY 2009 timber sale program targeted volume goal.

Secondary Objectives

Minimize losses in timber volume from mortality due to insect and disease conditions present within the sale area.

Promote the continued presence and/or reestablishment of historically appropriate timber types on Trust land included in this project.

Reduce fire hazard and associated risks of loss to State of Montana, United States Forest Service, and privately owned lands in the area.

Management Directives

In planning and preparing this project, management direction of the State Forest Land Management Plan and associated Administrative Rules shall be followed. All applicable Streamside Management Zone rules and regulations will be met. Montana Best Management Practices will be applied in all instances.

CHECKLIST ENVIRONMENTAL ASSESSMENT

Project Name:	Shiloh Road Timber Sale
Proposed Implementation Date:	June, 2009
Proponent:	Department of Natural Resources and Conservation, Northwest Land Office, Plains Unit
Location:	Section 10, Township 21 North, Range 26 West
County:	Sanders

I. TYPE AND PURPOSE OF ACTION

The Department of Natural Resources and Conservation (DNRC) proposes to harvest approximately 8,000 tons (1.0 mmbf) of timber in the Lynch Creek drainage, 7 air miles north of Plains, Montana. The project would be a ground based harvest over approximately 130 acres .This action would produce estimated revenue of $175,000.00 for Public Buildings (P. B.) Trust Grant and an estimated $45,000.00 in Forest Improvement Fees. Activities proposed would reduce excessive fuel loading and the related risk of wildfire, reduce the risk of insect infestations, promote timber types historically found in the area, and increase forest productivity beneficial to future trust actions.

The project would include the maintenance and minor improvements of approximately 1 mile of existing road as necessary to meet Best Management Practices (BMPs).

Lands involved in this proposed project are held by the State of Montana in trust for the support of specific beneficiary institutions such as the public buildings trust, public schools, state colleges, universities, and other state institutions (Enabling Act of February 22, 1889:1972 Montana Constitution, Article X Section11). The Board of Land Commissioners and the Department of Natural Resources and Conservation are required, by law, to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run for these beneficiary institutions (Section 77-1-202, MCA). The DNRC would manage lands involved in this project in accordance with the State Forest Land Management Plan (DNRC 1996) and the Administrative Rules for Forest Management (ARM 36.11.401 through 450) as well as other applicable state and federal laws.

II. PROJECT DEVELOPMENT

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

Provide a brief chronology of the scoping and ongoing involvement for this project.

Public involvement has been solicited through local newspaper advertisements plus letters sent to adjacent landowners and other known interested parties and organizations. Three letters supporting the project, two letters concerning wildlife and one comment, via telephone, concerning access roads were received. Hydrological, soils, wildlife and vegetative concerns were identified by DNRC specialists and field foresters for the Action Alternative as well as the effects of the No Action Alternative. Issues and concerns have been resolved or mitigated through project design or would be included as specific contractual requirements of the project. Recommendations to minimize direct, indirect and cumulative impacts have been incorporated in the project design (see Attachment 1, Area Maps and Project Plan; Attachment II, Resource Analysis; Attachment III, Prescriptions; Attachment IV, Mitigation; Attachment V, Consultants and References).

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

Pile burning, if necessary, will be accomplished is accordance with State Air Quality Laws.

3. ALTERNATIVES CONSIDERED:

Action: The Action Alternative is shown in Section 1, Type and Purpose of Action. No other action alternatives were identified during project scoping or analysis; therefore only forest product removal and sale are analyzed in the EA Checklist. Recommended actions to reduce environmental effects would be incorporated into the proposed action.

No Action: Under the No Action Alternative, no activity would be undertaken. No timber would be harvested and no road improvements would occur. The No Action alternative would result in decreased growth rates, continued decline of stand conditions and increased fuel loading within the timber stands. This alternative would not produce revenue for the Public Buildings Trust Grant. Effects of the No Action Alternative are show in the Checklist and Attachments and can be used to compare effects of the proposed action.

III. IMPACTS ON THE PHYSICAL ENVIRONMENT

- *RESOURCES potentially impacted are listed on the form, followed by common issues that would be considered.*
- *Explain POTENTIAL IMPACTS AND MITIGATIONS following each resource heading.*
- *Enter "NONE" If no impacts are identified or the resource is not present.*

4. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE:

Consider the presence of fragile, compactable or unstable soils. Identify unusual geologic features. Specify any special reclamation considerations. Identify any cumulative impacts to soils.

Recommendations from a DNRC hydrologist to minimize direct, indirect, and cumulative impacts have been incorporated in the project design. (Attachment I, Area Maps and Project Plan: Attachment II, Resource Analysis: Attachment III, Prescriptions: Attachment IV, Mitigation). As detailed in the Soils Analysis, limiting the area of adverse effects would control cumulative effects.

5. WATER QUALITY, QUANTITY AND DISTRIBUTION:

Identify important surface or groundwater resources. Consider the potential for violation of ambient water quality standards, drinking water maximum contaminant levels, or degradation of water quality. Identify cumulative effects to water resources.

A DNRC hydrologist has reviewed the project area, transportation system and harvest plan. Recommendations to minimize impacts have been incorporated into the project design. No Class 1 or Class 2 streams were identified in the project area. An ephemeral draw was identified and will be treated as a Class 3 stream (See Attachment II, Resource Analysis, Hydrology Analysis/Soils Analysis; Attachment IV, Mitigation Measures). Cumulative effects to sediment delivery and water yield would be limited through BMP implementation.

6. AIR QUALITY:

What pollutants or particulate would be produced? Identify air quality regulations or zones (e.g. Class I air shed) the project would influence. Identify cumulative effects to air quality.

The project is located in Montana State Airshed 2; it is not within a Class 1 Airshed. Some particulate matter would be introduced into the Airshed from the burning of logging slash. Impacts are expected to be minor and temporary with slash burning to be conducted when conditions favor good to excellent smoke dispersion. All burning would be conducted during times of adequate ventilation within the existing rules and regulations.

7. VEGETATION COVER, QUANTITY AND QUALITY:

What changes would the action cause to vegetative communities? Consider rare plants or cover types that would be affected. Identify cumulative effects to vegetation.

Silvicultural prescriptions have been developed to keep stands moving towards historic desired cover types through the removal of diseased, insect infested and non-preferred timber species. Recommendations to minimize direct, indirect and cumulative impacts have been incorporated in the project design (see Attachment 1, Area Maps and Project plan: Attachment 2, Resource Analysis, Attachment 3, Prescriptions; Attachment 4, Mitigation). No old growth stands as defined by Green et.al. (1992) are present in the project area; therefore the action alternative would not affect old growth. No sensitive plants listed by the Montana Natural Heritage

Program have been identified in the project area. Measures to minimize noxious weeds, insects and disease are included in the project design. (See Attachment IV, Mitigations for a complete list of mitigations).

8. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS:
Consider substantial habitat values and use of the area by wildlife, birds or fish. Identify cumulative effects to fish and wildlife.

A DNRC wildlife biologist has reviewed the project area, transportation system and harvest plan. Recommendations to minimize impacts have been incorporated into the project design. (See Attachment II, Resource Analysis, Wildlife Analysis and Hydrology Analysis for the effects to species that may occur as a result of the proposed action. See Attachment IV, Mitigations for a complete list of mitigations).

9. UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES:
Consider any federally listed threatened or endangered species or habitat identified in the project area. Determine effects to wetlands. Consider Sensitive Species or Species of special concern. Identify cumulative effects to these species and their habitat.

The analysis identified suitable habitat for the following species in the project area and vicinity: the gray wolf, the flammulated owl, pileated woodpecker and the fisher. The gray wolf, listing status is currently in flux but for purposes of this analysis, it has been considered endangered as specified under the Endangered Species Act. The flammulated owl, pileated woodpecker and the fisher are listed by the DNRC as sensitive. Recommendations to minimize direct, indirect and cumulative impacts have been incorporated into project design. (See Attachment II, Resource Analysis; Wildlife Analysis for effects to species that may occur as a result of the proposed action. See Attachment IV, Mitigations for a complete list of mitigations).

10. HISTORICAL AND ARCHAEOLOGICAL SITES:
Identify and determine effects to historical, archaeological or paleontological resources.

No significant sites or artifacts were identified by a DNRC archeologist.

11. AESTHETICS:
Determine if the project is located on a prominent topographic feature, or may be visible from populated or scenic areas. What level of noise, light or visual change would be produced? Identify cumulative effects to aesthetics.

Portions of the project would be visible from the County Road # 7512. Openings from skid trails and changes in tree cover density would be seen from sections of the road until regeneration has reached the point of canopy closure again. The selective harvest prescriptions and the inclusion of a buffer strip along the main county road should minimize the visual impacts. Prescriptions are designed to mimic historical stand conditions and should not have an adverse visual impact on the area. (See Attachment IV, Mitigation).

12. DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR OR ENERGY:
Determine the amount of limited resources the project would require. Identify other activities nearby that the project would affect. Identify cumulative effects to environmental resources.

No impacts are likely to occur under either alternative.

13. OTHER ENVIRONMENTAL DOCUMENTS PERTINENT TO THE AREA:
List other studies, plans or projects on this tract. Determine cumulative impacts likely to occur as a result of current private, state or federal actions in the analysis area, and from future proposed state actions in the analysis area that are under MEPA review (scoped) or permitting review by any state agency.

Mudd Creek Environmental Analysis, 2007.
Lynch Creek Salvage 3 & 4 Environmental Analysis, 2007.
West Lynch Timber Sale Environmental Analysis, 2002.

IV. IMPACTS ON THE HUMAN POPULATION

- *RESOURCES potentially impacted are listed on the form, followed by common issues that would be considered.*
- *Explain POTENTIAL IMPACTS AND MITIGATIONS following each resource heading.*
- *Enter "NONE" If no impacts are identified or the resource is not present.*

14. HUMAN HEALTH AND SAFETY:

Identify any health and safety risks posed by the project.

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

15. INDUSTRIAL, COMMERCIAL AND AGRICULTURE ACTIVITIES AND PRODUCTION:

Identify how the project would add to or alter these activities.

Timber harvest would provide continuing industrial production in the Plains area.

16. QUANTITY AND DISTRIBUTION OF EMPLOYMENT:

Estimate the number of jobs the project would create, move or eliminate. Identify cumulative effects to the employment market.

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

17. LOCAL AND STATE TAX BASE AND TAX REVENUES:

Estimate tax revenue the project would create or eliminate. Identify cumulative effects to taxes and revenue.

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

18. DEMAND FOR GOVERNMENT SERVICES:

Estimate increases in traffic and changes to traffic patterns. What changes would be needed to fire protection, police, schools, etc.? Identify cumulative effects of this and other projects on government services

Log trucks hauling to the purchasing mill would result in temporary increases in traffic on Road #7512 (County Road) and Highway 200. The ACM Road # 56 would have a temporary increase if an alternative haul route is used. This increase is a normal contributor to the activities of the local community and industrial base and cannot be considered a new or increased source.

19. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS:

List State, County, City, USFS, BLM, Tribal, and other zoning or management plans, and identify how they would affect this project.

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

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

On March 13, 2003, the DNRC adopted Administrative Rules for Forest Management (Rules) (Administrative Rules of Montana [ARM] 36.11.401 through 456). The Rules provide DNRC personnel with consistent policy, direction, and guidance for the management of forested trust lands. Together, the SFLMP and Rules define the programmatic framework for this project.

20. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITIES:
Identify any wilderness or recreational areas nearby or access routes through this tract. Determine the effects of the project on recreational potential within the tract. Identify cumulative effects to recreational and wilderness activities.

The area is hunted frequently. Skid trails will be closed after the project to restrict and minimize illegal off- road vehicle use, closure of them will not affect the ability of people to recreate on these parcels. Recreational areas and wilderness are not accessed through this tract. Use is expected to remain the same following this project.

21. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING:
Estimate population changes and additional housing the project would require. Identify cumulative effects to population and housing.

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

22. SOCIAL STRUCTURES AND MORES:
Identify potential disruption of native or traditional lifestyles or communities.

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

23. CULTURAL UNIQUENESS AND DIVERSITY:
How would the action affect any unique quality of the area?

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

24. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:
Estimate the return to the trust. Include appropriate economic analysis. Identify potential future uses for the analysis area other than existing management. Identify cumulative economic and social effects likely to occur as a result of the proposed action.

Costs, revenues and estimates of return are estimates intended for relative comparison of alternatives. They are not intended to be used as absolute estimates of return. The estimated stumpage is based on comparable sales analysis. This method compares recent sales to find a market value for stumpage. These sales have similar species, quality, average diameter, product mix, terrain, date of sale, distance from mills, road building and logging systems, terms of sale, or anything that could affect a buyer's willingness to pay for. The effect of the proposed project would generate an estimated return to the school trust of $175,000.00 in the Alternative Action. The No Action alternative does not generate income to the school trust at this time.

EA Checklist Prepared By:	Name: David Olsen	Date: 4/14/2009
	Title: Forest Management Supervisor	

V. FINDING

25. ALTERNATIVE SELECTED:

The Action Alternative is selected for implementation

26. SIGNIFICANCE OF POTENTIAL IMPACTS:

No significant impacts are created by implementing the action alternative.

27. NEED FOR FURTHER ENVIRONMENTAL ANALYSIS:

[ ] EIS [ ] More Detailed EA [X] No Further Analysis

EA Checklist Approved By:	Name: Larry Ballantyne
	Title: Plains Unit Resource Program Manager
Signature: Larry Ballantyne	Date: 20 April 2009

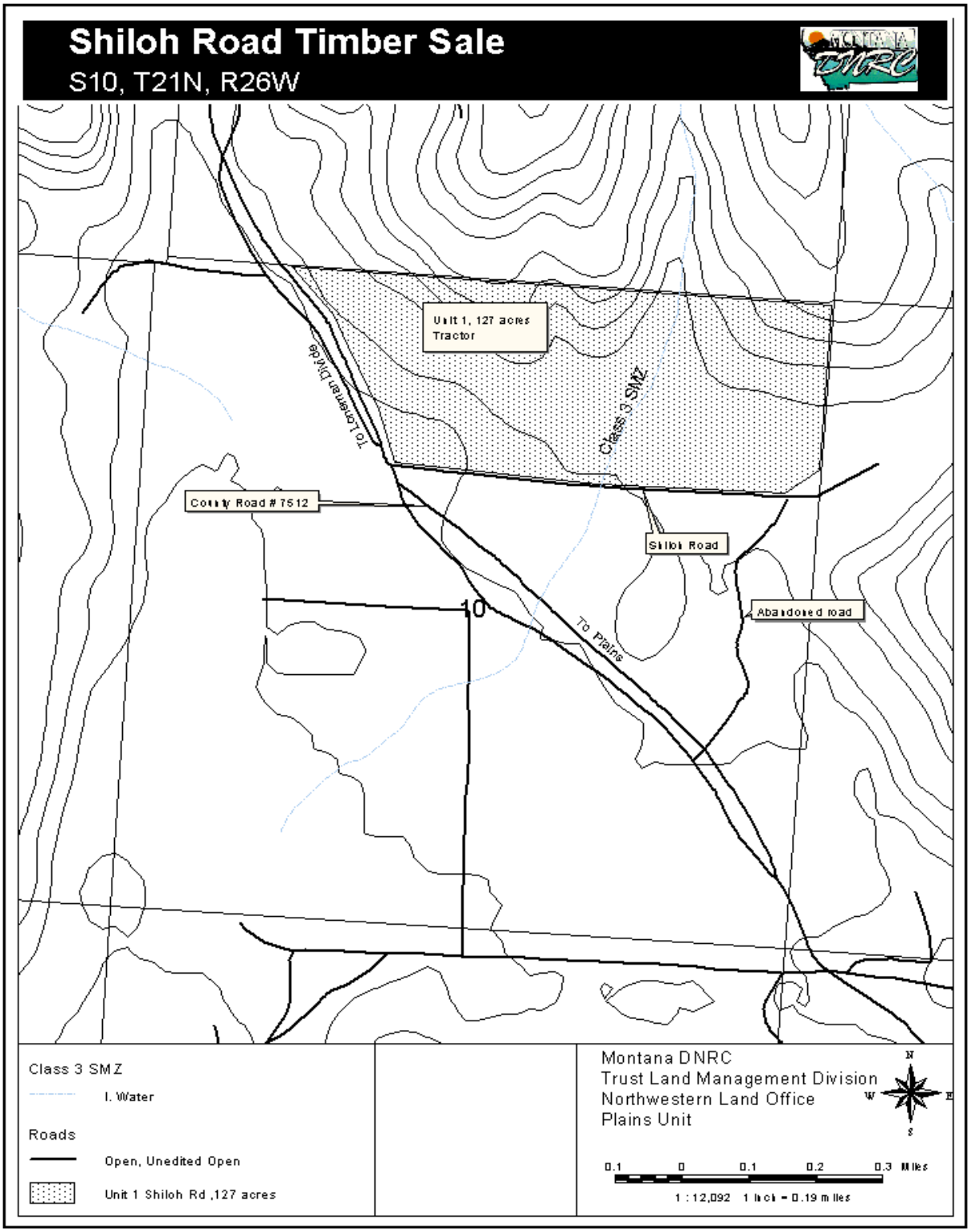
Attachment I

Sale & Access Maps

Harvest Units and Travel Plan

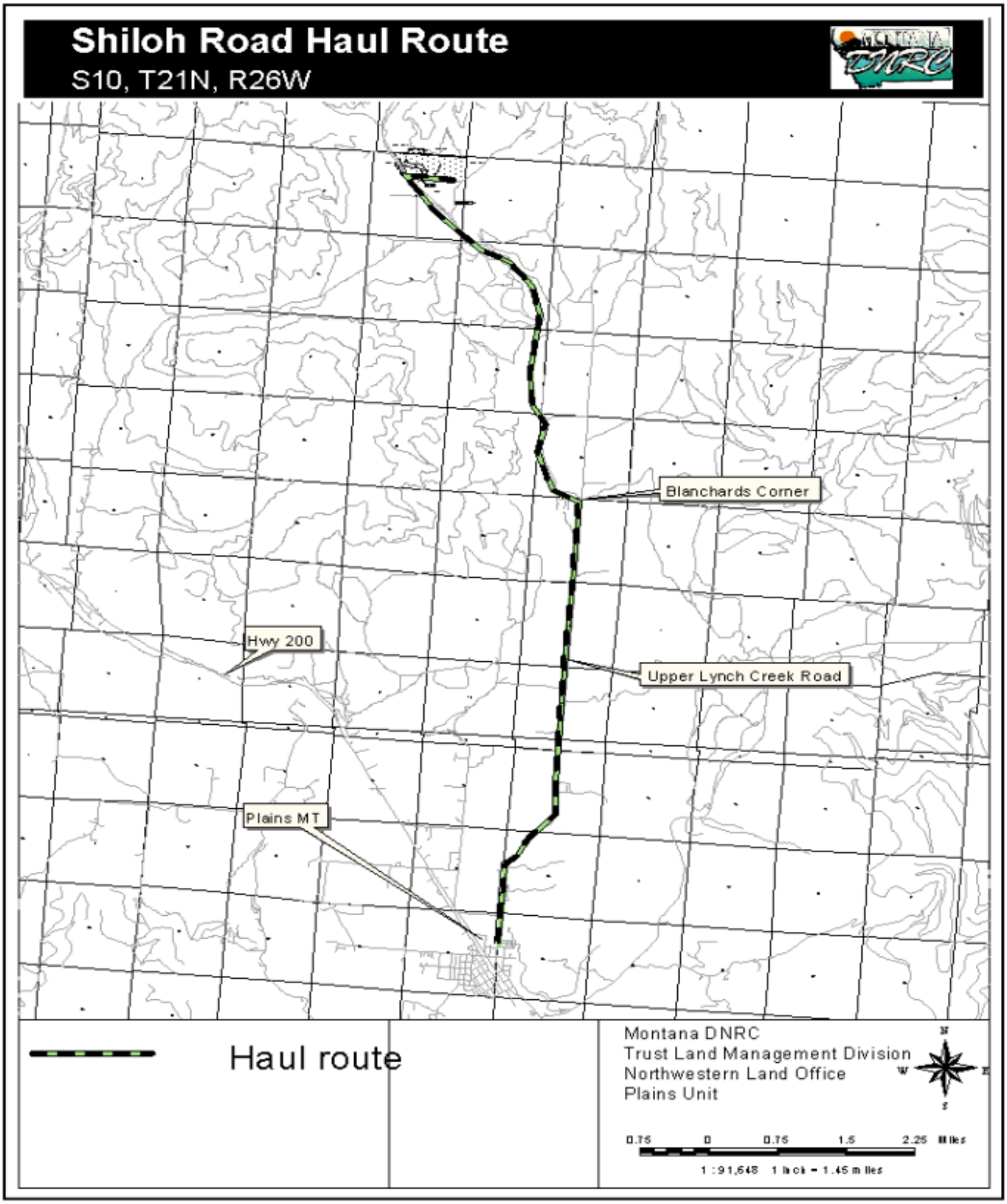
Cover Types

Attachment A



Plot date: February 20, 2009 c:\gis\daues\shiloh rd. sale\shiloh.apr

Attachment A



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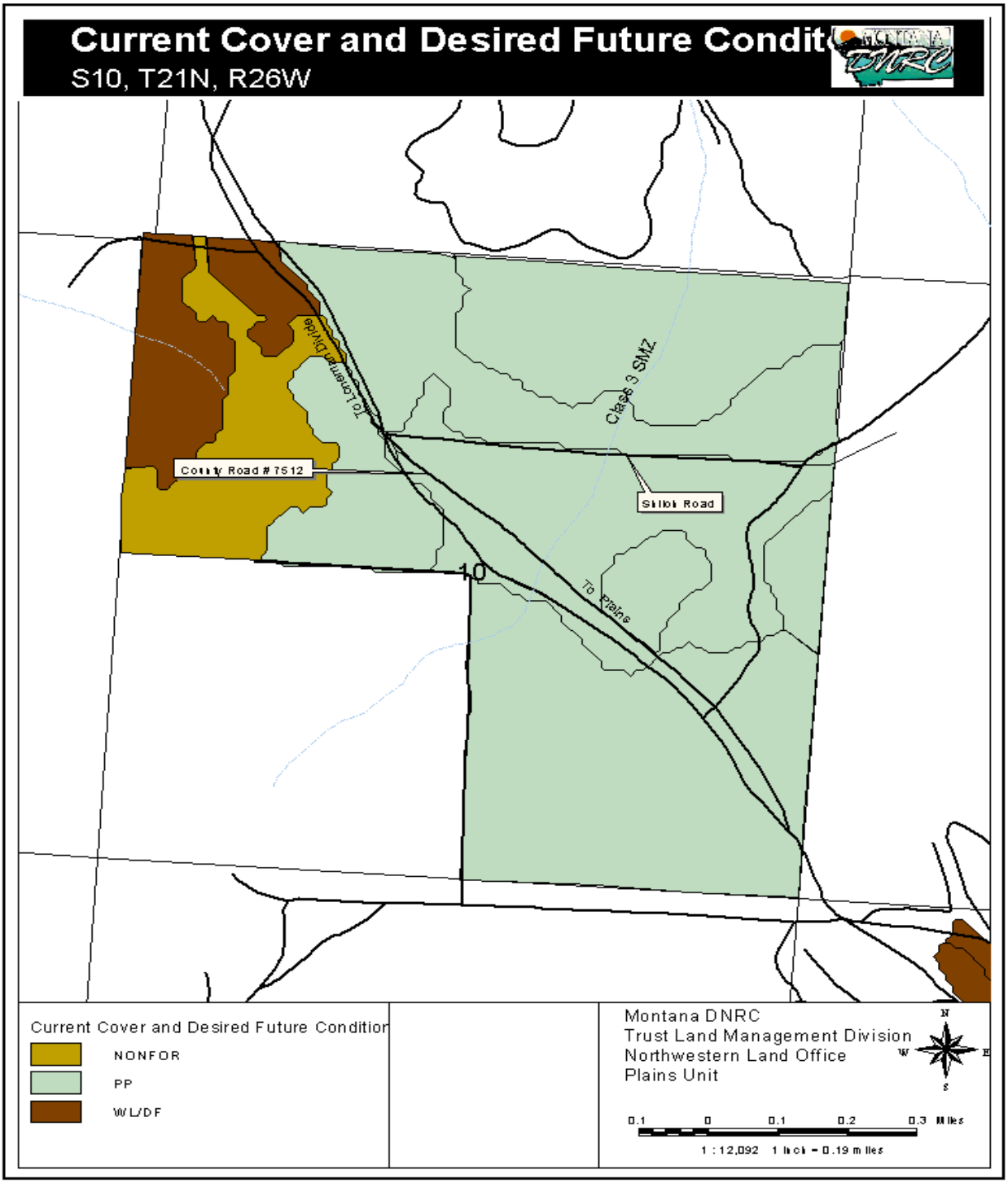
Attachment A



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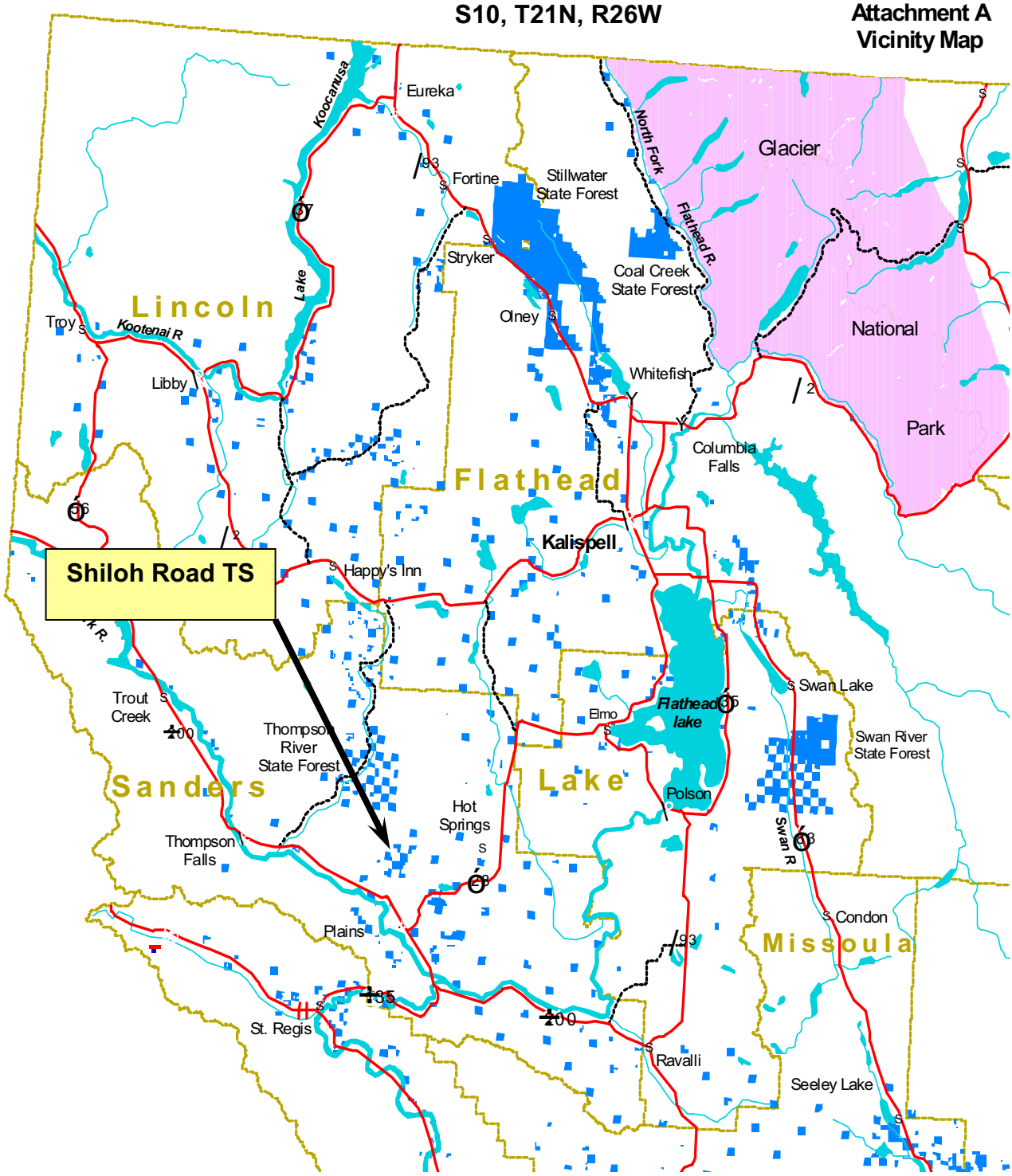
Shiloh Road Timber Sale
S10, T21N, R26W

Attachment A
Vicinity Map



0 10 20 30 40 50
Miles

N
W E
S

Highways
Other Roads
County line
Lakes
Streams
State Land

Attachment II

Resource Analysis

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Vegetation Analysis

Introduction

This analysis is designed to disclose the existing condition of the vegetative resource and display the anticipated effects that may result from each alternative of this proposal. During the initial scoping, issues were developed by the public and internally regarding vegetative concerns. The following concerns were expressed from these comments regarding proposed timber harvesting and related activities:

- Concern regarding impacts to threatened, endangered and sensitive plant and animal species (TES).
- Aesthetics: There are concerns that harvesting activities would reduce the visual quality along the County Road.
- Fire Ecology: There is concern that the exclusion of fire from the site has changed stand compositions, and age classes from what would have historically occurred in the area. There is also concern that forest fuels have accumulated to a point that would leave this area predisposed to a catastrophic fire event.
- Forest Health: There are concerns that endemic populations of diseases and insects are increasing on the site and have the potential to reach epidemic proportions or reduce productivity.

Analysis Area

The analysis area for vegetation is the State Section 10, Township 21 North, Range 26 West, and north of Shiloh Road. The section is referred to as the Jones Bench parcel. This analysis will adequately allow for the disclosure of existing conditions, direct, indirect, and cumulative impacts.

Analysis Method

The Plains Unit typically prepares two to four timber sales per year. Each project is evaluated for its potential effects on lands managed by the DNRC and the surrounding landscape. Methods used in the analysis included review of stand level inventory (SLI), field visits, review of scientific literature, aerial photography, and consultation with other professionals.

Existing Condition

Section records indicate that logging activities have been occurring on the Jones Bench parcel as early as the 1940's. The Jones Bench parcel has had one large timber sale removing 1,430 mbf in 1989. Five commercial Christmas tree permits between 1948 and 1967 were issued. Numerous post and rail permits have been sold between 1967 and 1994. Seven timber salvage permits totaling 205 mbf and 2400 tons of pulps were issued between 1976 and 1988. The last entry in the area north of Shiloh road was a 46 acre commercial thinning in 1975. The previous logging and fire suppression history of these parcels has led to stands that are of the appropriate timber types, but have become overstocked with shade tolerant tree species (Douglas fir and grand fir) and are not regenerating with appropriate species composition (ponderosa pine). A map showing current cover type and desired future conditions, for the Jones Bench Parcel, can be seen in Attachment 1, Maps.
All stands within the project area are beginning to show increases in fuel loading as advanced shade tolerant regeneration has increased ladder fuels. This type of fuel loading is occurring in parts of all stands within the project area. There is also mortality due to insects and disease in both the overstocked understory and the intermediate components of these stands. Overstory mortality due to insects and disease is also increases fuel loading. Contributing to the mortality in the intermediate components of these stands are heavy infestations of Dwarf mistletoe (*Arceuthobium douglasii & Arceuthobium laricis*), Douglas-fir beetle (*Dendroctunus pseudotsugae*), western pine beetle (*Dentroctonus brevicomis*) and root rots. Tree boring indicates core rot in many of the large diameter (> 25 in dbh) Douglas fir. There is a minor component of noxious weeds present throughout the project area, mostly prevalent along open roads.

Direct and Indirect Effects

<u>No Action Alternative</u>

No timber harvest or associated activities would occur under this alternative. Timber types would continue to advance towards climax conditions with shade tolerant Douglas- fir and grand fir continuing to thrive in the understory. These species have already begun to become dominant and are replacing the ponderosa pine, lodgepole pine and western larch. Growth and vigor of the trees present in the analysis area would continue to

decline as competition for resources increases. Noxious weeds would continue to exist along the roads and move into the forested areas as natural disturbances prepare appropriate seedbeds.

Action Alternative
The proposed alternative would harvest timber and maintain 130 acres of ponderosa pine cover types. None of the proposed harvest area is in old growth timber as defined by Green et.al. The harvest would be focused on the removal of mistletoe infected Douglas fir and western larch, beetle infested lodgepole pine and ponderosa pine with poor crown development. More detailed information for treatment by individual units can be obtained in Attachment 3, Prescriptions. Through harvest and site preparation activities, fuel loadings would be reduced by the removal of ladder fuels from the understory intermediate components of these stands as well as increase crown spacing in the intermediate and overstory components. Growth and vigor would increase because residual tree spacing would allow full light to crowns and more access to water. Adverse visual effects could occur in the short term but are expected to decrease as seral species invade openings created during logging. The impact would be reduced by using road screening, skid trail and corridor design with the appropriate logging systems. Noxious weeds may increase in canopy openings and will be monitored and addressed through an integrated pest management plan including chemical and biological control methods.

Cumulative Effects

No Action Alternative
Under this alternative, stand structure and species composition on State land across the Plains Unit are expected to continue the change toward more shade tolerant species. Fuel loading is also expected to increase.

Action Alternative
The Alternative Action would maintain the current cover and enhance the desired future condition vegetation types as identified by the Stand Level Inventory. The project area would be altered with regard to overall size class distribution and a reduction in stocking levels. Stand density and forest canopy structure within the proposed harvest unit would be reduced from 85-90% to 30-35% canopy cover. Harvest would focus on removing diseased, bug infested and shade tolerant species. Due to the small number of acres harvested expected effects would be minor. No road construction would be required for this proposed timber sale; the proposed project would utilize existing roads. These changes will not have a significant impact across the landscape of the Plains Unit.

WILDLIFE ANALYSIS

Introduction

This analysis is designed to disclose the existing condition of the wildlife resources and display the anticipated effects that may result from each alternative of this proposal. During the initial scoping, several comments were received regarding the effects of proposed timber harvesting that led to the following list of issues:

- Concern was expressed that timber harvesting could reduce forested cover, which could reduce the amount of mature forested habitats available to those species that rely on these habitats and/or decrease the ability of some wildlife species to move through the landscape, which could alter their ability to use the area and or successfully reproduce.
- Concern was expressed that timber harvesting could reduce snags and coarse woody debris densities, leading to a decline in the quality of habitat for those wildlife species that are dependant upon these resources, which could alter their survival and/or reproductive ability.
- Concern was expressed that timber harvesting and associated activities could displace gray wolves from important habitats, particularly denning and rendezvous sites and/or alter prey availability.
- Concern was expressed that timber harvesting and associated activities could reduce fisher habitat availability and quality by reducing canopy cover, snag density, and the amount of coarse woody debris.
- Concern was expressed that timber harvesting and associated activities could enhance flammulated owl habitat by reducing canopy closure and increasing tree spacing, but could remove snags needed by flammulated owls for nesting
- Concern was expressed that timber harvesting and associated activities could remove canopy cover and snags needed by pileated woodpeckers to forage and nest and/or displace nesting pileated woodpeckers from active nests, resulting in increased mortality to pileated woodpecker chicks.
- Concern was expressed that timber harvesting and associated activities could remove thermal cover on big game winter ranges, which could reduce carrying capacity of the winter range.

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

Analysis Area

The discussions of existing conditions and environmental effects will focus on two different scales. The first will be the “project area,” which consists of portions of Section 10, T21N, R26W. The project area will be used to assess the direct and indirect effects the proposed action may have on wildlife and their habitats. The second scale or the “analysis area” relates to the surrounding landscape for assessing cumulative effects to wildlife and their habitats. The scales of these analysis areas vary according to the species being discussed, but generally approximate the size of the home range of the discussed species.

Analysis Methods

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

For each species or habitat issue, existing conditions of wildlife habitats are described and compared to the anticipated effects of the proposed No Action and each Action Alternative to determine the foreseeable impacts to associated wildlife habitats.

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

Relevant Agreements, Laws, Plans, Rules, and Regulations
Various legal documents dictate management criteria for management of wildlife and their habitats on state lands. The documents most pertinent to this project include: DNRC Forest Management ARMs, the Endangered Species Act, the Migratory Bird Treaty Act, and the Bald and Golden Eagle Protection Act.

COARSE FILTER WILDLIFE ANALYSIS

Of the 108 mammal species found in Montana, 68 are suspected or known to occur in Sanders County (Foresman 2001). The majority of terrestrial vertebrates that were present at the time of European settlement likely still occur in the vicinity of the proposed project area. Eight amphibian and nine reptile species have also been documented in Sanders County (Maxell et al. 2003) and at least 151 species of birds have been documented in the vicinity in the last 10 years (Lenard et al. 2003). Terrestrial species that rely on special habitat elements, such as white bark pine (*Pinus albicaulis*), western white pine (*Pinus monticola*), or burned areas, may not be present or occur in lower abundance due to the decline of these elements across the landscape. Over time, due to fire suppression, tree densities have increased and shade-tolerant species, such as Douglas-fir and grand fir have become more prevalent than they were historically. These departures probably benefit wildlife species that rely on shade-tolerant tree species and/or closed-canopy habitats, while negatively affecting species that rely on shade-intolerant tree species and/or open habitats.

MATURE FORESTED HABITATS AND LANDSCAPE CONNECTIVITY

Issue: Concern was expressed that timber harvesting could reduce forested cover that could reduce the amount of mature forested habitats available to those species that rely upon these habitats and/or decrease the ability of some wildlife species to move through the landscape, which could alter their ability to use the area and or successfully reproduce.

Introduction

A variety of wildlife species rely upon mature to old stands for some or all life requirements. A partial list of these species includes pileated woodpeckers (*Dryocopus pileatus)*, American marten (*Martes americana*), brown creepers (*Certhia americana)*, and winter wrens (*Troglodytes troglodytes*). Wildlife species that require connectivity of forest habitat types between patches or those species that are dependent upon interior forest conditions can be sensitive to the amount and spatial configuration of appropriate habitats. Some species are adapted to thrive near patch edges, while others are adversely affected by the presence of edge or the other animals that prosper in edge habitats. Connectivity of forested habitats facilitates movements of those species that avoid non-forested areas and other openings; connectivity under historical fire regimes likely remained relatively high as fire differentially burned various habitats across the landscape.

Wildlife species that require connectivity of forest habitat types between patches or those species that are dependent upon interior forest conditions can be sensitive to the amount and spatial configuration of appropriate habitats. Some species are adapted to thrive near patch edges, while others are adversely affected by the presence of edge or other animals that prosper in edge habitats.

Analysis Area

Direct and indirect effects were analyzed on the project area. Cumulative effects were analyzed on the eight surroundings sections (approximately 5,414 acres). This scale of analysis would be large enough to support a diversity of species that use mature forested habitats and/or require connected forested habitats.

Analysis Methods

Mature forested habitats and landscape connectivity were assessed using field evaluations, aerial photograph interpretation, and GIS analysis. Factors considered within the analysis include the level of harvesting, amount of densely forested habitats, and connectivity.

EXISTING ENVIRONMENT

There are approximately 130 acres within the project area that are classified as mature (at least 100 plus years of age). These stands are primarily comprised of Douglas fir/ponderosa pine, as well as some western larch of varying ages and stocking densities. Connectivity within the project area has been compromised with past timber harvesting, county road # 7512, and other human development on private lands.

The network of open roads through the cumulative effects analysis area (approximately 15 miles) coupled with a mosaic of timber management regimes implemented by multiple lands owners (DNRC, Plum Creek Timber Company, and private) has reduced some of the landscape-level connectivity. On DNRC owned land within the cumulative analysis area approximately 862 acres have undergone some level of timber management within the last 30 years. However, across the cumulative effects analysis area, a moderate amount of landscape connectivity and forested interior habitats remain.

Direct and Indirect Effects of the No-Action Alternative on mature forested habitats and connectivity

Forest conditions would continue to age and move toward denser stands of shade-tolerant tree species with high canopy cover. Largely, no appreciable changes to forest age, the distribution of dense forested cover, or landscape connectivity would be anticipated. No changes in wildlife use would be expected; wildlife favoring dense stands of shade-tolerant tree species would benefit, while those requiring conditions likely found under natural disturbance regimes would continue to be underrepresented. This area would continue to contribute a minor amount of habitat for old stand associated species, such as American marten, northern goshawk, and pileated woodpecker; however western larch and ponderosa pine, preferred snag species, could decline in abundance over time. Thus, since 1) no changes to existing stands would occur, 2) no appreciable changes to forest age, the distribution of dense forested cover, or landscape connectivity would be anticipated, and 3) no changes to wildlife use would be expected, no direct or indirect effects to mature forested habitats and connectivity would be expected that could affect wildlife in the project area.

Direct and Indirect Effects of the Action Alternative on mature forested habitats and connectivity

Approximately 130 acres of Douglas-fir/ponderosa pine stands would be harvested, all of which is mature forest (at least 100 plus years of age) with a closed canopy. Under this alternative the majority of these acres of mature, forested habitats would receive a regeneration-type treatment, which would reduce habitat for those species relying upon mature, closed-canopy forested habitats. Overall, the resultant changes in stand age and density would reduce habitats for species associated with older stands, such as American marten and pileated woodpeckers, which benefited from the increasing stand ages and densities caused by modern fire suppression. Minor reductions in landscape connectivity would be anticipated with the proposed harvesting; however, landscape connectivity has been compromised in the vicinity with diversity of ownership, past harvesting, human development, and roads. In general, under this alternative habitat conditions would improve for species adapted to more open forest conditions, while reducing habitat quality for species that prefer dense, mature forest conditions. Thus, since 1) harvesting would reverse succession in several stands, reducing stand age and the amount of forested cover, 2) minor changes to landscape connectivity would occur, and 3) some changes to wildlife use would be expected, minor adverse direct and indirect effects to mature forested habitats and connectivity would be expected that could affect wildlife in the project area.

Cumulative Effects of the No-Action Alternative on mature forested habitats and connectivity

Habitats within the cumulative effects analysis area are a mosaic of habitat types and age classes. Past harvesting on DNRC, Plum Creek Timber Company, and private lands has reduced the amount of mature, forested habitats. Levels of mature forest and connectivity have been impacted by a wide variety of timber management regimes on private and industrial lands within the cumulative effects analysis area. Aerial photograph interpretation showed mature forest characteristics in approximately 57% of lands owned privately or by Plum Creek Timber Company. Approximately 862 acres of the total 1705 DNRC owned acres have undergone some sort of timber management within the last 30 years. However across the cumulative effects analysis area conversion to mature forest appears to be the trend. This alternative would continue to contribute to the mature forested stands on DNRC owned lands. Losses of individuals and pockets of trees would not likely alter the overall age or landscape connectivity. Ongoing activities on other land ownerships would continue reducing forested habitats and/or altering connectivity. Under this alternative, continued use of the analysis area by species favoring dense stands of shade-tolerant tree species would be expected. Habitat for old stand associated species, such as American marten, northern goshawk, and pileated woodpecker, would likely persist. Thus, since 1) no changes to existing stands would occur, 2) no further changes to forest age, the distribution of dense forested cover, or landscape connectivity would be anticipated, and 3) no changes to wildlife use would be expected, no cumulative effects to mature forested habitats and connectivity would be expected that could affect wildlife in the cumulative effects analysis area.

Cumulative Effects of the Action Alternative on mature forested habitats and connectivity

Despite the general trend in the cumulative effects analysis area of conversion to mature forested habitats, past harvesting on all ownerships has reduced the amount of mature, forested habitats. Reductions in mature, forested habitats associated with this alternative would be additive to losses associated with past harvesting activities. Across the analysis area, wide-ranging forested habitats would still exist and landscape connectivity would persist. Habitats for old stand associated species, such as American marten, northern goshawk, and pileated woodpecker, would be expected to be reduced; however continued use of the analysis area would be expected. Thus, since 1) harvesting would remove mature stands, further reducing the amount of forested cover in the cumulative effects analysis area, 2) no appreciable changes to landscape connectivity would occur, and 3) some changes to wildlife use would be expected, minor adverse cumulative effects to mature forested habitats and connectivity would be expected that could affect wildlife in the cumulative effects analysis area.

SNAGS AND COARSE WOODY DEBRIS

Issue: Concern was expressed that timber harvesting could reduce snags and coarse woody debris densities, leading to a decline in the quality of habitat for those wildlife species that are dependant upon these resources, which could alter their survival and/or reproductive ability.

Introduction

Snags and coarse woody debris are an important component of the forested ecosystems. The 5 primary functions of dead wood in the forested ecosystems are to 1) increase structural diversity, 2) alter the canopy microenvironment, 3) promote biological diversity, 4) provide critical habitat for wildlife, and 5) act as a storehouse for nutrient and organic matter recycling agents (Parks and Shaw 1996). Snags and defective trees (partially dead, spike top, broken top) are used by a wide variety of wildlife species for nesting, denning, roosting, feeding, and cover. Snags and defective trees may be the most valuable individual component of Northern Rocky Mountain forests for wildlife species (Hejl and Woods 1991). The quantity, quality, and distribution of snags affect the presence and population size of many of these wildlife species.

Snags provide foraging sites for insectivorous species and offer opportunities for primary cavity-nesting species to excavate nests. The cavities created by primary excavators (i.e. woodpeckers) also provide habitat for secondary cavity users, including other birds and small and mid-sized mammals. Snags and defective trees can also provide nesting sites for secondary cavity users where cavities are formed by broken tops and fallen limbs. Primary risk factors include loss to legal and illegal firewood cutting, prescribed burning, removal for wood fiber, purposeful felling during timber harvest operations for human safety, and incidental loss during logging due to equipment operation and yarding activities.

The tree species, diameter, height, decay stage, species, and densities of snags determine the snag-habitat value for wildlife species. Larger, taller snags tend to provide nesting sites, while shorter snags and stumps tend to provide feeding sites (Bull et al. 1997). Many species that use smaller diameter snags will also use large snags; however, the opposite is not true. Typically, older-aged stands will have greater numbers of large snags. Snags in early stages of decay are often used more for feeding substrates, while mid-level decay provides opportunities for cavity excavation (Schepps et al. 1999). Some species of trees decay at slower rates than others, thereby providing habitat for longer periods of time. For example, western larch, western white pine, and ponderosa pine are harder woods that decay less rapidly than Douglas-fir, subalpine fir, or Engelmann spruce trees. Finally, snag densities are another important aspect of habitat value for cavity-nesting birds, as many of these species tend to nest in areas where snag densities are high, using one snag for nesting but having others nearby for foraging or roosting opportunities.

Meanwhile, coarse woody debris provides structural diversity and promotes biological diversity by providing habitat for many wildlife species. Many small mammals require coarse woody debris to survive. In turn, these species distribute fungi which are beneficial for seedling establishment and tree growth (Graham et al. 1994). Additionally, coarse woody debris can provide feeding substrates for species such as pileated woodpeckers and black bears, as logs will often host high densities of insects (Aney and McClelland 1985). Forest carnivores such as pine marten and lynx rely on coarse woody debris to provide resting and denning habitat (Patton and Escano 1985, Squires et al. 2008).

The quality and distribution of coarse woody debris can affect habitat quality for wildlife species that rely upon it to meet various life requisites. Longer lengths of large diameter downed wood typically provide higher quality habitat for wildlife than do smaller and/or shorter pieces. Single scattered logs can provide lookout and travel sites while log piles provide denning and resting habitat. Under natural conditions, logs tend to occur in patches or clumps, often where a blow-down event has occurred, with scattered lone logs occasionally distributed in between.

Analysis Area

Direct and indirect effects were analyzed on the project area. Cumulative effects were analyzed on the surrounding eight sections (approximately 5,414 acres). This scale of analysis would be large enough to support a diversity of species that use coarse woody debris resources, from birds to small mammals and meso-carnivores.

Analysis Methods

Snags and coarse woody debris were assessed during site visits and reviewing past DNRC harvesting information. Factors considered within the analysis include the level of harvesting, number of snags and coarse woody debris, and risk level of firewood harvesting.

EXISTING ENVIRONMENT

During field visits, 0 to 6 variably spaced snags per acre and approximately 15-20 tons of coarse woody debris per acre were observed within the project area. The snags and coarse woody debris exhibit a range of sizes and decay classes, ranging from small to large and sound to almost fully decayed. The network of open roads in the project area has facilitated firewood gathering, which has affected snag and coarse woody debris levels in the vicinity.

Past harvesting in the surrounding area has reduced the availability of snags and snag recruits while increasing coarse woody debris levels, however on DNRC owned lands minimum retention thresholds for each of these resources have been retained in the recent past. Snags and coarse woody debris are frequently collected for firewood, especially near open roads.

Direct and Indirect Effects of the No-Action Alternative on snags and coarse woody debris

No direct changes in the deadwood resources would be expected. Existing snags would continue to provide wildlife habitats and new snags would be recruited as trees die. However, in the long-term, densities of shade-intolerant trees and resulting snags could decline as these species are replaced by increasing numbers of shade-tolerant species. Shade-intolerant species tend to provide important habitats, such as nesting structures and foraging habitats, for cavity-nesting birds. Coarse woody debris would persist without other disturbances influencing its distribution and quality. Continued decay and decline in existing snags and trees would continue

to contribute to the coarse woody debris in the project area. Thus, since, 1) no harvesting would occur that would alter present or future snag or coarse woody debris concentrations, and 2) no changes to human access for firewood gathering would occur, negligible direct and indirect effects would be anticipated to snags and coarse woody debris would be expected to affect wildlife species requiring these habitat attributes.

Direct and Indirect Effects of the Action Alternative on snags and coarse woody debris

Present and future snags and CWD would be reduced due to timber harvesting on 130 acres within the project area. Prescriptions call for a minimum of 2 large snags per acre (> 21 in. dbh where they exist, otherwise the next largest size class), 2 large snag recruits per acre (>21 in. dbh where they exist, otherwise the next largest size class), and 10-15 tons of CWD per acre would be planned for retention within the project area where they exist. Prescriptions call for girdling of some large (> 25 in dbh) diseased Douglas fir in areas where they would not be readily available to firewood gatherers. However, some snags and/or recruit trees could be lost due to safety and operational concerns, but replacements would be identified in order to stay in compliance with ARM 36.11.411. Future snag quality in the project area would be enhanced with proposed silvicultural prescriptions that should lead to the re-establishment of shade-intolerant species that tend to provide important habitats, such as long lasting nesting structures and foraging habitats, for cavity nesting birds. Thus, since 1) harvesting would reduce snag, snag recruitment trees, and CWD, and 2) negligible changes to human access for firewood gathering would occur, minor adverse direct and indirect effects to snags and coarse woody debris would be anticipated that would affect wildlife species requiring these habitat attributes for 30-100 years.

Cumulative Effects of the No-Action Alternative on snags and coarse woody debris

Snags and coarse woody debris would not be altered in the project area. The species composition of future snags could be altered with changing species composition in the stands due to advances in succession. Snags have been retained during some of the past harvesting across the cumulative effects analysis area. Snags and snag recruits have been retained with recent harvesting across DNRC owned lands. Firewood and other forest product gathering have reduced these deadwood resources in the vicinity. Wildlife species in the cumulative effects analysis area that rely on snags and coarse woody debris would be expected to persist. Thus, since 1) no further harvesting would occur, 2) negligible changes in the numbers of snags, and 3) no change in the level of firewood gathering, no cumulative effects to snags and coarse woody debris would be anticipated.

Cumulative Effects of the Action Alternative on snags and coarse woody debris

Some snags and coarse woody debris could be removed from the project area, while others may be recruited. The losses of snags and coarse woody debris associated with this alternative would be additive to the losses associated with firewood gathering as well as past and ongoing harvesting occurring in the area. However, the project requirements to retain a minimum of 2 large snags per acre (>21 in. dbh where they exist, otherwise the next largest size class), 2 large snag recruits per acre (> 21 in. dbh where they exist, otherwise the next largest size class), and 10-15 tons of CWD per acre would mitigate additional cumulative effects associated with this project. There would be areas where these requirements would not be met due to a lack of snags, risk of firewood gathering, or higher removal requirements for fire protection purposes. Species that rely on snags and coarse woody debris in the cumulative effects analysis area would be expected to persist at similar levels, albeit slightly lower numbers on proposed harvest sites following treatment. Thus, since 1) a cumulative amount of the analysis area would be harvested reducing snags and snag recruit trees, 2) no change in access for the general public and associated firewood gathering would be anticipated, and 3) the slightly increased representation of shade-intolerant species that could become snags in the long term, minor adverse effects to wildlife requiring snags and CWD would be anticipated that would affect these species in the cumulative effects analysis area for 30-100 years.

FINE-FILTER ANALYSIS

In the fine-filter analysis, individual species of concern are evaluated. These species include wildlife species listed as threatened or endangered under the Endangered Species Act of 1973, species listed as sensitive by DNRC, and species managed as big game by DFWP**.** TABLE W-1 – STATUS OF SPECIES CONSIDERED IN THE FINE FILTER ANALYSIS FOR THIS PROPOSED PROJECT summarizes how each species considered was included in the following analysis or removed from further analysis because suitable habitat does not occur within the project area or proposed activities would not affect their required habitat components.

TABLE W-1 –STATUS OF SPECIES CONSIDERD IN THE FINE FILTER ANALYSIS FOR THIS PROPOSED PROJECT

SPECIES		DETERMINATION - BASIS
Threatened and Endangered Species	Grizzly Bear	No further analysis conducted – The project area is approximately three miles outside of the grizzly bear recovery zone. Limited use by grizzly bears is possible, but extensive use is not expected. Thus, no direct, indirect, or cumulative effects to lynx would be expected to occur as a result of either alternative.
	Canada Lynx	No further analysis conducted – The project area occurs outside of the elevations and habitats where lynx are typically found. The overall quality of snowshoe hare habitat, the primary prey for lynx, is relatively low within the project area. Thus, no direct, indirect, or cumulative effects to lynx would be expected to occur as a result of either alternative.
	Gray Wolf	***Included*** – The project area is within the annual home range of the Thompson Peak wolf pack.
Sensitive Species	Bald eagle	No further analysis conducted – The project area is approximately nine miles from the nearest bald eagle nest. No known or suspected active nests or areas of seasonal concentrations occur in the project area. Thus, no direct, indirect, or cumulative effects to bald eagles would be expected to occur as a result of either alternative.
	Black-backed woodpecker	No further analysis conducted – No recently (less than 5 years) burned areas are in the project area. Thus, no direct, indirect, or cumulative effects to black-backed woodpeckers would be expected to occur as a result of either alternative.
	Coeur d'Alene salamander	No further analysis conducted – No moist talus or streamside talus habitat occurs in the project area. Thus, no direct, indirect, or cumulative effects to Coeur d'Alene salamanders would be expected to occur as a result of either alternative.
	Columbian sharp-tailed grouse	No further analysis conducted – No suitable grassland communities occur in the project area. Thus, no direct, indirect, or cumulative effects to Columbian sharp-tailed grouse would be expected to occur as a result of either alternative.
	Common loon	No further analysis conducted – No suitable lake habitats exist within the project area. Thus, no direct, indirect, or cumulative effects to common loons would be expected to occur as a result of either alternative.
	Fisher	***Included*** – Potential fisher habitats occur within the project area.
	Flammulated owl	***Included*** – Suitable dry ponderosa pine and Douglas-fir habitats occur within the project area.
	Harlequin duck	No further analysis conducted – no suitable high-gradient streams occur within the project area. Thus, no direct, indirect, or cumulative effects to harlequin ducks would be expected to occur as a result of either alternative.
	Northern bog lemming	No further analysis conducted – No suitable sphagnum bogs or fens occur in the project area. Thus, no direct, indirect, or cumulative effects to northern bog lemmings would be expected to occur as a result of either alternative.
	Peregrine falcon	No further analysis conducted – No suitable cliffs/rock outcrops occur within the project area. Thus, no direct, indirect, or cumulative effects to peregrine falcons would be anticipated as a result of either alternative.
	Pileated woodpecker	***Included*** – Western larch/Douglas-fir and mixed-conifer habitats occur in the project area.
	Townsend's big-eared bat	No further analysis conducted – No caves or mine tunnels occur in the project area. Thus, no direct, indirect, or cumulative effects to Townsend's big-eared bats would be anticipated as a result of either alternative.
Big Game Species	Big Game Winter Range	***Included*** –White-tailed deer winter range habitat exists on approximately 32 of the 130 acre project area.

	Elk Security Habitat	No further analysis conducted – No elk security habitat exists in the project area and no large blocks of security habitat exist that contribute to a larger block of elk security habitat outside of the project area exist. Thus, no direct, indirect, or cumulative effects to elk security habitat would be anticipated as a result of either alternative.

THREATENED AND ENDANGERED SPECIES
In northwestern Montana, 3 terrestrial species are classified as “threatened” or “endangered” under the Endangered Species Act of 1973. The grizzly bear and Canada lynx are classified as "threatened," and the gray wolf is classified as “endangered” under this act. The USFWS recently de-listed the gray wolf (March 28, 2008); however, a preliminary injunction recently (July 18, 2008) lead to the re-listing of wolves in this area as “endangered.”

GRAY WOLF
Issue: Concern was expressed that timber harvesting and associated activities could displace gray wolves from important habitats, particularly denning and rendezvous sites and/or alter prey availability.

Introduction
The gray wolf was listed as “endangered” under the Endangered Species Act in the northern portion of Montana, which includes the project area. To meet the delisting criteria, the 3 recovery areas need to support a minimum of 30 breeding pairs for 3 consecutive years. The 3 recovery zones have met the recovery objectives for breeding pairs since 2000. In 2007, 107 packs that met the definition of a ‘breeding pair” were documented within the tri-state region (USFWS et al. 2008). Of those 107 packs, 73 occurred in Montana, with 23 of those found in northern Montana portion of the recovery area along with 13 additional packs that didn’t meet the requirements to be considered a “breeding pair” (Sime et al. 2008). Therefore, the USFWS de-listed gray wolves on March 28, 2008; however a recent lawsuit and preliminary injunction re-established gray wolves as “endangered.” Following the injunction, the USFWS requested the Court allow them to voluntarily withdraw its decision to de-list wolves and re-evaluate information and make a new decision, which was granted (October 14, 2008). Subsequently, USFWS reopened the public comment period on its proposal to de-list gray wolves in the Rocky Mountains (October 24, 2008). On April 2, 2009, the Secretary of the Interior once again issued a final rule to de-list the gray wolf. However, the rule will not take effect until 30 days after the final posting; thus, gray wolves are listed as “endangered” currently and will be included in this section.

Wolves are a wide-ranging, mobile species. Adequate habitat for wolves consists of areas with adequate prey and minimal human disturbance, especially at den and/or rendezvous sites. The Thompson Peak pack has been in the vicinity for at least the last three years and has been a breeding pair counted towards the recovery goals. The home range for this pack is variable, but typically includes part or all of the project area (USFWS et al. 2008).

The Northern Rocky Mountain Wolf Recovery Plan (USFWS 1987) identified the key components of wolf habitat as: 1) a sufficient, year-round prey base of ungulates (big game) and alternate prey, 2) suitable and somewhat secluded denning and rendezvous sites, and 3) sufficient space with minimal exposure to humans.

Wolves are opportunistic carnivores that frequently take vulnerable prey (including young individuals, older individuals, and individuals in poor condition). In general, wolf densities are positively correlated to prey densities (Oakleaf et al. 2006, Fuller et al. 1992). Wolves prey primarily on white-tailed deer, and, to a lesser extent, elk and moose, in northwest Montana (Kunkel et al. 1999). However, some studies have shown that wolves may prey upon elk more frequently during certain portions of the year (particularly winter) or in areas where elk numbers are higher (Arjo et al. 2002, Kunkel et al. 2004, Garrott et al. 2006). Thus, reductions in big game populations and/or winter range productivity could indirectly be detrimental to wolf populations.

Wolves typically den during late April in areas with gentle terrain near a water source (valley bottoms), close to meadows or other openings, and near big game wintering areas. When the pups are 8 to 10 weeks old, wolves leave the den site and start leaving their pups at rendezvous sites while hunting. These sites are used throughout the summer and into the fall. Disturbance at den or rendezvous sites could result in avoidance of these areas by the adults or force the adults to move the pups to a less adequate site. In both situations, the risk

of pup mortality increases. No known den or rendezvous sites are known in the project area; however, landscape features frequently associated with these sites occur in the project area. Wolves may be using the vicinity of the project area for hunting, breeding, and other life requirements.

Analysis Area

Direct and indirect effects were analyzed for activities conducted within the project area. Cumulative effects were analyzed on the 71,000 acre cumulative effects analysis area defined using natural landscape features and home range boundaries. This area includes most of the annual home ranges for the Thompson Peak wolf pack and would be large enough to support this wolf pack.

Analysis Methods

Since changes in winter range could have a sizable effect on availability of prey for wolves, portions of the analysis are tied to the big game winter range section, meanwhile, disturbance at den and rendezvous sites are important during certain portions of the year, timing of proposed activities in relation to these sites is also important. Direct and indirect as well as cumulative effects were analyzed using field evaluations, aerial photograph interpretation, and a GIS analysis of habitat components. Factors considered in the analysis include the amount of winter range modified and level of human disturbance in relation to any known wolf dens or rendezvous sites.

EXISTING ENVIRONMENT

The project area falls within the Thompson Peak wolf pack home range, showing use of the area that would be expected to continue into the future. Big game species are abundant in the project area; there are approximately 33 acres of white-tailed winter range in the southwest corner of the project area. The Thompson Peak pack's known den site is approximately five miles from the project area; two known rendezvous sites are located two and four miles from the project area (*K. Laudon, DFWP, personal communication, January 30, 2009).*

Within the larger, cumulative effects analysis area, big game species are abundant; there are approximately 30,000 acres of elk, 20,000 acres of white-tailed deer and 1,350 acres of mule deer winter range. Numerous landscape features commonly associated with denning and rendezvous sites, including meadows and other openings near water and in gentle terrain, occur in the cumulative effects analysis area. Wolves from the Thompson Peak wolf pack have utilized much of the cumulative effects analysis area in the past and would be expected to continue into the future. This pack has a den site as well as two rendezvous sites established within the analysis area (*K. Laudon, DFWP, personal communication, January 30, 2009).* Past harvesting on all ownerships in the analysis area has altered big game and wolf habitats.

Direct and Indirect Effects of the No-Action Alternative on Gray Wolves

Disturbance to wolves would not increase. No changes in big game habitat, including no changes to forested cover on white-tailed deer, mule deer, or elk winter range would be expected during the short-term; therefore, no changes in wolf prey availability would be anticipated. Wolf use of the project area would be expected to continue at current levels. Thus, since 1) no changes in human disturbance levels would occur, and 2) no changes to big game winter range would occur, no direct and indirect effects would be expected to affect gray wolves in the Thompson Peak wolf pack.

Direct and Indirect Effects of the Action Alternative on Gray Wolves

Wolves using the area could be disturbed by harvesting activities, and are most sensitive at den and rendezvous sites, which are not known to occur within the project area. After harvesting activities, human disturbance levels would likely revert to pre-harvest levels. Likewise, wolf use of the project area for denning and rendezvous sites would likely revert to pre-harvest levels. In the short term, the proposed harvest units could lead to shifts in big game use, which could lead to a shift in wolf use of the project area. Thus, since 1) minor, short-term increases and negligible long-term changes in human disturbance levels would occur with no increases near known wolf den and/or rendezvous sites anticipated, and 2) no changes to big game winter range would occur, negligible direct and indirect effects would be expected to affect gray wolves in the Thompson Peak wolf pack.

Cumulative Effects of the No-Action Alternative on Gray Wolves

White-tailed deer, mule deer, and elk winter range would not be affected and substantive change in big game populations, distribution, or habitat use would be anticipated. Levels of human disturbance would be expected to remain similar to present levels. Timber management on Plum Creek Timber Company and privately owned lands may cause shifts in white-tailed deer use and subsequently gray wolf use of the cumulative effects analysis area; however, no changes would be anticipated that would alter levels of gray wolf use of the cumulative effects analysis area. Thus, since 1) no changes in human disturbance levels would occur, particularly near known wolf den and/or rendezvous sites, and 2) no changes to big game winter range would occur, no further cumulative effects would be expected to affect gray wolves in the Thompson Peak wolf pack.

Cumulative Effects of the Action Alternative on Gray Wolves

Since the expected effects of this project on wolves would be negligible, cumulative effects would also be negligible. Some slight shifts of big game use may occur. Reductions in cover may cause slight decreases in use by deer and elk; however, no appreciable changes would be expected within the cumulative effects analysis area. Reductions in white-tailed deer winter range would be additive to reductions associated with past timber harvest; however no changes to mule deer, or elk winter range would be anticipated. Human-disturbance levels would be expected to revert to levels similar to current levels after the proposed harvesting has been completed. No substantive change in wolf use of the Thompson Peak wolf pack home range would be expected; wolves would continue to use the area in the long term. Thus, since 1) negligible short-term and long-term changes in human disturbance levels would occur with no increases near known wolf den and/or rendezvous sites anticipated and 2) minor changes to big game winter range would occur, negligible further cumulative effects would be expected to affect gray wolves in the Thompson Peak wolf pack.

SENSITIVE SPECIES

When conducting forest-management activities, the SFLMP directs DNRC to give special consideration to sensitive species. These species may be sensitive to human activities, have special habitat requirements, are associated with habitats that may be altered by timber management, and/or may, if management activities result in continued adverse impacts, become listed under the Federal Endangered Species Act. Because sensitive species usually have specific habitat requirements, consideration of their needs serves as a useful “fine filter” for ensuring that the primary goal of maintaining healthy and diverse forests is met. A search of the Montana Natural Heritage Database documented fisher and Canada lynx in the vicinity of the project area. As shown in ***TABLE W-1 - STATUS OF SPECIES CONSIDERD IN THE FINE FILTER ANALYSIS FOR THIS PROPOSED PROJECT,*** the sensitive species portion of this analysis will focus on fisher, flammulated owls and pileated woodpeckers

FISHER

Issue: Concern was expressed that timber harvesting and associated activities could reduce fisher habitat availability and quality by reducing canopy cover, snag density, and the amount of coarse woody debris.

Introduction

Fishers are generalist predators that prey upon a variety of small mammals and birds, as well as snowshoe hares and porcupines. They also take advantage of carrion and seasonally available fruits and berries (Foresman 2001). Fishers use a variety of 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 does occur for short hunting forays or if sufficient overhead cover (shrubs, saplings) is present. Fishers appear to be highly selective of stands that contain resting and denning sites and tend to use areas within 150 feet of water (Jones 1991). Resting and denning sites are found in cavities of live trees and snags, downed logs, brush piles, mistletoe brooms, squirrel and raptor nests, and holes in the ground. Forest-management considerations for fisher involve providing for resting and denning habitats near riparian areas while maintaining travel corridors.

Analysis Area

Direct and indirect effects were analyzed for activities conducted within the project area. Cumulative effects were analyzed on the 71,000 acre cumulative effects analysis area defined in the gray wolf section. This scale includes enough area to approximate overlapping home ranges of male and female fishers (Heinemeyer and Jones 1994).

Analysis Methods

To assess potential fisher habitat and travel cover on DNRC-managed lands in the cumulative effects analysis area, sawtimber stands within preferred fisher covertypes (ARM 36.11.403(60)) below 6,000 feet in elevation with 40 percent or greater canopy closure were considered potential fisher habitat. Fisher habitat was further divided into upland and riparian-associated areas depending upon the proximity to streams and based upon stream class. Direct and indirect effects were analyzed using field evaluations and GIS analysis of potential habitat. Cumulative effects were analyzed using field evaluations analysis of potential habitat and aerial photograph interpretation of potential habitat on all other lands within the cumulative effects analysis area. Factors considered include amount of suitable fisher habitats, landscape connectivity, and human access.

EXISTING ENVIRONMENT

The project area ranges from 3,520 to 3,760 feet in elevation. Modeling fisher habitats using SLI data generated an estimate of approximately 130 acres of upland fisher habitats in the project area (Heinemeyer and Jones 1994). These upland habitats serve to maintain landscape connectivity while providing features necessary for fisher travel use. The project area lacks any class one or two streams.

Within the cumulative effects analysis on DNRC owned lands area there are roughly 522 acres of preferred fisher habitats, these are areas that are moderately to well-stocked in preferred fisher cover types no more than 100 feet from a class one stream or 50 feet from a class two stream. Additionally aerial photograph interpretation of lands owned privately or by Plum Creek Timber Company showed mature forest characteristics that may represent preferred habitats in approximately 2,116 acres; these habitats may represent both upland and riparian types.

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

No effects to fishers would be expected under this alternative. Little change to the stands providing fisher upland habitats would be expected. Human disturbance would be expected to remain at current levels. No changes in landscape connectivity would occur. Thus, since: 1) no changes to existing habitats would be anticipated, 2) landscape connectivity would not be altered, 3) no appreciable changes to snags, snag recruits, and coarse woody debris levels would be anticipated, and 4) no changes to human access would be anticipated, no direct and indirect effects would affect fishers in the project area.

Direct and Indirect Effects of the Action Alternative on Fishers

Approximately 130 acres of upland habitats in the project area would be harvested under this alternative. These upland habitats maybe used by fisher for travel. Treatments of the upland habitats in the project area would likely yield stands too open for appreciable fisher use. Minor reductions in connectivity would be expected in a landscape where connectivity has already been compromised (see WILDLIFE- MATURE FORESTED HABITATS AND LANDSCAPE CONNECTIVITY). Thus, since: 1) harvesting would reduce or remove upland fisher habitats, 2) minor reductions in landscape connectivity would occur, 3) harvesting would reduce snag and coarse woody debris levels, however some of these resources would be retained, and 4) motorized human access levels would be not change, minor adverse direct and indirect effects would be anticipated that would affect fisher in the project area for 70 to 100 years.

Cumulative Effects of the No-Action Alternative on Fishers

Fisher upland habitats would be retained. Suitable fisher foraging, denning, and resting habitats may occur across the cumulative effects analysis area. Road access within the cumulative effects analysis area would not appreciably change; therefore, snags, snag recruits, and coarse woody debris levels would be expected to remain unchanged. Fisher habitats could be altered with future timber management on Plum Creek Timber Company and privately owned lands. Thus, since: 1) no changes to existing habitats on DNRC ownership would occur, 2) landscape connectivity afforded by the stands on DNRC ownership would not appreciably change, and 3) no changes to snags, snag recruits, or coarse woody debris levels would be expected, no further cumulative effects to fishers would be anticipated in the cumulative effects analysis area.

Cumulative Effects of the Action Alternative on Fishers

Approximately 130 acres of upland fisher habitats in the cumulative effects analysis area would be harvested, reducing the amount of the preferred fisher covertypes in the cumulative effects analysis area. These reductions would be additive to the losses associated with past timber harvesting in the cumulative effects analysis area. Landscape connectivity within the cumulative effects analysis area would remain largely intact. Human disturbance would not be expected to change. Thus, since: 1) harvesting would remove upland fisher habitats, but considerable upland habitats would persist, 2) negligible changes to preferred covertypes or fisher habitats associated with the riparian areas in the cumulative effects analysis area would be anticipated, 3) negligible reductions in landscape connectivity would be anticipated, 4) harvesting would partially reduce snags and snag recruits, while increasing the coarse woody debris levels, largely in the smaller-sized pieces, 5) negligible changes to motorized human access would occur, minor adverse cumulative effects would be anticipated that would affect fisher in the project area for 70 to100 years.

FLAMMULATED OWL

Issue: There is concern that timber harvesting and associated activities could enhance flammulated owl habitat by reducing canopy closure and increasing tree spacing, but could remove snags needed by flammulated owls for nesting.

Introduction

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. They usually nest in cavities excavated by pileated woodpeckers or northern flickers in 12-25" dbh aspen, ponderosa pine, or Douglas-fir. Without disturbance, Douglas-fir will encroach upon ponderosa pine stands, increasing stand density and resulting in decreased habitat quality for flammulated owls.

Analysis Area

Direct and indirect effects were analyzed on the project area. Cumulative effects were analyzed on the on the 8 surrounding sections (approx 5,414 acres). This scale includes enough area to support several pairs of flammulated owls (McCallum 1994).

Analysis Methods

To assess potential flammulated owl habitats on the project area, SLI data were used to identify stands in preferred habitat types (ARM 36.11.403(28)). Direct and indirect effects as well as cumulative effects were analyzed using a combination of field evaluation, aerial photograph interpretation, and a GIS analysis of available habitats. Factors considered within the cumulative effects analysis area included the degree of harvesting and the amount of continuous forest within the cumulative effects analysis area.

EXISTING ENVIRONMENT

The stands in the project area are largely ponderosa pine/Douglas fir and western larch. Within the project area there are approximately 130 acres of flammulated owl habitats. During field visits, 0-6 variably spaced snags per acre were observed in the project area.

On DNRC owned lands in the cumulative effects analysis area, flammulated owl preferred habitats exists on approximately 1,062 acres. Additionally aerial photograph interpretation of lands owned privately or by Plum Creek Timber Company showed mature forest characteristics that may represent preferred habitats in approximately 2,116 acres. In the cumulative effects analysis area, much of the area (roughly 43%) exists in relatively open forested conditions which are partially the result of recent timber harvesting activity. Largely, these areas are not currently useful for flammulated owl nesting, but may serve as foraging habitats. Modern fire suppression has allowed Douglas-fir in-growth to create denser stands of ponderosa pine and Douglas-fir in portions of the cumulative effects analysis area, which has reduced habitat quality for flammulated owls.

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

Existing flammulated nesting habitats within the project area would continue maturing; likewise younger stands from the past harvesting are also maturing and becoming denser, which would reduce the quality of this area for

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

Direct and Indirect Effects of the Action Alternative on Flammulated Owls

Flammulated owls are tolerant of human disturbance (McCallum 1994), however the elevated disturbance levels associated with harvesting could negatively impact flammulated owls should they be using existing habitat during the nesting period. Proposed timber harvest would open the canopy while favoring western larch and ponderosa pine. Elements of the forest structure important for nesting flammulated owls, including snags (a minimum of 2 snags per acre > 21 in. dbh where they exist, otherwise the next largest size class), coarse woody debris (10-15 tons per acre), numerous leave trees, and snag recruits (> 21 in. dbh where they exist, otherwise the next largest size class) would be retained in the project area. Realistically, however, some snags would likely be removed due to safety and/or logistical concerns (see snags and coarse woody debris section), which further affects flammulated owls now and into the future. 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, since 1) harvesting would open denser stands up, 2) elements of forest structure (snags, snag recruits, and CWD) used for foraging and nesting by flammulated owl would be retained, 3) prescriptions would lead to more open stands with scattered mature ponderosa pine, and 4) prescriptions would promote future development of ponderosa pine within the units, minor positive direct and indirect effects would be expected to affect flammulated owls in the project area for the next 30-50 years.

Cumulative Effects of the No-Action Alternative on Flammulated Owls

Flammulated owl habitats would persist in the state parcel. Portions of the cumulative effects analysis area have been harvested in the recent past, potentially improving flammulated owl habitats by creating foraging habitats and reversing a portion of the Douglas-fir encroachment, however retention of large ponderosa pine was not necessarily a consideration in many of these harvest units; thereby minimizing the benefits to flammulated owls. No further harvesting would occur and areas exhibiting mature forested conditions would be expected to persist and could provide flammulated owl nesting habitats. Other portions of the cumulative effects analysis area that are not currently providing flammulated owl habitats are not expected to change any time in the future. Collectively, stands would continue maturing and becoming more densely stocked, which would reduce habitat quality for flammulated owls. Thus, since 1) no harvesting would occur, 2) no changes to potential nesting habitats would be anticipated, and 3) long-term, succession-related declines in foraging habitats coupled with advancing succession leading to denser stands, negligible adverse direct and indirect effects would be expected to affect flammulated owls in the project area.

Cumulative Effects of the Action Alternative on Flammulated Owls

Proposed harvesting would add to the amount of the cumulative effects analysis area that has been recently harvested, which would add to the amount of foraging habitats available, but possibly at the expense of nesting habitats. Conversely, this reduction in mature forested stands dominated by ponderosa pine would reduce potential nesting habitats within the cumulative effects analysis area. The portions of the cumulative effects analysis area that are not currently providing flammulated owl habitats are not expected to change any time in the future. Collectively, stands would continue maturing and becoming more densely stocked, which would reduce habitat quality for flammulated owls. Thus, since 1) harvesting would reduce flammulated owl nesting habitats while potentially increasing foraging habitats, and 2) a small slight increase in the amount of the cumulative effects analysis area that would be more representative of historic conditions would occur, negligible beneficial cumulative effects would be expected to affect flammulated owls in the cumulative effects analysis area.

PILEATED WOODPECKER

Issue: Concern was expressed that timber harvesting and associated activities could remove canopy cover and snags needed by pileated woodpeckers to forage and nest and/or displace nesting pileated woodpeckers from active nests, resulting in increased mortality to pileated woodpecker chicks.

Introduction

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

Analysis Area

Direct and indirect effects were analyzed for activities conducted within the project area. Cumulative effects were analyzed on the surrounding eight sections (approximately 5,414 acres). This scale includes enough area to support many pairs of pileated woodpeckers (Bull and Jackson 1995).

Analysis Methods

To assess potential pileated woodpecker nesting habitats on DNRC-managed lands in the cumulative effects analysis area, SLI data were used to identify sawtimber stands with more than 100 square feet basal area per acre, older than 100 years old, had greater than 40 percent canopy closure, and occurring below 5,000 feet in elevation. Foraging habitats are areas that do not meet the definition above, but include the remaining sawtimber stands below 5,000 feet in elevation with greater than 40 percent canopy cover. Direct and indirect effects as well as cumulative effects were analyzed using a combination of field evaluation, aerial photograph interpretation, and these mapped potential habitats. Factors considered included the amount of potential habitat, degree of harvesting, and the amount of continuous forested habitat.

EXISTING ENVIRONMENT

In the project area, potential pileated woodpecker nesting habitat exists on approximately 130 acres that are dominated by ponderosa pine/Douglas-fir. Although nesting habitat is defined differently than foraging habitat, nesting habitat also provides foraging opportunities for pileated woodpeckers. During field visits 0 to 6 variably spaced, large snags per acre were observed in the project area.

On DNRC owned lands in the cumulative effects analysis area, potential pileated woodpecker nesting habitat exists on approximately 644 acres, with at least an additional 608 acres of sawtimber-sized stands that may be suitable foraging habitats. Similar to the project area, these nesting habitats are dominated by western larch/Douglas-fir and mixed conifers. Additionally aerial photograph interpretation of lands owned privately or by Plum Creek Timber Company showed mature forest characteristics that may represent foraging or nesting habitats in approximately 2,116 acres. Within the cumulative effects analysis area, a variety of timber management regimes have been employed in the past, which has fragmented the contiguous forest to a degree. However in the more recent past, DNRC owned stands have been managed for mature western larch and ponderosa pine, snags, and snag-recruit trees, which benefit pileated woodpeckers in the long-term.

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

No disturbance of pileated woodpeckers would occur. Forest succession and natural disturbance agents would continue to bring about changes in existing stands. Trees would continue to grow, mature, and die, thus providing potential nesting and foraging structure for pileated woodpeckers. Continual conversion to shade-tolerant species would reduce the quality of habitat for pileated woodpeckers over time. Therefore, a reduction in suitable nesting trees would be likely over time, which could lead to decreased reproduction in the project area. Thus, 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, and 4) long-term, succession-related declines in the abundance of shade-intolerant tree species, which are valuable to pileated woodpeckers would be anticipated, negligible adverse indirect effects to pileated woodpeckers in the project area would be expected until some other disturbance reverses stand succession.

Direct and Indirect Effects of the Action Alternative on Pileated Woodpeckers

Pileated woodpeckers tend to be tolerant of human activities (Bull and Jackson 1995), but might be temporarily displaced by the proposed harvesting. Harvesting 130 acres would reduce continuously forested and potential nesting habitats for pileated woodpeckers. Elements of the forest structure important for nesting pileated woodpeckers would be retained, including snags, coarse woody debris, numerous leave trees, and snag recruits. Elements of the forest structure important for nesting pileated woodpeckers, including snags (a minimum of 2 snags > 21 inch dbh per acre where they exist and would be expected to persist without being lost due to firewood gathering), coarse woody debris (15 to 20 tons per acre), numerous leave trees, and snag recruits (a minimum of 2 trees per acre >21 inch dbh where they exist) would be retained in the project area. 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 130 acres. The silvicultural prescriptions would retain healthy western larch, ponderosa pine, and some larger Douglas-fir while promoting the regeneration of western larch and ponderosa pine, which would benefit pileated woodpeckers in the future by providing nesting, roosting, and foraging habitats. Thus, since: 1) harvesting would reduce the amount of continuous forested habitats available, 2) potential nesting habitats would be reduced, 3) several snags and snag recruits per acre would be removed; however mitigation measures to retain a minimum of 2 snags per acre and 2 snag recruits per acre in most of the units would be included, and 4) harvest prescriptions would promote seral species in the proposed units, minor direct and indirect effects would be anticipated that would affect pileated woodpeckers in the project area for 30-100 years.

Cumulative Effects of the No-Action Alternative on Pileated Woodpeckers

No disturbance of pileated woodpeckers would occur. Trees would continue to grow, mature, and die, thus providing potential nesting and foraging structure for pileated woodpeckers. Continued widespread use of the cumulative effects analysis area by pileated woodpeckers would be expected. Timber management on Plum Creek Timber Company and privately owned lands would continue to remove potential pileated woodpecker habitats while reducing the amount of the cumulative effects analysis area that would be in mature, forested covertypes. Thus, 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, and 3) long-term, succession-related declines in the abundance of shade-intolerant tree species would occur, which are valuable to pileated woodpeckers, negligible adverse cumulative to pileated woodpeckers in the cumulative effects analysis area would be expected.

Cumulative Effects of the Action Alternative on Pileated Woodpeckers

Under this alternative, reductions in pileated woodpecker habitat would be expected. Several snags and coarse woody debris would be retained within the project area; however, future recruitment of these attributes may be reduced by the proposed activities. Stands that have previously undergone harvest within the cumulative effects analysis area have reduced pileated woodpecker habitats as well. Additionally, any potential harvesting associated with Plum Creek Timber Company or privately owned land could also further alter pileated woodpecker habitats. The loss of pileated woodpecker habitats under this alternative would be additive to habitat losses associated with past harvesting in the cumulative effects analysis area; continued widespread use of the analysis area would be expected. Additionally, continued maturation of stands across the analysis area is increasing suitable pileated woodpecker habitats. Thus, since: 1) harvesting would reduce the amount of continuous forested habitats available in the cumulative effects analysis area, but considerable forested habitats would persist, 2) potential nesting and foraging habitats would be reduced, but extensive habitats would persist in the cumulative effects analysis area, 3) several snags and snag recruits per acre would be removed in the proposed units; however mitigation measures would retain some of these attributes in several of the units, and 4) harvest prescriptions would promote seral species in the proposed units, overall minor cumulative effects would be anticipated that would affect pileated woodpeckers within the analysis area for the next 30-100 years.

BIG GAME WINTER RANGE

Issue: There is concern that timber harvesting and associated activities could remove thermal cover on big game winter ranges, which could reduce carrying capacity of the winter range.

Introduction

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, while moderating ambient temperatures. Besides providing a moderated climate, the snow-intercept capacity effectively lowers snow depths, which enables big game movement and access to forage. Snow depths differentially affect big game; deer are most affected, followed by elk, then moose.

Analysis Area

Direct and indirect effects were analyzed on the project area. Cumulative effects were analyzed on the contiguous 16,000 acre white-tailed deer winter range that includes the project area. This analysis area would be sufficient to support concentration of large numbers of big game.

Analysis Methods

Effects were evaluated using a combination of field evaluation, aerial photograph interpretation, and GIS analysis. Factors considered within this cumulative effects analysis area include acres of winter range harvested and level of human disturbance and development.

EXISTING ENVIRONMENT

Montana Department of Fish, Wildlife, and Parks identified approximately 32 acres of the entire project area as white-tailed deer winter range. The winter range in the project area is part of a larger (approximately 16,000 acres) and continuous block of white-tailed deer winter range. Winter snow depths and suitable microclimates influence big game distribution and use within the vicinity. Mature ponderosa pine/Douglas-fir, and western larch, stands in the project area are providing attributes facilitating use by wintering big game. Proximity to open roads and residential developments has likely slightly reduced the capacity of the winter range in the project area. Evidence of use by deer and elk was noted throughout the project area during field visits.

Presently, a variety of stands across the winter range are providing thermal cover and snow intercept for big game. In the past 30 years, timber management has reduced thermal cover and snow intercept on DNRC managed lands within the cumulative effects analysis area. These reductions are additive to past reductions on other ownerships. Human disturbance within the winter range is largely associated with county road #7512 and residential developments. Additional disturbance to the winter range is likely from commercial timber harvesting, and other land management regimes which likely influences wintering big game.

Direct and Indirect Effects of the No-Action Alternative

No direct effects to big game winter range would be anticipated. No additional disturbance or displacement would be anticipated within the project area. Big game thermal cover in the project area would not be altered in the near term. In the longer-term, continued succession could reduce forage production while increasing thermal cover in these stands. No appreciable changes to winter carrying capacity 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, and 3) the levels of human disturbance would remain similar, no direct or indirect effects to big game winter range would be anticipated.

Direct and Indirect Effects of the Action Alternative

Some displacement would be expected as a result of the proposed harvesting operations. The regeneration type prescription on 32 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. These losses of thermal cover and snow intercept would require 40-60 years for suitable sized trees (>40 ft. tall) to develop in the stand. 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, since 1) the relatively short-term logging activities would create disturbance in this area, 2) a small amount of

winter range in the project area would be altered, 3) availability of cover on surrounding ownerships that provides some opportunity for deer should they be displaced in the short or long term, minor adverse direct or indirect effects to white-tailed deer would be expected for the next 20-30 years.

Cumulative Effects of the No-Action Alternative
No changes would be anticipated in thermal cover and snow intercept. Stands that are providing thermal cover would be expected to continue providing this resource under this alternative. Continued winter use of the larger winter range would be expected. Harvesting on Plum Creek Timber Company and privately owned lands could continue to displace wintering big game and reduce available winter range habitats. Those portions of the winter range where timber harvesting occurred in the last 30 years could start developing thermal cover and snow intercept in the next 10-30 years. Human disturbance levels would be anticipated to continue at similar levels. Thus, there would be minor positive cumulative effects to big game winter range as a result of this alternative.

Cumulative Effects of the Action Alternative
Thermal cover would be largely removed from approximately 32 acres of the white-tailed deer winter range, which would be additive to ongoing and past reductions across the winter range. Portions of the winter range are expected to start providing some habitat attributes suitable for winter big game use in the near future as they continue maturing with time. Displacement associated with this alternative could also be additive to the displacement associated with timber management on Plum Creek Timber Company and privately owned lands. In addition to the direct displacement associated with harvesting, human disturbance levels could increase slightly with the increasing openness that could facilitate more human use and/or elevate the disturbance levels associated with ongoing activities Thus, 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 winter range in the cumulative effects analysis area would be altered, 3) availability of cover on surrounding ownerships that provides some opportunity for deer should they be displaced, minor adverse cumulative effects to white-tailed deer would be expected for the next 20-30 years.

Recommended Wildlife Mitigations:

- Cease all operations if a threatened or endangered species is encountered. Consult a DNRC biologist and develop additional mitigations that are consistent with the administrative rules for managing threatened and endangered species (ARM 36.11.428 through 36.11.435).

- Manage for snags, snag recruits, and coarse woody debris, particularly favoring western larch and ponderosa pine (ARM 36.11.439(1)(b)).

- Favor western larch, and ponderosa pine in retention and regeneration decisions for pileated woodpecker nesting and foraging habitats.

- Close skid trails opened with proposed activities to reduce the potential for unauthorized motor vehicle use.

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HYDROLOGY ANALYSIS

Introduction
This analysis is designed to disclose the existing condition of the hydrologic and fisheries resources and display the anticipated effects that may result from each alternative of this proposal. The following issue statements were expressed from internal comments regarding the effects of proposed timber harvesting:

- Timber harvesting and road construction has the potential to increase water yield which in turn may affect stream channel stability
- Timber harvesting and road construction activities may increase sediment delivery into streams and affect water quality.

These issues can best be evaluated by analyzing the anticipated effects of sediment delivery and water yield on the water quality of streams in the project area. Other comments were received from the DNRC fisheries biologist; however those comments regarded resources outside the scope of this project.

The Environmental Effects sections disclose the anticipated indirect, direct and cumulative effects to water resources within the analysis area from the proposed actions. Past, current, and future planned activities on all ownerships within each analysis area have been taken into account for the cumulative effects analysis.

The primary concerns relating to aquatic resources within the analysis area are potential impacts to water quality from sources outside the channel as well as inside the channel. In order to address these issues the following parameters are analyzed by alternative:

-Miles of new road construction and road improvements
-Potential for sediment delivery to streams
-Increases in ECA and annual water yield

Analysis Method
Sediment Delivery
The methods applied to the project area to evaluate potential direct, indirect and cumulative effects include a field review to look at potential sediment sources from haul routes and proposed harvest areas. Roads were evaluated to determine existing sources of introduced sediment.

Water Yield
Due to the small size of this harvest area (127 in relation to the watershed size of approximately 15,000 acres) and the absence of a continuous or intermittent surface water features, only a very low risk of measurable increases in annual water yield could occur from this proposal. Because direct, indirect or cumulative impacts would not likely be measurable, no further analysis of water yield is deemed appropriate as described in ARM 36.11.423 (1)(a)(i).

Analysis Area
Sediment Delivery
The analysis area for these parameters is limited to the harvest units and roads used for hauling. This includes in-channel and upland sources of sediment that could result from this project as well as vegetation removal within harvest units.

Cumulative Effects
The analysis area for cumulative effects is limited to the harvest units and roads used for hauling This is selected as the appropriate scale of analysis due to the size of the project versus the watershed size and the potential for impacts.

Water Uses and Regulatory Framework
Water Quality Standards
This portion of the Clark Fork River basin, including the Buffalo Bill Creek watershed is classified as B-1 by the State of Montana Department of Environmental Quality (DEQ), as stated in the Administrative Rules of Montana (ARM 17.30.607). The water quality standards for protecting beneficial uses in B-1 classified watersheds are

located in ARM 17.30.623. Water in B-1 classified waterways is suitable for drinking, culinary and food processing purposes after conventional treatment, bathing, swimming and recreation, growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers, and agricultural and industrial water supply. State water quality regulations prohibit any increase in sediment above naturally occurring concentration in water classified B-1. Naturally occurring means condition or materials present from runoff or percolation over which man has no control or from developed land where all reasonable land, soil and water conservation practices have been applied. Reasonable land, soil and water conservation practices include methods, measures or practices that protect present and reasonably anticipated beneficial uses. The State of Montana has adopted Best Management Practices (BMPs) through its non-point source management plan as the principle means of meeting the Water Quality Standards.

Water Quality Limited Waterbodies
Buffalo Bill Creek is not listed as a water quality limited water body in the 2006 303(d) list. The 303(d) list is compiled by the Montana Department of Environmental Quality (MDEQ) as required by Section 303(d) of the Federal Clean Water Act and the Environmental Protection Agency Water Quality Planning and Management Regulations (40 CFR, Part 130). Under these laws, DEQ is required to identify water bodies that do no fully meet water quality standards, or where beneficial uses are threatened or impaired.

Streamside Management Zone Law (SMZ)
All rules and regulations pertaining to the Streamside Management Zone (SMZ) Law will be followed. An SMZ width of 100 feet is required on Class I and II streams when the slope is greater then 35%. An SMZ width of 50 feet is required when the slope is less than 35%.

Water Rights and Beneficial Uses
Water rights for surface water exist within 3 miles downstream of the project area on Buffalo Bill Creek for stock watering.

EXISTING CONDITION
The Buffalo Bill Creek watershed drains approximately 15,000 acres as it flows in a northeast-to-southwest direction into Weeksville Creek and eventually the Clark Fork River. Elevation ranges from approximately 2440 feet at the confluence with the Weeksville Creek to about 5,140 feet on ridges of the western watershed boundary.

Water resources on the parcel are limited to an old railroad grade that may channel water during spring runoff. This railroad grade is vegetated with lodgepole pine, Douglas-fir, grand fir and ponderosa pine saplings indicating that surface water rare but has characteristics of an ephemeral draw. No fish or fish habitat is present. Due to the potential for ephemeral flows, I recommend imposed Class III SMZ restrictions on this channel.

Sediment Delivery
Field reconnaissance indicated no sediment delivery to streams from the proposed harvest area. No delivery was identified into Buffalo Bill Creek or its tributaries. However, the proposed haul route on the county road adjacent to Lynch Creek has several problems. During EA preparation for the West Lynch Timber Sale (DNRC, 2002), the county road was noted as the primary source of sediment to Lynch Creek. Delivery occurs during runoff in the winter and spring when road sanding material is washed into the creek. At that time, the entire road through the canyon above Cedar Creek was paved. Portions of the road are no longer paved and likely contribute sediment to the stream throughout the year.

While Lynch Creek is fish-bearing, the extent of occupied fish habitat in upper Lynch Creek along the county road is unknown. Montana FWP biologist Jon Hanson indicated that brook trout may inhabit this reach of the stream. Sedimentation into a fish-bearing stream can impact reproductive success of fish, reduce aquatic insect abundance or result in fish mortality (DFO, 2000). Although no data has been collected on Lynch Creek, it is likely that fish in the area would be at least temporary displaced during periods of high turbidity from sediment.

Further evidence of sediment to Lynch Creek is noted in the 2006 reassessment summary of Lynch Creek by MDEQ (http://www.deq.mt.gov/CWAIC/wqrep/2006/assmtrec/MT76N003_010.xls). It was noted that as the stream becomes intermittent above Cedar Creek, extreme stability problems occur in the canyon where the road crowds the stream.

ENVIRONMENTAL EFFECTS

Description of Alternatives

No Action Alternative

No timber harvest or associated activities would occur under this alternative. Existing activities such as recreational use, and firewood gathering would continue. Sediment from the county road would continue to impact Lynch Creek.

Action Alternative

One unit approximately 127 acres in size would be harvest with a shelterwood prescription that removes Douglas fir, lodgepole pine and grand fir. Ponderosa pine and western larch and disease free Douglas fir would be retained in the overstory and as a seed source for regeneration after site preparation (scarification and slash piling with an excavator). Crown removal would be reduced by approximately 50%. All work would be completed during frozen and/or snow-covered conditions or when soil moistures are less than 20% with conventional ground-based equipment. Some minor road improvements would occur on the Shiloh road. No new stream crossings would be constructed.

Direct and Indirect Effects

No Action Alternative

Sediment Delivery

Under this alternative, no timber harvest or related activities would occur. Sediment from the county road would continue to impact Lynch Creek.

Action Alternative

Sediment Delivery

Under this alternative, sediment delivery into streams from harvest units would not likely occur due to the lack of streams in the project area. Sediment from the county road would continue to impact Lynch Creek.

Cumulative Watershed Effects

No Action Alternative

Under the no action alternative the potential for sediment contribution from the proposed haul route and would still exist, however, no additional cumulative effects would be expected beyond those impacts described in the existing condition.

Action Alternative

Due to the lack of streams in the project area, no additional cumulative effects would be expected from the timber harvesting or the minor BMP work on the access road. Cumulative effects of sediment delivery from the county maintained Lynch Creek road would not be measurably increased due to the action alternative, especially with respect to the high level of traffic on the road from other users not associated with the proposed actions. Sediment delivery to the stream would likely continue until the road is moved by Sander County. Spring runoff would be expected to continue washing traction sand and gravel from the road surface into the stream.

Because applicable Forestry BMPs would be implemented and no streams occur in the project area, the risk of long-term cumulative impacts to water quality and beneficial uses from this action would be low.

REFERENCES

DNRC, 2002. West Lynch Timber Sale Environmental Analysis. Plains Unit. Plains, MT.

DFO, 2000. Effects of sediment on fish and their habitat. DFO Pacific Region Habitat Status Report 2000/01.

SOILS ANALYSIS

Introduction
This analysis is designed to disclose the existing condition of the soil resources and display the anticipated effects that may result from each alternative of this proposal. The following issue statement was expressed from comments regarding the effects of proposed timber harvesting:

- Timber harvest activities may result in reduced soil productivity and increased erosion due to compaction and displacement, depending on area and degree of harvest effects.

Other comments regarding unstable soils were expressed. However, after reviewing the Plains Unit Soil Survey (Collins & Ottersberg, 1985); and walking through the project area no unstable soils were identified in the project area and therefore will not be further discussed.

Analysis Area
The analysis area for soil impacts will be the harvest units. This analysis area will adequately allow for disclosure of existing conditions, direct, indirect and cumulative impacts.

Analysis Methods
Methods for disclosing impacts include using general soil descriptions and the management limitations of the landtype and then qualitatively assessing the risk of negative effects to soil productivity from compaction and displacement from each alternative.

While the anticipated impacts from each alternative will disclose the direct/indirect effects, the cumulative impacts will be the result of previous and proposed activities.

EXISTING CONDITIONS
General Conditions
The Plains Unit Soil Survey combines landform and soil quality information with habitat types to inventory and map soils in the project area. Three general landtypes were identified in the project area.

Table ST-1: Project Area Landtype Descriptions

Soil Description			Management Implications (erosion hazard)	
Landtype	Name	Soil & Vegetation Descriptions	Erosion Potential	Comments
13JC	Alluvial Lands, High and Old Terraces 0-10% slopes	Surface soils are 8-12 inches deep and excessively well-drained. Subsurface soils are very gravelly loam and sandy loam. The major habitat types are warm and dry.	Soil erosion is low to moderate and sediment delivery efficiency is low. Erosion on roads and trails can be controlled with standard drainage.	Timber productivity potential is low to moderate. Well suited for tractor operations. Due to the excessively well drained soils, the season of operation is long; however regeneration may be difficult.
30U-8B	Mountain Sideslopes 20-40% slopes	Soils are deep (10-20 inches) and well drained. Consists of residual rock mixed with gravels and cobbles. Major habitat type is Douglas fir although substantial areas of Ponderosa pine can be found on south slopes.	Soil erosion and sediment delivery efficiency is moderate. Erosion on roads and trails can be controlled with standard drainage.	Timber productivity potential is low. Season of use is typically long. Droughty soils may be difficult to revegetate on cut- and fillslopes.

The Plains Unit is dominated by partially metamorphic, sedimentary rocks from the 600-million year old Belt Supergroup. The project area is within the Wallace Formation that encompasses the foothills and lower mountain slopes from Plains to the Thompson Lakes. Rocks in this formation are generally comprised of argillites, quartzites and siltites. Overlying these sediments is a layer of loess influenced volcanic ash deposited and redeposited from Mount Mazama approximately 6700 years ago.

Cumulative Effects from Management Activities
Past harvesting activities in the project area include a variety of entries. Harvesting began in the area around 1940 and continued through 1975 with a commercial thin. Harvests have ranged from Christmas tree and firewood permits to post and pole harvests and some small salvages. No harvest has occurred in the project area since 1975. During a field review, an ocular assessment of the area in skid trails and landings from previous entries was estimated at 5 to 7%.

DNRC strives to maintain soil productivity by limiting cumulative soil impacts to 15% or less of a harvest area as noted in the State Forest Management Plan (DNRC, 1996). As a recommended goal, if existing detrimental soil effects exceed 15% of an area, proposed harvest should minimize any additional impacts. Harvest proposals on areas with existing soil impacts in excess of 20% should avoid any additional impacts and include restoration treatments as feasible base on site-specific evaluation and plans. Past monitoring on DNRC timber sales from 1988 to 2003 has shown an average of 13.9% soil impacts across all parent materials. Recent soil monitoring on the nearby West Lynch Timber Sale found total soil impacts of 5.9% after winter harvest and summer excavator piling and scarification.

Cumulative effects from past and current uses on these parcels are limited to skid trails, roads and off-road trails from vehicles.

ENVIRONMENTAL EFFECTS

Description of Alternatives

No Action Alternative

No timber harvest or associated activities would occur under this alternative. Existing activities such as recreational use, and firewood gathering would continue.

Action Alternative

One unit approximately 127 acres in size would be harvest with a heavy shelterwood type prescription that removes Douglas fir, lodgepole pine and grand fir. Ponderosa pine and western larch would be retained in the overstory and as a seed source for regeneration after site preparation (scarification and slash piling with an excavator). All work would be completed during frozen and/or snow-covered conditions or when soil moistures are less than 20% with conventional ground-based equipment. Some minor road improvements would occur on the Shiloh road.

Direct and Indirect Effects

No Action Alternative

No timber harvest or associated activities would occur under this alternative. Skid trails from past harvesting would continue to recover from compaction as freeze-thaw cycles continue and vegetation root mass increases.

Action Alternative

To provide an adequate analysis of potential impacts to soils, a brief description of implementation requirements is necessary. The Administrative Rules of Montana 36.11.422 (2) and (2)(a) state that appropriate BMPs shall be determined during project design and incorporated into implementation. To ensure the incorporated BMPs are implemented, the specific requirements would be incorporated into the DNRC Timber Sale Contract. As part of this alternative design, the following BMPs are considered appropriate and, therefore would be implemented during harvest operations:

1) Limit ground based equipment operations to periods when soils are relatively dry, (less than 20%), frozen or snow covered to minimize soil compaction and rutting, and maintain drainage features. Check soil moisture conditions prior to equipment start-up.

2) On ground skidding units, the logger and sale administrator will agree to a general skidding plan prior to equipment operations. Skid trail planning would identify which main trails to use, and what additional trails are needed. Trails that do not comply with BMPs (i.e. draw bottom trails) would not be used and may be closed with additional drainage installed where needed or grass seeded to stabilize the site and control erosion.

3) Tractor skidding should be limited to slopes less than 35% unless the operation can be completed without causing excessive erosion. Short steep slopes above incised draws may require a combination of mitigation measures based on site review, such as adverse skidding to ridge or winch line skidding from more moderate slopes less than 35%.

4) Keep skid trails to 20% or less of the harvest unit acreage. Provide for drainage in skid trails and roads concurrent with operations.

5) Slash Disposal- Limit disturbance and scarification combined to 30-40% of harvest units. No dozer piling on slopes over 35%; no excavator piling on slopes over 40% unless the operation can be completed without causing excessive erosion. Consider lop and scatter or jackpot burning on steeper slopes.

Considering data from the DNRC Soil Monitoring Report (DNRC, 2004), the implementation of Forestry Best Management Practices has resulted in less risk of detrimental soil impacts from erosion, displacement and severe compaction. While the report noted that the impacts were more likely on the fine textured soils and steep slopes, reduced soil productivity due to compaction and displacement may occur on coarser parent materials similar to those found in the state parcels. Also, the greatest impacts were noted where harvest implementation departed from BMPs such as limiting ground-based skidding to slopes of 40 percent or less.

Comparing the soil type map, field reconnaissance notes and topographic map features with the proposed harvest unit map indicates that under this alternative ground-based skidding would occur on slopes of up to 40%, on well-drained relatively rocky soils. The extent of impacts expected would likely be slightly more than the West Lynch Timber Sale due to the summer season of operation. Impacts would be expected to be in the 5.9%-13.9% range or 7.5 to 17.5 acres. This range of impacts would be considered acceptable because less than 15% of the project area would be impacted.

As vegetation begins to establish on the impacted areas, and freeze-thaw cycles occur, the area of reduced productivity would decrease.

Cumulative Soil Effects
Cumulative effects would be controlled by limiting the area of adverse soil impacts to less than 15% of harvest units (as recommended by the SFLMP) through implementation of BMPs, skid trail planning on tractor units and limiting operations to frozen and/or snow-covered conditions. Future harvest opportunities would likely use the same road system, skid trails and landing sites to reduce additional cumulative impacts. Large woody debris would be retained for nutrient cycling long-term soil productivity.

Some of the area proposed for harvest under this alternative have been harvested in the past using ground based harvest methods. In order to limit cumulative impacts, existing skid trails would be used if they are properly located and adequately spaced. By reusing existing skid trails and mitigating the direct and indirect effects with soils moisture restrictions, season of use and method of harvest, the risk of unacceptable long-term impacts to soil productivity due to compaction and displacement would be low.

REFERENCES:
DNRC, 2004. DNRC Compiled Soils Monitoring Report on Timber Harvest Projects. Missoula, MT.

DNRC, 1996. State Forest Land Management Plan. Montana Department of Natural Resources and Conservation. Missoula, MT.

Collins, Jeff and Ottersberg, R. 1985. Plains Unit Soil Survey. Montana Department of State Lands. Missoula, MT.

Attachment III

Prescriptions

Proposed Shiloh Road Timber Sale Harvest Unit Prescriptions

Harvest Unit: 1 **Harvest Unit Acres:** 127 acres

Elevation: 3600 ft. **Slope:** 0-25 % **Aspect:** Flat to Southwesterly

Habitat Type: ABGR/LIBO-LIBO

Current Cover Type: ponderosa pine

Desired Future Condition: ponderosa pine

Soil Type: Bignell, Rumblecreek

Description of Existing Stand: This unit is located to the east of the County Road # 7512 and north of Shiloh Road and is comprises stands in the northeast half of Section 10, Township 21 North, Range 26 West. The topography is mostly flat with slopes ranging from 0-30%. The unit is comprised of two identified stands in the Stand Level Inventory. The stand structure is comprised of three distinct layers. Douglas-fir and ponderosa pine are the co-dominant species in the overstory (70%), with a scattered population of western larch (10%). Overstory tree height averages 90 feet with an average of 19" DBH with a few scattered +25" DBH. The age of the stand ranges from 90 to 210 years and averages 150 years old. Overstory trees are evenly distributed and form a relatively closed canopy layer (40-75 % canopy closure).
The mid-canopy is mainly Douglas-fir (50-60%), ponderosa pine (30-40%) lodgepole pine and western larch (10-20 %). The mid canopy average age is 70-80 years old, averages 10" DBH and is 60-70 feet in height.
The understory consists of Douglas-fir (40-60%), grand fir, lodgepole pine, ponderosa pine, western larch and grand fir each in the 10-20% range. The understory ranges in height from 10-20 feet, 2-3" DBH and averages 20-25 years old.
Mountain pine beetle (*Dendroctunus ponderosae*) activity is evident in the ponderosa pine in endemic proportions. Mistletoe occurs occasionally in the western larch and is prevalent in the all layers of Douglas-fir along with root and stem rot diseases. Tree boring indicated core rot in many of the large diameter (> 25 "dbh) Douglas fir.
Surface fuel loading of down material ranges from 15-20 tons per acre.

Treatment Objectives:

- Remove unhealthy, diseased trees, as well as those with poor vigor, from the overstory to promote long-term forest health.
- Thin intermediate and understory components of stand to enhance growth characteristics and reduce fuel loading.
- Promote natural ponderosa pine and western larch regeneration in areas where Douglas-fir is becoming dominant component in the stand.

Prescribed Treatment:

- Shelterwood harvest, variable spacing of healthy trees with good crown and bark characteristics leaving 20-30 TPA. Favor leaving ponderosa pine and western larch, then Douglas fir in that order. Remove all merchantable lodgepole and grand fir.
- Reduce 80% canopy cover to 30-35% canopy cover.
- Create openings of 100' on at least two sides of existing clumps or isolated individual ponderosa pine and western larch overstory trees in the areas where Douglas fir is the predominant species.
- Retain at least two snags per acres >14" DBH and two snag recruits per acre to remain standing if they are not a safety hazard. Mark to leave and girdle a few of the obviously cull, large diameter (> 25 in dbh), mistletoe infected Douglas fir that are not accessible to firewood gatherers.

Harvest Method:

- Tractor logging with conventional, mechanical, or cut-to-length operations are applicable to this unit.
- Trees marked to leave.

Hazard Reduction:

- Urban interface area, high hazard slash clean up
- Pile and grind or burn at landings following harvest.
- Slash would be lopped and /or trampled to a depth of 18” or less. In openings where ponderosa pine regeneration is a primary goal, slash would be spot piled and burned. Jackpot burn open areas during pile burning operations.
- Machine pile and burn all slash in excess of retention requirements of 5 to 10 tons per acre.

Regeneration/Site Preparation:

- Precommercial thin healthy regeneration to promote future growth and vigor.
- In areas where ponderosa pine and western larch regeneration is a primary goal, 30% of ground would be scarified during machine piling and burned one year after harvest.
- Monitor success of natural regeneration and plant seedlings within 5 years after harvest if necessary.

Anticipated Future Treatments:

- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.
- This stand would be evaluated for regeneration, planting needs and possible precommercial thinning opportunities as the stand progresses in age.
- Look for opportunity to remove overstory in 25 years.

Attachment IV

Mitigations

Mitigations

Roads: A transportation system minimizing road miles and meeting all BMPs has been designed by the DNRC. No new roads will be constructed with the proposed harvest activities. Road drainage improvements would be implemented on approximately 1.0 miles of road to reduce the potential for sediment introduction from the haul routes. Existing roads to be incorporated into the transportation system would be upgraded to meet all BMPs.

Wildlife: The following issues have been identified, with mitigation measures (italicized) incorporated into the proposed project.

- Gray Wolf: Suspend operations and temporarily restrict use of roads within a 1-mile radius of any known active wolf den. Suspend operations and consult a DNRC biologist if a suspected rendezvous site is observed within 0.5 miles of any ongoing project activities. Close skid trails after the proposed activities to reduce the potential for motor vehicle disturbance. Using a combination of topography, group retention, and roadside vegetation buffers to reduce views into harvest units along open roads. Cease all operations if a threatened or endangered species is encountered. Consult a DNRC biologist and develop additional mitigations that are consistent with the administrative rules for managing threatened and endangered species (ARM 36.11.428 through 36.11.435). *These items would be specified in the Timber Sale Contract and monitored by the Forest Officer.*

- Pileated Woodpecker: Favor western larch and Ponderosa pine in retention and regeneration decisions. *Harvest and stand prescriptions accomplish this. Reduce motorized access to reduce potential loss of existing snags to firewood gathering.* Manage for snags, snag recruits, and coarse woody debris according to ARM 36.11.411, 16.11.413, and 36.11.414, particularly favoring western larch and ponderosa pine. *Contract provisions would be in place to accomplish this*.

- Flammulated Owl: Favor ponderosa pine in retention and regeneration decisions. Restrict public access to reduce potential loss to firewood gathering. Manage for large-sized snags and snag recruits according to ARM 36.11.411, particularly favoring ponderosa pine. *Mitigation identical to those above under "Pileated Woodpecker".*

Soils: Limit equipment operations to periods when soils are relatively dry, (less than 20% soil moisture content), frozen or snow covered to minimize soil compaction and rutting, and maintain drainage features. Check soil moisture conditions prior to equipment start-up. The logger and sale administrator would agree to a general skidding plan prior to equipment operations. Skid trail planning would identify which main trails to use and what additional trails may be needed. Trails that do not comply with BMP's (i.e. draw bottom trails) would not be used. Accept disturbance incurred during skidding operations to provide for a portion of the scarification for regeneration Tractor skidding would be limited to slopes less than 40%.

Slash Disposal: Shiloh Road is considered a urban interface, high hazard clean up area. No dozer piling on slopes over 35%: no excavator piling on slopes over 40% unless the operation can be completed without excessive erosion. Consider lop and scatter or jackpot burning on steeper slopes. Retain 5-10 tons/acre large woody debris and a majority of all fine litter feasible following harvest (ARM 36.11.410 and 36.11.414). If whole tree harvesting is used, implement one of the following mitigations for nutrient cycling; return skid slash and evenly distribute within the harvest area or cut off tops from every third bundle of logs so that tops are dispersed as skidding progresses. *These measures would be specified in the timber Sale Contract and would be monitored by the Forest Officer.*

Hydrology: All forestry Best Management Practices (BMP's) would apply to limit the potential for sediment delivery to dry draws and swales. Ephemeral draw has been identified by a DNRC hydrologist and will be treated under the same rules as a Class 3 SMZ. Possible draw crossings will be flagged no less than 200 ft. apart. This would further limit the potential for sediment introduction.

Visual Effects: The selective harvest prescriptions and the inclusion of a buffer strip along the main county road should minimize the visual impacts.

Weed Management: Roads and skid trail approaches would be seeded and spot treated with chemicals following construction and project completion. Prior to entering site, off-road equipment would be cleaned and inspected through the timber sale contract to avoid seed migration.

Attachment V

Consultants and References

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Consultants

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