ENVIRONMENTAL ASSESSMENT

For the:

Harlow Dump Timber Sale

Prepared by:

Kyle Johnson,
Management Forester

Plains Unit, Northwestern Land office,
Montana Department of Natural Resources and Conservation

November 9, 2009

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MEMORANDUM

To: Kyle Johnson, Management Forester, Plains Unit

From: Larry Ballantyne, Plains Unit Resource Program Manager

Date: September 22, 2009

RE: Harlow Dump Timber Sale Objectives

Primary Objective

The primary objective of the Harlow Dump Timber Sale is to generate income for the CS and DDA trusts. The land parcels involved in this proposed project are located in Section 36, Township 22N, Range 30W (CS), and Section 22, Township 23N, Range 30W (DDA). This project would provide an estimated 2MMBF of merchantable timber toward the Northwestern Land Office s FY 2010 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:	Harlow Dump Timber Sale
Proposed Implementation Date:	January 2010
Proponent:	Department of Natural Resources and Conservation, Northwest Land Office, Plains Unit.
Location:	Section 36, Township 22N, Range 30W and Section 22, Township 23N, Range 30W
County:	Sanders

I. TYPE AND PURPOSE OF ACTION

The Department of Natural Resources and Conservation (DNRC) proposes to sell approximately 18,000 tons (3.0 MMBF) of timber in the Clark Fork River Drainage, Section 36, Township 22N, Range 30W, and Section 22, Township 23N, Range 30W roughly 2 and 10 air miles respectively northwest of Thompson Falls, Montana. This action would produce an estimated $237,600.00 for the Common Schools (CS) and $118,800.00 for the Deaf and Blind (DDA) Trust Grants at an estimated stumpage of $20.00 per ton. Forest Improvement fees collected in association with the proposed action would total approximately $112,500.00. Activities proposed would maintain and improve forest health, reduce fuel loading, and increase forest productivity beneficial to future trust actions. (See Attachment I, Area Maps, and Project Plan)

Six harvest units totaling approximately 227 acres are proposed. New roads constructed in association with this project total approximately 0.6 miles. There would be reconditioning and improvement of existing roads totaling approximately 2 miles. Approximately 0.6 miles of existing roads and trails would be decommissioned. Following the proposed harvest, all open roads would be water barred, grass seeded, fertilized and closed to vehicle traffic. (See Attachment I, Area Maps and Project Plan).

Lands involved in this proposed project area are held by the State of Montana in trust for the support for specific beneficiary institutions such as the public schools trust, public buildings, state colleges, universities, and other state institutions (Enabling Act of February 22, 1889: 1972 Montana Constitution, Article 1 Section 11). 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). 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 456) 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 newspaper advertisements in the Sanders County Ledger, plus letters sent to adjacent landowners and other known interested parties and organizations. Public response was received and used to assist in defining issues surrounding the proposed project. Hydrological, soils, wildlife, and vegetative concerns were identified by DNRC specialist 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 I, 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:

Montana Department of Environmental Quality (DEQ)

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

Montana/Idaho Airshed Group

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

3. ALTERNATIVES CONSIDERED:

Action: The Action Alternative is described 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.

No Action: Under the No Action Alternative, no activity would be undertaken. No timber would be harvested and no road construction or improvements would occur. Effects of the No Action Alternative are shown in the Checklist 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.

A DNRC soils scientist has reviewed the project area, transportation system and harvest plan. Recommendations to minimize direct, indirect, and cumulative impacts have been incorporated in the project design. (see: Attachment I, Area Maps and Project Plan; Attachment II, Resource Analyses; Attachment III, Harvest Prescriptions; Attachment IV, Mitigations). As detailed in the Soils Analysis, no substantial direct, indirect or cumulative impacts to soils resources are expected to result from the implementation of the Action Alternative.

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.

Recommendations from DNRC specialists to minimize direct, indirect, and cumulative impacts have been incorporated in the project design (See: Attachment II, Resource Analyses; Attachment IV, Mitigations). As detailed in the Hydrology Analysis, no substantial direct, indirect or cumulative

impacts to water quality or downstream beneficial uses are expected to result from the implementation of the Action Alternative.

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 the Thompson Falls Impact Zone as identified by the Montana / Idaho State Airshed Group. All activities would be conducted in accordance with the impact zone regulations.
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. Efforts will be made to dispose of slash without burning. Thus direct, indirect, and cumulative effects to air quality are expected to be minimal.

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 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 I, Area Maps and Project plan: Attachment II, Resource Analysis; Vegetative Analysis, Attachment III, Prescriptions; Attachment IV, Mitigations). 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.

Two Species of Concern listed by the Montana Natural Heritage Program were identified as occurring within the Townships of the project area. No individuals of these species were found in the project area during field surveys. For more information on these Species of Concern, see Attachment II, Resource Analyses, Vegetation Analysis.

Measures to minimize noxious weeds, insects and diseases are included in the project design (see: Attachment IV, 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 for 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.

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 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.

A DNRC Archaeologist was consulted and recommendations to minimize direct, indirect, and cumulative impacts have been incorporated in the project design. (see: Attachment I, Area Maps and Project Plan; Attachment II, Resource Analyses; Attachment III, Harvest Prescriptions; Attachment IV, Mitigations).
No substantial direct, indirect or cumulative impacts to historical, archaeological or paleontological resources are expected to result from the implementation of the Action Alternative.

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 area would be visible from Birldand Bay Road, Golf Course Road, Blueslide Road, Harlow Road and MT Highway 200 west of Thompson Falls MT. Some concerns regarding visual impacts of harvesting have been raised by neighboring landowners.
Openings from changes in tree cover density and skid trails would be visible from these areas until regeneration has reached the point of canopy closure again. Adverse visual impacts may occur in the short term but would decrease as seral species such as Lodgepole pine and Western larch populate the openings created during harvesting. Any adverse impacts would be reduced by implementation of buffer strips for visual screening, skid trail spacing and group retention where appropriate. Therefore, direct, indirect, and cumulative effects to aesthetics is expected to be short term and minimal (see: Attachment IV, Mitigations).
Under the No Action Alternative, aesthetics are expected to change gradually as a progression towards denser more shaded stands with a higher instance of insect and disease mortality takes place.

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 direct, indirect, or cumulative impacts would likely 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.

- Categorical Exclusion for the Old Dump Salvage, 2005
- Environmental Analysis for the Blueslide Timber Sale, 1999

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 of 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.

The proposed timber harvest would provide continuing industrial production in the Plains and Thompson Falls areas.

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 direct, indirect, or cumulative impacts 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 direct, indirect, or cumulative impacts from this proposed action.

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 Birldand bay road, Harlow road and Blueslide county road as well as MT Highway 200. This increase is a normal contributor to the activities of the local community 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 biologically diverse forests. Our understanding is that a diverse forest is a stable forest that will produce the most reliable and highest long term revenue stream... In the foreseeable future, timber management will continue to be our primary source of revenue and our primary tool for achieving biodiversity objectives.*

On March 12, 2003, the DNRC adopted Administrative Rules for Forest Management (Rules)(Administrative Rules of Montana [ARM] 36.11.401 through 450). 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 project area is hunted frequently. Roads and skid trails in the project area would be closed after the project to minimize illegal off-road vehicle use. Closure of them would 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 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 timber. The proposed action would produce an estimated $237,600.00 for the Common Schools (CS) and $118,800.00 for the Deaf and Blind (DDA) Trust Grants, as well as Forest Improvement (FI) fees totaling approximately $112,500.00. The No Action Alternative does not generate any return to the CS or DDA trusts or the FI account at this time.

EA Checklist Prepared By:	**Name:**	Kyle Johnson	**Date:**	9/23/09
	Title:	Management Forester, Plains Unit MT DNRC		

V. FINDING

25. ALTERNATIVE SELECTED:

The Action Alternative is selected for implementation

26. SIGNIFICANCE OF POTENTIAL IMPACTS:

No significant impacts have been identified as a result of 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 Resource Program Manager**
Signature:	**Date:** 9 November 2009

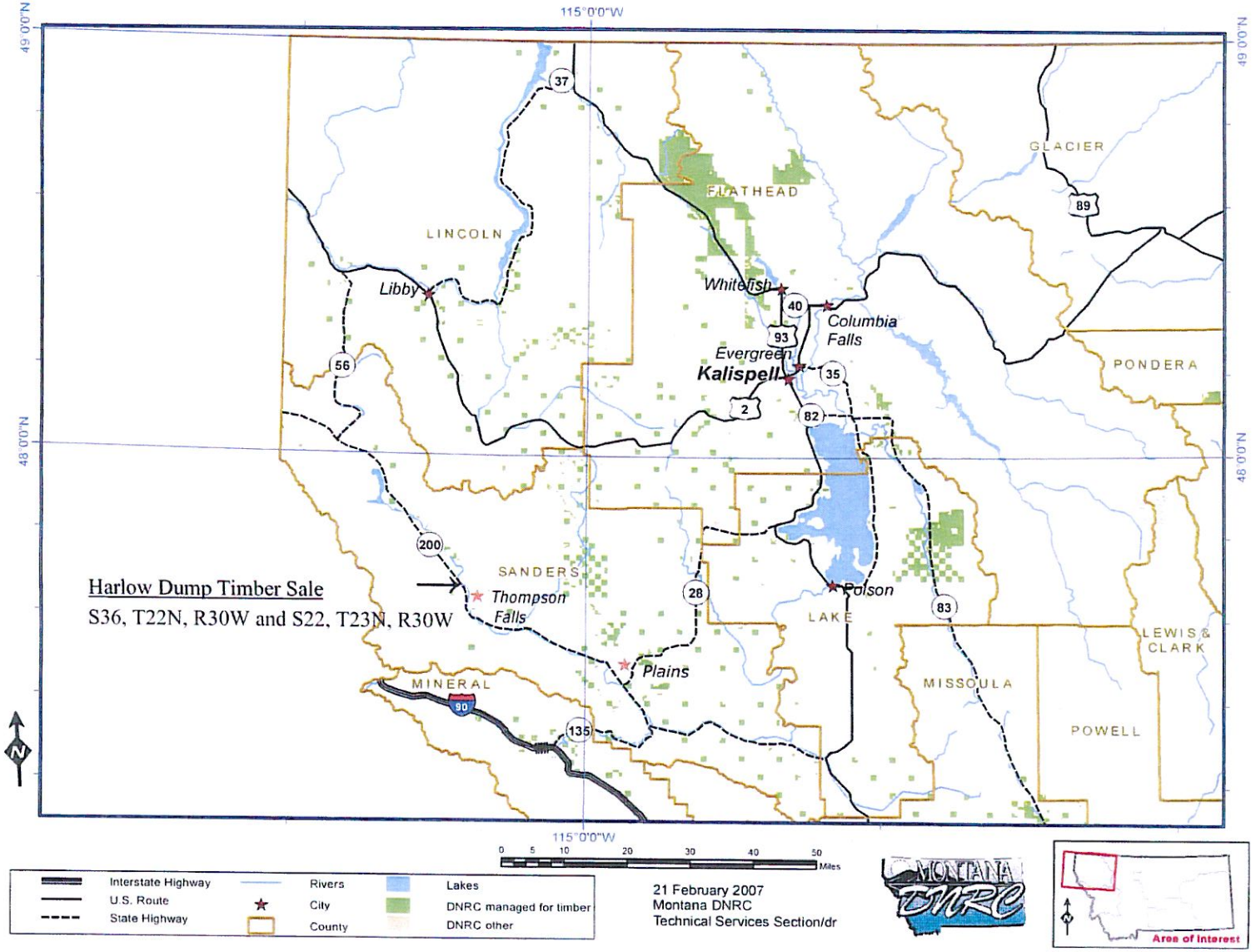
Attachment I

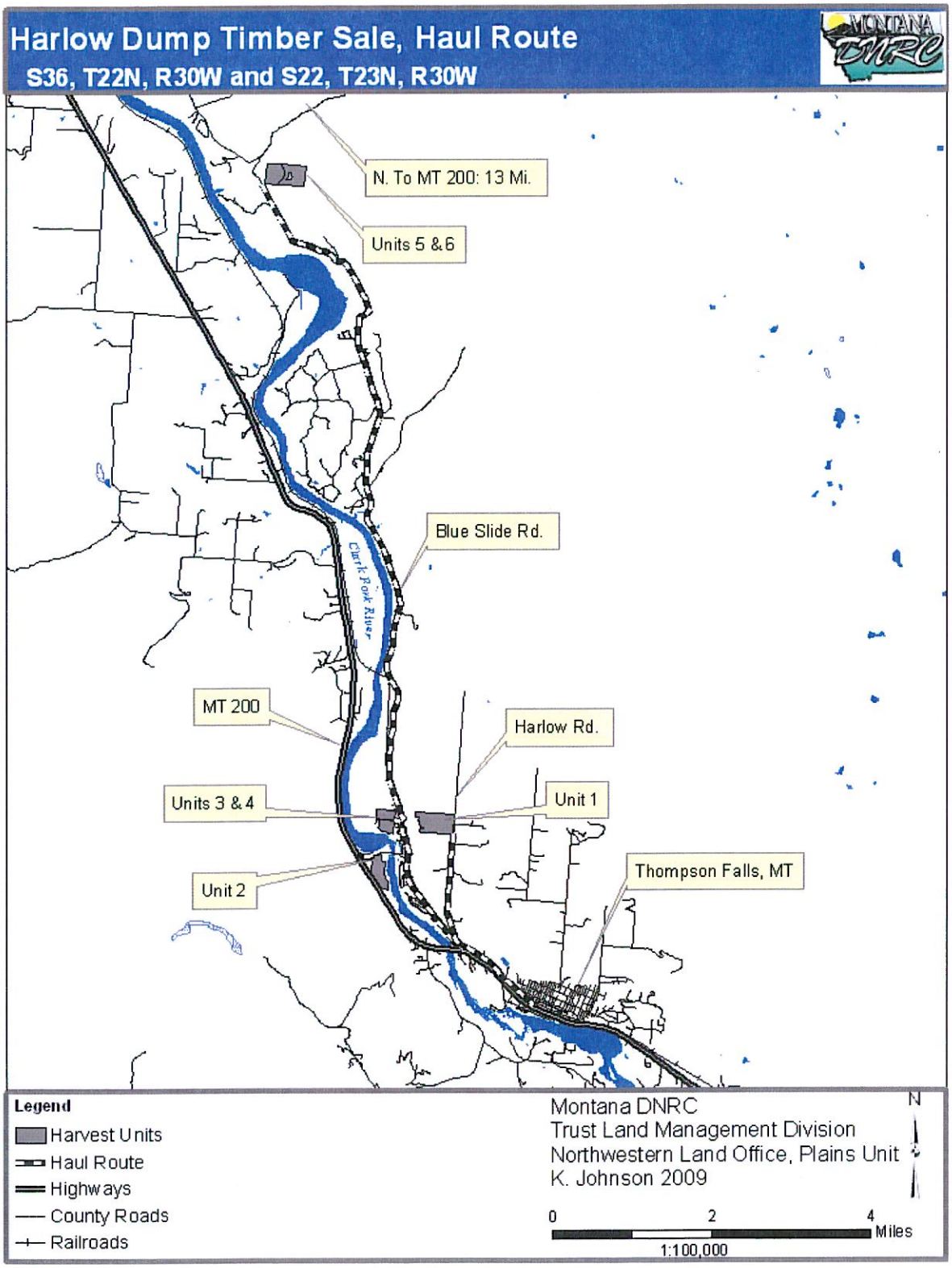
Area Maps and Project Plan

- **Vicinity Map..... Page 12**
- **Haul Route Map..... ..... Page 13**
- **Harvest Unit Maps..... ..... Page 14**
- **Current Cover Types .... Page 16**
- **Desired Future Condition..... Page 18**

Harlow Dump Timber Sale
Section 36, T22N, R30W and Section 22, T23N, R30W

Attachment I




Harlow Dump Timber Sale, Haul Route
S36, T22N, R30W and S22, T23N, R30W
N. To MT 200: 13 Mi.
Units 5 &6
Blue Slide Rd.
Clark Fork River
MT 200
Harlow Rd.
Units 3 & 4
Unit 1
Unit 2
Thompson Falls, MT
Legend
Harvest Units
Haul Route
Highways
County Roads
Railroads
Montana DNRC
Trust Land Management Division
Northwestern Land Office, Plains Unit
K. Johnson 2009
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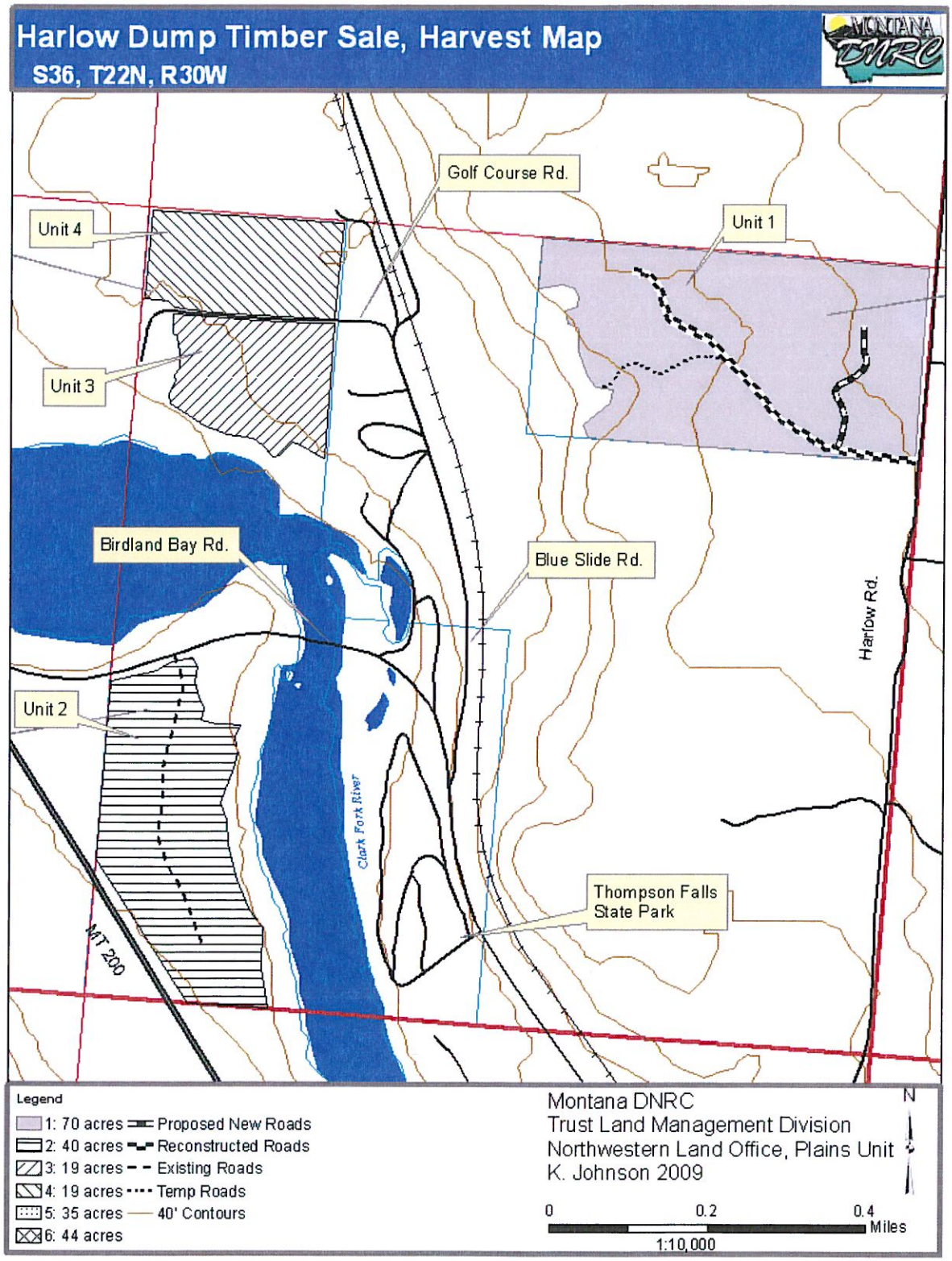
Harlow Dump Timber Sale, Harvest Map
S36, T22N, R30W
Golf Course Rd.
Unit 4
Unit 1
Unit 3
Birdland Bay Rd.
Blue Slide Rd.
Harlow Rd.
Unit 2
Clark Fork River
Thompson Falls State Park
MT 200
Legend
1: 70 acres
2: 40 acres
3: 19 acres
4: 19 acres
5: 35 acres
6: 44 acres
Proposed New Roads
Reconstructed Roads
Existing Roads
Temp Roads
40' Contours
Montana DNRC
Trust Land Management Division
Northwestern Land Office, Plains Unit
K. Johnson 2009
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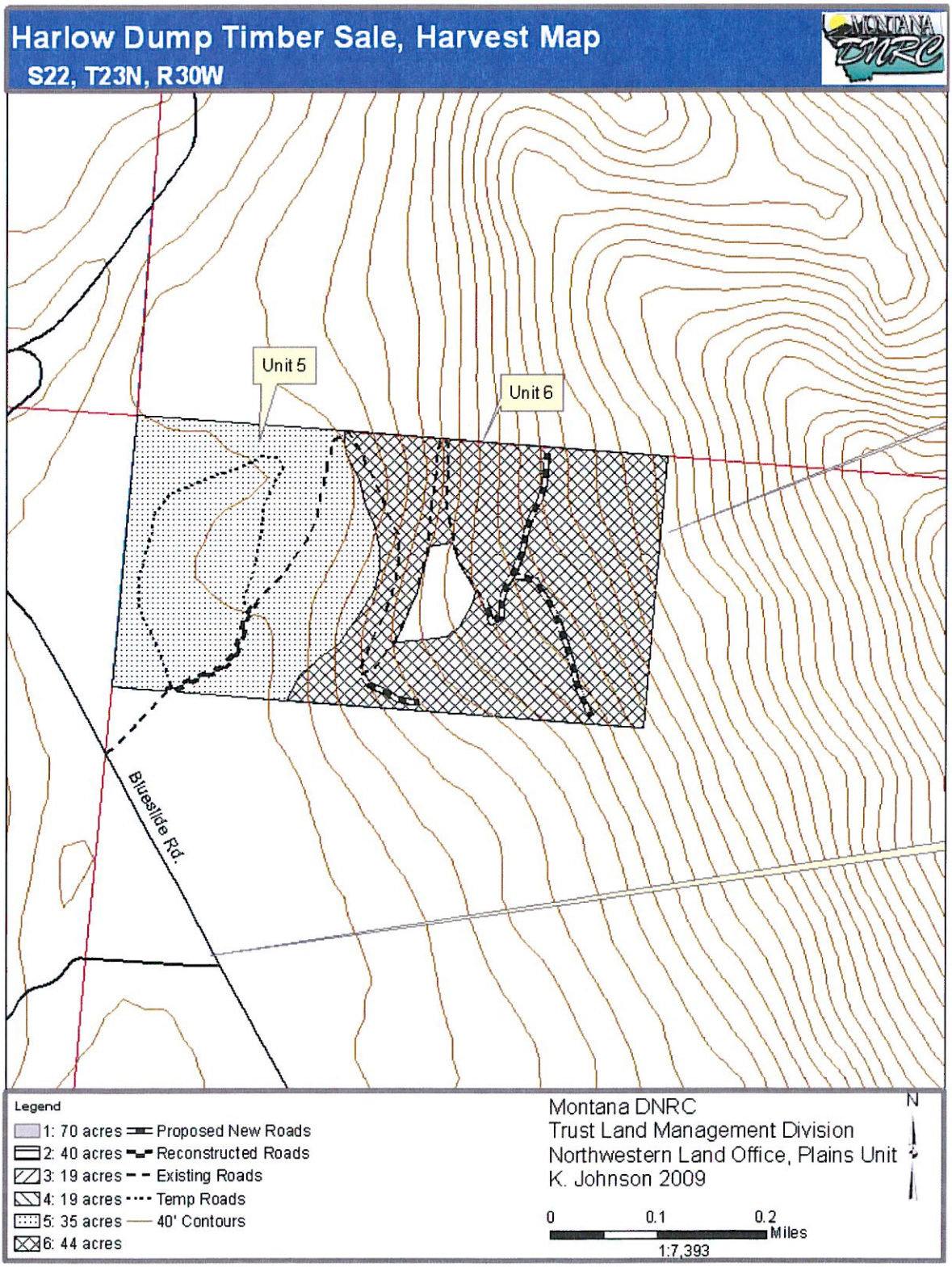
Harlow Dump Timber Sale, Harvest Map
S22, T23N, R30W
Unit 5
Unit 6
Blueslide Rd.
Legend
1: 70 acres
2: 40 acres
3: 19 acres
4: 19 acres
5: 35 acres
6: 44 acres
Proposed New Roads
Reconstructed Roads
Existing Roads
Temp Roads
40' Contours
Montana DNRC
Trust Land Management Division
Northwestern Land Office, Plains Unit
K. Johnson 2009
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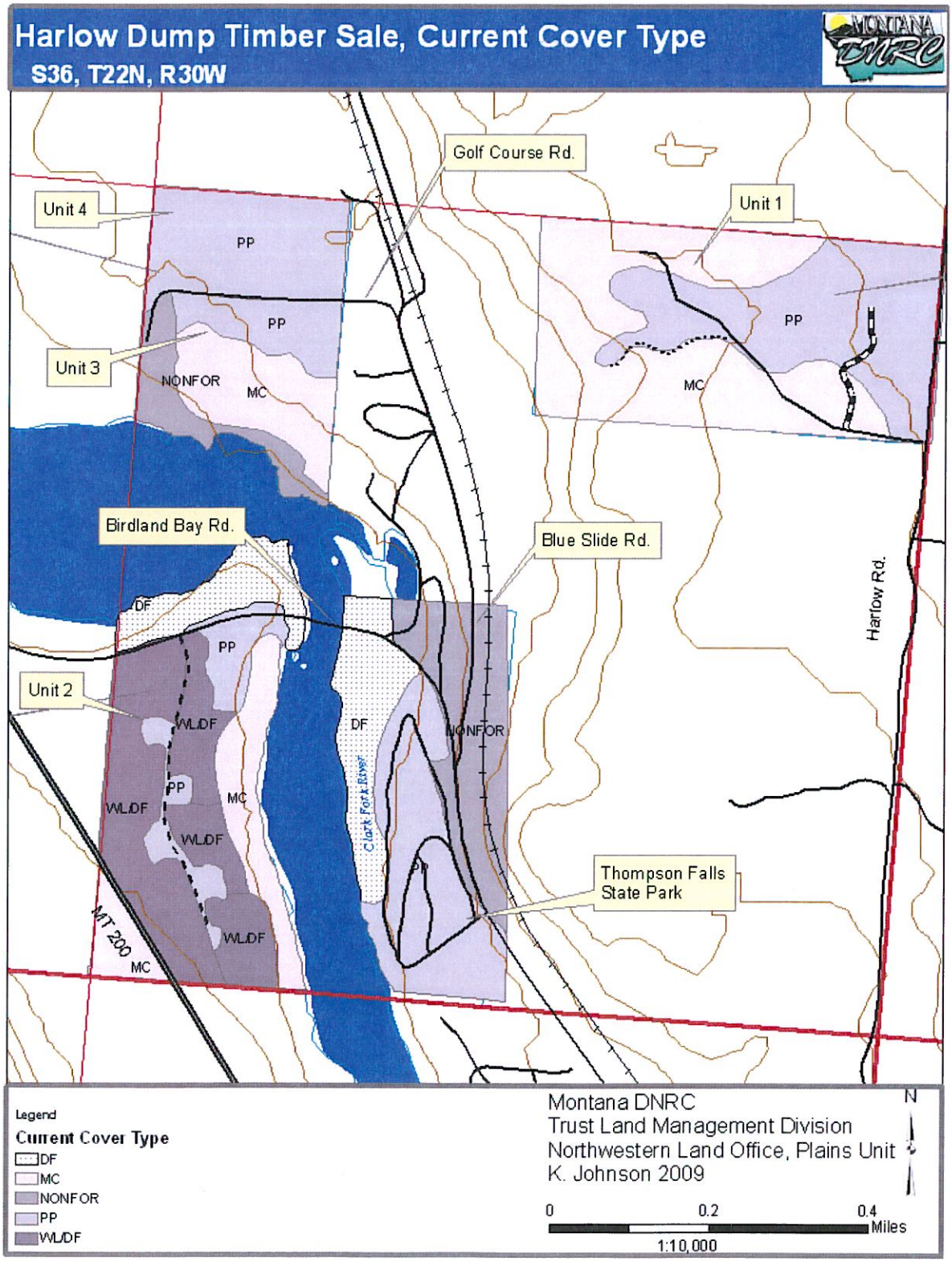
Harlow Dump Timber Sale, Current Cover Type
S36, T22N, R30W
Golf Course Rd.
Unit 4
Unit 1
Unit 3
Unit 2
Birdland Bay Rd.
Blue Slide Rd.
Harlow Rd.
Thompson Falls State Park
MT 200
Clark Fork River
PP
NONFOR
MC
DF
WL/DF
Legend
Current Cover Type
DF
MC
NONFOR
PP
WL/DF
Montana DNRC
Trust Land Management Division
Northwestern Land Office, Plains Unit
K. Johnson 2009
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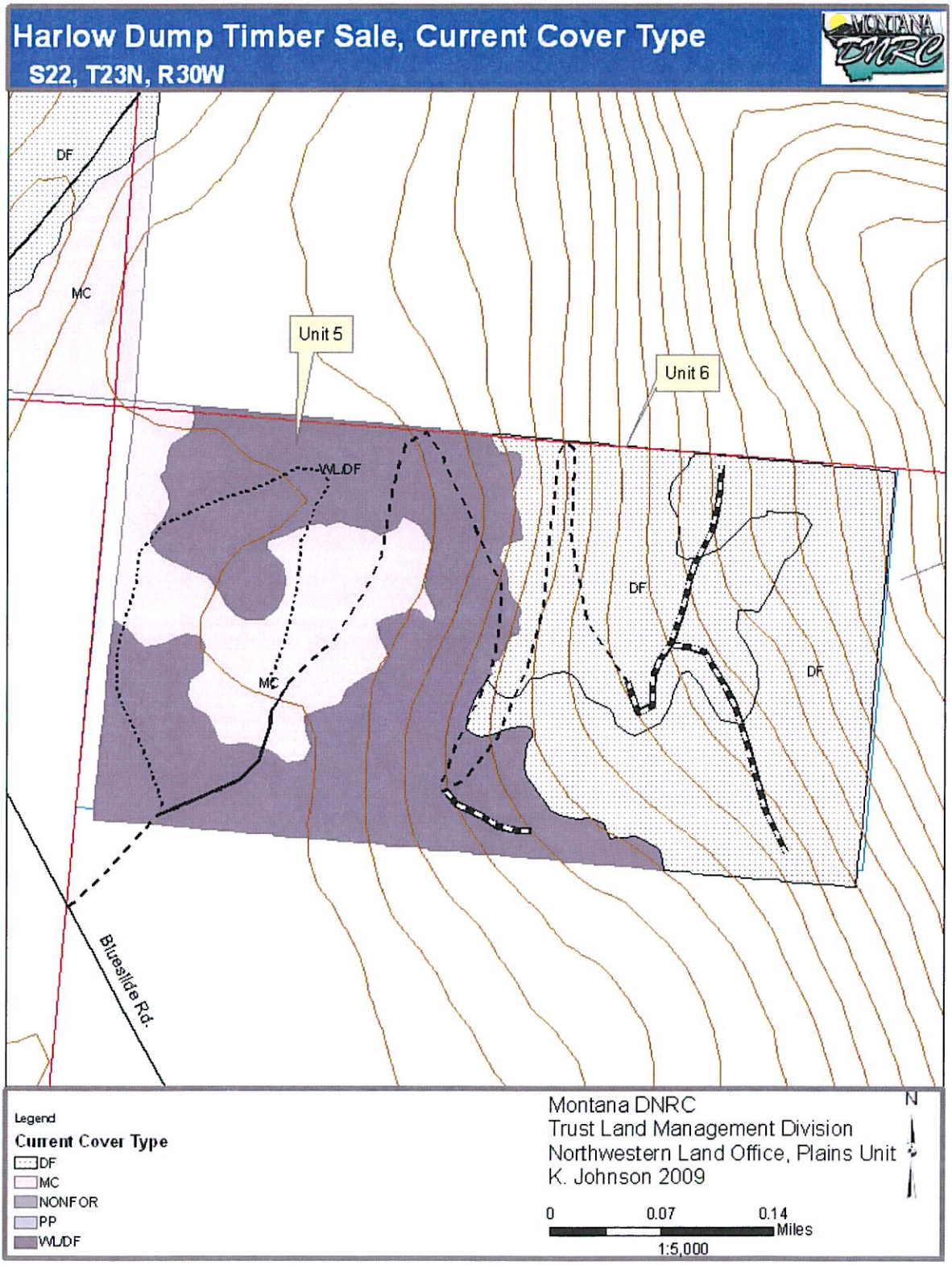
Harlow Dump Timber Sale, Current Cover Type
S22, T23N, R30W
DF
MC
Unit 5
Unit 6
WL/DF
MC
DF
DF
Blueslide Rd.
Legend
Current Cover Type
DF
MC
NONFOR
PP
WL/DF
Montana DNRC
Trust Land Management Division
Northwestern Land Office, Plains Unit
K. Johnson 2009
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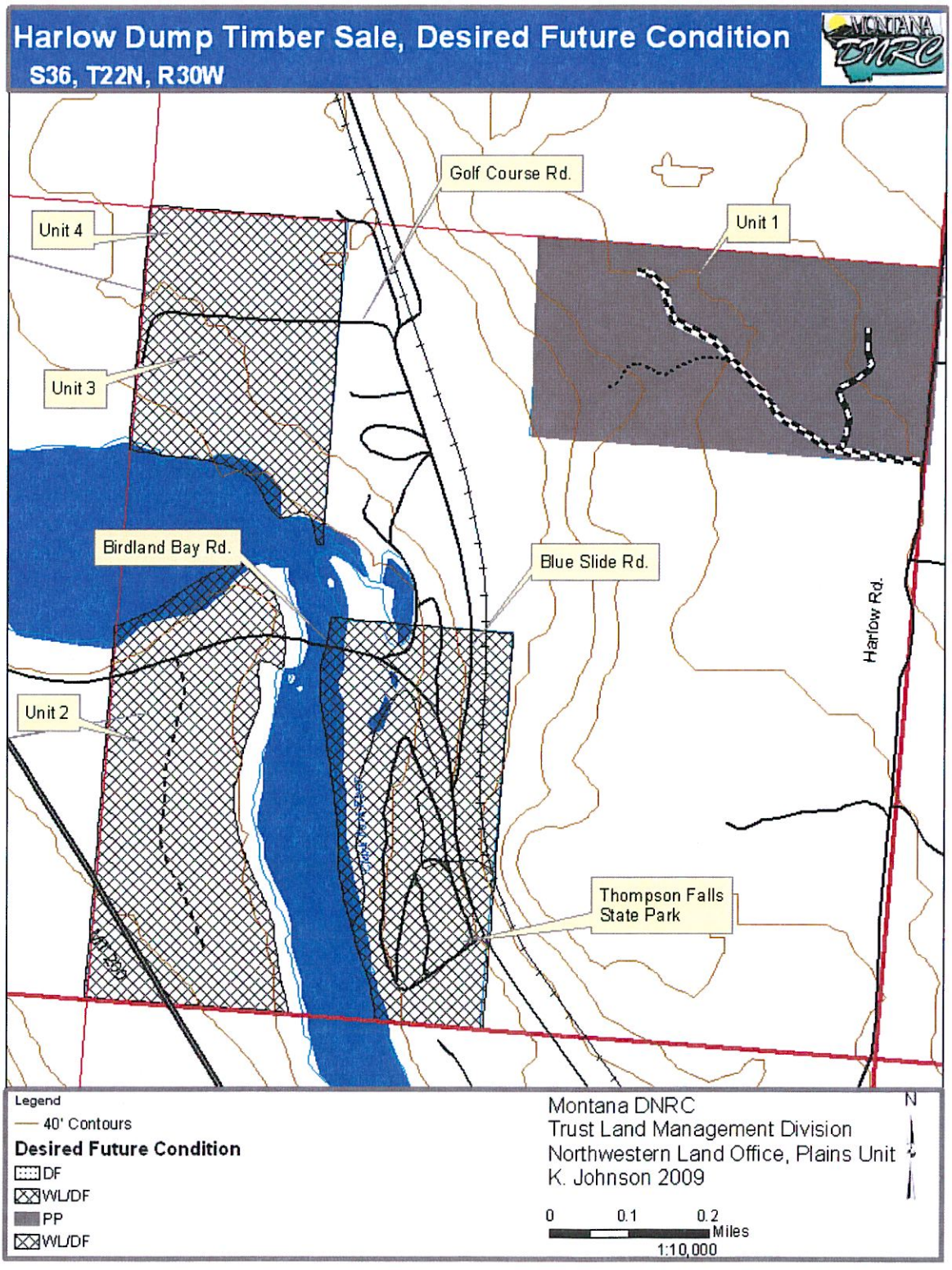
Harlow Dump Timber Sale, Desired Future Condition
S36, T22N, R30W
Golf Course Rd.
Unit 4
Unit 1
Unit 3
Birdland Bay Rd.
Blue Slide Rd.
Harlow Rd.
Unit 2
Thompson Falls State Park
Legend
40' Contours
Desired Future Condition
DF
WL/DF
PP
WL/DF
Montana DNRC
Trust Land Management Division
Northwestern Land Office, Plains Unit
K. Johnson 2009
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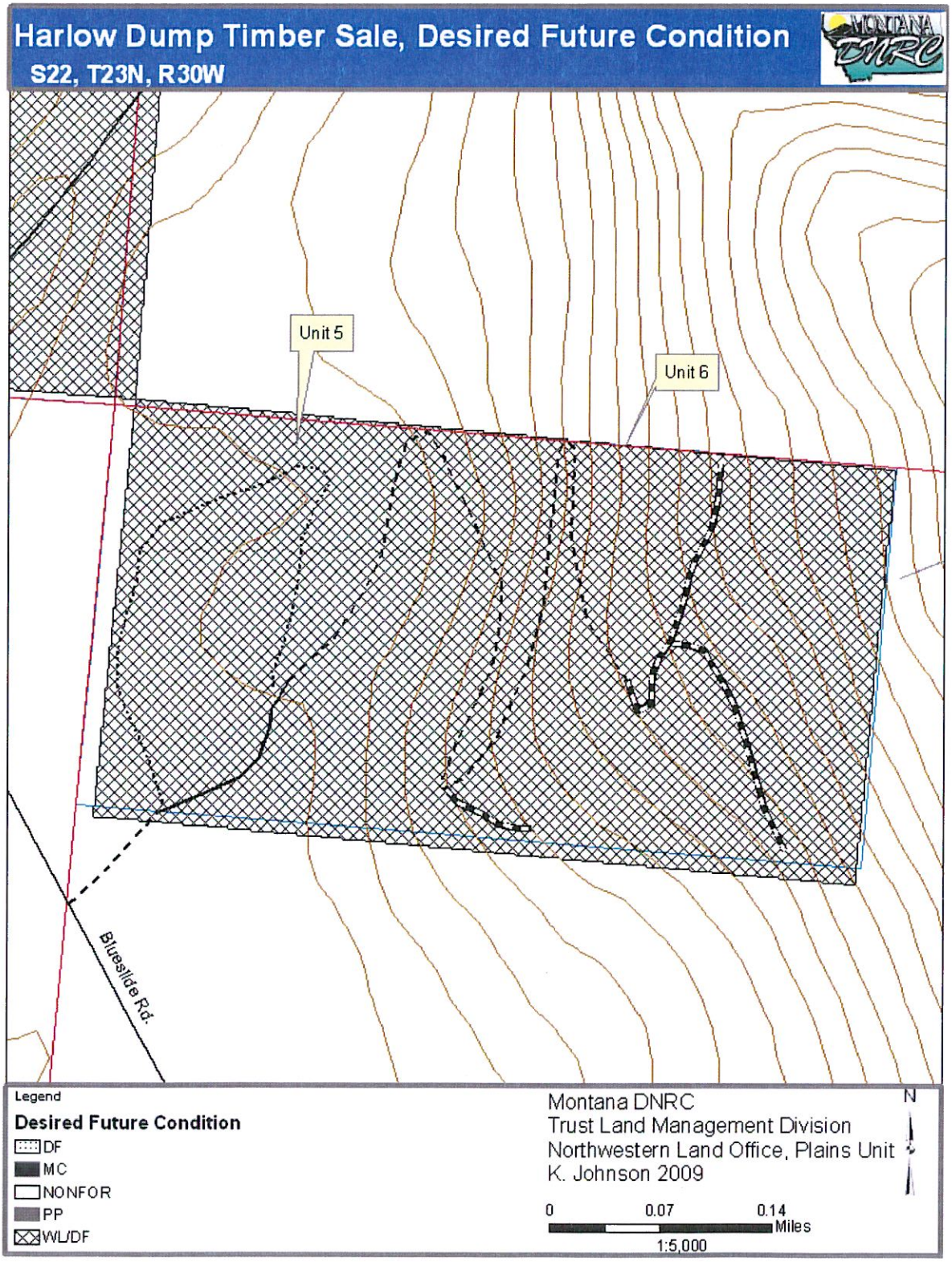
Harlow Dump Timber Sale, Desired Future Condition
S22, T23N, R30W
Unit 5
Unit 6
Blueslide Rd.
Legend
Desired Future Condition
DF
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PP
WL/DF
Montana DNRC
Trust Land Management Division
Northwestern Land Office, Plains Unit
K. Johnson 2009
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Miles
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Attachment II

Resource Analysis

- **Vegetation Analysis..... Page 21**
- **Hydrology Analysis..... Page 26**
- **Soils Analysis..... Page 30**
- **Wildlife Analysis..... ..... Page 35**

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 regarding vegetative conditions. The following concerns were expressed from these comments regarding proposed timber harvesting and related activities.

- Concern regarding impacts to threatened, endangered and sensitive species (TES)
- Forest health: There are concerns that endemic populations of insects and diseases in the parcel could continue to increase and reach epidemic proportions.
- Site productivity: There are concerns that continued canopy closure will result in decreaed growth rates, the development of vegetative climax conditions and eventual loss of seral species.

Analysis Area

The analysis area for direct and indirect effects are the state parcels within section 36, T22N, R30W and section 22, T23N, R30W referred to as the Harlow Dump parcels. Cumulative impacts are considered at the scale of the Plains Unit.

Analysis Methods

The Plains Unit typically prepares two to four timber sales per year. Each proposed 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) data, field visits, review of scientific literature, aerial photography, and consultation with other professionals. (The SLI data used for this analysis is from the *PLNsli20081211* files)

Existing Conditions

Stand History and Past Management

Section 36, Township 22 North, Range 30 West: (Proposed Harvest Units 1, 2, 3, and 4)
Section records indicate past harvesting activities dating back to 1959. Between 1959 and 2001 many small volume permits have been issued, totaling approximately 6.7 MMBF. The majority of the volume removed was lodgepole pine, with lesser amounts of western larch, Douglas-fir, ponderosa pine and grand fir removed. Aside from firewood permits, the section has been idle since that time. The beneficiary for this section is the Common Schools Trust Grant (C.S.).

Section 22, Township 23 North, Range 30 West: (Proposed Harvest Units 5 and 6)
Section records indicate timber harvesting dating back to 1952 when approximately 250MBF of Douglas-fir and ponderosa pine was removed. In 2001, this parcel was harvested as part of the Blue Slide Timber Sale #1388. At that time approximately 556MBF was removed. Since that time activity has been limited to small salvage permits and firewood. The beneficiary for this parcel is the Deaf and Blind Trust Grant (D.D.A.).

Cover Types, Age Classes, and Stand Structure

Past and current events have changed the forest conditions on the State-owned parcels within the project area from what the desired future conditions (DFC) identified by DNRC. DFCs are based on historic cover types described by Losensky (1997), and are determined for each stand using a site-specific model that assigns a DFC in terms of cover type for each stand identified in the DNRC's Stand Level Inventory (SLI). At the administrative unit level, the aggregate acreage of each desired future cover type describes a broad picture of the desired future condition for that

unit. This provides a basis for comparison of current and desired future conditions at both the project and landscape (administrative unit) levels. Current conditions are described by DNRC's 2008 SLI for the Plains Unit. Table V-1 compares the current cover type distribution and DFC for the Harlow Dump project area, and Table V-2 shows the current cover types and DFC for the Plains Unit.

Table V-1: Current cover types and desired future conditions within the Harlow Dump project area.

Cover Type	Current Acres	DFC Acres	Current minus (-) DFC**
Douglas-fir	61.3	0.0	61.3
Mixed conifer	88.7	0.0	88.7
Other*	28.2	19.8	8.4
Ponderosa pine	97.5	80.8	16.7
Western larch/Douglas-fir	67.2	242.3	-175.1
Grand Total	342.9	342.9	

*Other includes non-commercial, nonstocked, and non-forest land.
**A positive value indicates excess current acreage compared to DFC, and a negative value indicates a deficiency in acreage compared to DFC

Table V-2: Current cover types and desired future conditions on the Plains Unit.

Cover Type	Current Acres	DFC Acres	Current minus (-) DFC**
Douglas-fir	3330.6	1596.1	1734.4
Hardwoods	23.1	125.0	-101.9
Lodgepole pine	1734.0	1969.8	-235.8
Mixed conifer	6327.0	956.6	5370.4
Other*	11739.7	11074.3	665.4
Ponderosa pine	27214.9	31668.8	-4453.9
Subalpine fir	906.6	224.4	682.3
Western larch/Douglas-fir	11703.9	14593.9	-2890.1
Western white pine	264.6	1035.4	-770.9
Grand Total	63244.4	63244.4	

*Other includes non-commercial, nonstocked, and non-forest land.
**A positive value indicates excess current acreage compared to DFC, and a negative value indicates a deficiency in acreage compared to DFC

As shown in Table V-1, Douglas-fir, mixed conifer, other types, and ponderosa pine are currently over-represented in the project area, while the western larch/Douglas-fir cover type is deficient. On the broader scale of the Plains Unit (Table V-2), shade-tolerant types including mixed conifer, Douglas-fir, and subalpine fire are over-represented compared to DFC, while shade-intolerant types such as ponderosa pine and western larch/Douglas fir are under-represented.

Table V-3 shows the age class distribution within the project area and on the Plains Unit. In some cases, stands in the 100-150-year and 150+ year age classes may meet DNRC's criteria to be defined as old-growth (*ARM 36.11.403*). No stands in the project area met these criteria; therefore, the amount and distribution of old-growth on the Plains Unit would not be affected by the proposed action.

Table V-3; Pre- and post-harvest age class distribution in the Harlow Dump project area and the Plains Unit.

Age Class	Current Project Area	Current Plains Unit
0-39 years	3%	7%
40-99 years	38%	16%
100-149 years	51%	35%
150+ years	0%	26%
Non-forested	8%	17%
Total	100%	100%

The current stand structures are generally characterized by an overstory of dominant and co-dominant western larch, ponderosa pine, Douglas-fir and lodgepole pine. Where it is present, the lodgepole pine is rapidly dying due to bark beetle infestation. Shade tolerant late-successional species such as: grand fir and western hemlock, are common in the mid story often with a high occurrence of root rot and stem decay. Across much of the project area the current canopy is closed, discouraging natural regeneration of preferred early seral species such as ponderosa pine and western larch. As a result, the mid and under stories are made up of shade tolerant late-succession climax species such as: Douglas-fir, grand fir and western hemlock. Across all of the parcels, regeneration of preferred early seral species, such as western larch and ponderosa pine is scarce or nonexistent. For more information on individual stands, refer to: Attachment III, Harvest Unit Prescriptions.

Forest Fuels and Fire Behavior

The project and surrounding area were historically characterized by frequent, low-intensity wildfires prior to the early 1900's. According to the Blue Slide EA (1999) much of the project area was burned in the Great Fires of 1910 with a stand replacing effect, while a few relics remain having survived the great fires. Since that time fire has been virtually eliminated from the project area allowing fuel loading to increase with time. For information regarding coarse woody debris levels, please see: Soils Analysis.

Forest Insects and Diseases

The primary insect and disease agents in the parcels are: western pine beetle (*Dendroctonus brevicomis*) in the ponderosa pine; mountain pine beetle (*Dendroctonus ponderosae)* in the ponderosa pine and lodgepole pine; fir engraver (*Scolytus ventralis*) in the grand fir; and Dwarf mistletoe *(Arceuthobium douglasii)*, and Douglas-fir beetle (*Dendroctonus pseudotsugae)* in the Douglas-fir. Indian paint fungus (*Ecinodontium tinctoruim*) is common in the grand fir and western hemlock. In some stands, the Western larch shows a high instance of pini or red ring rot (*Phellinus pini).*

Noxious Weeds

Noxious weeds are present in the parcels, mainly along the open roads. These weeds are known to exist in the parcel, while others may be present as well: knapweed (Centaurea spp.), oxeye daisy (Chrysanthemum leucanthemum), yellow toadflax (Linaria vulgaris), orange hawkweed (Hieracium aurantiacum), St. Johnswort (Hypericum perforatum), Sulfur Cinquefoil (Potentilla recta) and tall buttercup (Ranunculus acris).

Threatened, Endangered, and Sensitive Plants

The Montana Natural Heritage Program (MNHP) has identified two species of concern as occurring within the townships of the project area. The MNHP does not specify on which sections or parcels within the township the species are known to occur. The two plant species are diamond clarkia (*Clarkia rhomboidea)* and clustered lady's-slipper (*Cypripedium fasciculatum*). Field surveys of the project area and the habitat types conducive to these plants during the active growing season revealed no individuals. If these species are discovered at any point during the project, steps will be taken to avoid damaging the plants or their immediate surroundings. For more information on project mitigations, please refer to Attachment IV, Mitigations.

Direct and Indirect Effects

No Action Alternative

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, grand fir and western hemlock continuing to thrive in the understory and midstory. Unchecked, these species will shade out all other tree species and convert the stand to a climax condition. In places, these species have already begun to become dominant and are replacing the historic timber types and preferred desired future condition species of ponderosa pine, western larch, and Dougls-fir in the overstory. Growth and vigor of trees present in the analysis area would continue to decline as competition increases with canopy closure. Endemic bark beetle populations will continue to advance towards epidemic levels due to over stocking and favorable conditions for beetles. Ground fuel loading and understory ladder fuels would continue to increase. Noxious weeds would continue to proliferate along open roads and advance into the forested areas as grazing, man caused and natural disturbances prepare an appropriate seedbed. All currently open roads and trails within project area would remain open to off road travel and firewood removal. As a result soil resource damage and snag removal would continue to be a problem.

Action Alternative

The proposed action alternative would harvest timber on approximately 227 acres. Table V-4 shows the changes that would occur to cover types within the project area under the Action Alternative. Under the Action Alternative, Douglas-fir and mixed conifer types would decrease in favor of western larch/Douglas-fir and ponderosa pine, resulting in a cover type distribution within the project area that more closely reflects DFC when compared to current conditions and the No-Action Alternative.

Table V-4: Current cover types, desired future conditions, and post-harvest cover type distribution in the Harlow Dump project area.

Cover Type	Current Acres	DFC Acres	Post-harvest Acres	Change in Acreage
Douglas-fir	61.3	0.0	26.3	-35.0
Mixed conifer	88.7	0.0	27.3	-61.4
Other*	28.2	19.8	28.2	0
Ponderosa pine	97.5	80.8	102.7	5.2
Western larch/Douglas-fir	67.2	242.3	158.4	91.2
Grand Total	342.9	342.9	342.9	0.0
*Other includes non-commercial, nonstocked, and non-forest land.				

The use of seed tree and shelterwood treatments would result in two-aged stands composed of the reserve overstory trees left during harvesting and the resulting regeneration. Immediately following harvesting, due to the methodology used to determine age class in the SLI, there would be little change in the age class distribution in the project area. However, over time the proportion of the project area in the 0-39 year age class would increase, and the proportion of the project area in the 100-149 year age class would decrease. Because no old-growth forests currently exist in the project area, there would be no effect on old-growth.

No harvesting would occur in Streamside Management Zones. Harvesting would focus on removal of dead and dying timber as well as diseased, overstocked and suppressed shade tolerant species. Harvest prescriptions would be designed to encourage natural regeneration of historic timber types and desired future condition species, such as ponderosa pine, western larch, and Douglas-fir. Supplemental planting of desired species where no seed trees exist would take place immediately following harvest. All parcels in the proposed harvest would be evaluated to determine the need for supplemental planting within 5 years of harvest. More detailed information for treatment of individual units can be found in Attachment III, Harvest Prescriptions.

Through harvest and site preparation activities, fuel loadings would be reduced by removal of ladder fuels from the understory and intermediate components of the stand, as well as opened crown spacing in the overstory component. Growth and vigor of the remaining trees would be expected to increase as residual tree spacing would allow full light to crowns and more available water. Noxious weeds may invade canopy openings following harvest and would be monitored and addressed through the Plains Unit integrated weed management program. No impacts to threatened, endangered or species of concern are likely to result from the proposed action.

Cumulative Effects

No Action Alternative

Under this alternative, stand structure and species composition on state land across the Plains Unit will move towards a shade tolerant, climax condition. Fuel loadings are expected to increase due to tree mortality from insects and disease outbreaks.

Action Alternative

Across the Plains Unit there would be a slight shift towards Desired Future Conditions as the proposed treatment and implementation of current and future timber sales on the Plains Unit would alter cover types toward DFC. The project area would be altered with regard to size class distribution and stocking levels. Harvesting would focus on removal of dead and dying timber as well as diseased, overstocked and suppressed shade tolerant species. Fuel loading, ladder fuels, insect and disease incidence would be reduced in the project area. This change would occur on approximately 227 acres of the Plains Unit. These changes would have a minor impact on the landscape of the Plains Unit, changing less than one percent of the total land area.

HYDROLOGY ANALYSIS

Introduction

This analysis is designed to disclose the existing condition of the hydrologic resources and display the anticipated effects that may result from each alternative of this proposal. During the initial scoping, no issues were identified by the public regarding water quality or quantity or fisheries resources. The following issue statements were expressed from internal comments regarding the effects of proposed timber harvesting:

- Timber harvesting and road construction activities may increase sediment delivery into streams and affect water quality.
- Timber-harvesting activities may affect the fish-habitat parameters of large woody debris, channel complexity, stream shading, stream temperature and fish passage at road crossing structures.

These issues can best be evaluated by analyzing the anticipated effects of harvest prescriptions and sediment delivery on the water quality and fisheries habitat of streams in the project area.

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. In order to address these issues the following parameters are analyzed by alternative:

-Miles of new road construction and number of stream crossings
-Potential for sediment delivery to streams

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. Roads were evaluated to determine existing sources of sediment delivery to streams. In addition, soil types in the project area were reviewed to identify areas prone to sediment delivery.

Fish Habitat Parameters

Expected effects to fisheries habitat will be addressed qualitatively using the current condition as a baseline, disclosing the expected changes due to the alternatives proposed. The analysis method for woody debris recruitment will evaluate the potential reduction in available woody debris and shading due to timber-harvesting activities. Stream temperature will be addressed by evaluating the risk of stream temperature increases due to reduced shading from existing vegetation.

Analysis Area

Sediment Delivery

The analysis area for sediment delivery is limited to the harvest units and roads used for hauling.

Fish Habitat Parameters

The only fish bearing stream in the project area is the Clark Fork River which contains bull trout, westslope cutthroat trout and several other native and non-native fish species. The analysis area for fisheries habitat parameters is the proposed harvest units immediately adjacent to fish-bearing streams. This includes proposed harvest units near the Clark Fork River. Fish passage will not be addressed because no stream crossings issues are in the project area except for the county bridge across the Clark Fork River.

Water Uses and Regulatory Framework

Water Quality Standards

This portion of the Clark Fork River basin 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.

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 Quality Limited Waterbodies
This portion of the Clark Fork River (MT76N001_010) is listed as a water-quality-limited waterbody in the *2008 303(d)* list for partial support of cold water fishery and not support of drinking water. The listed probable causes for not fully supporting these uses include cadmium from abandoned mines and fish passage barriers due to dam construction.

The *303(d)* list is compiled by DEQ as required by *Section 303(d)* of the *Federal Clean Water Act* and the *EPA Water Quality Planning and Management Regulations (40 CFR, Part 130)*. Under these laws, DEQ is required to identify waterbodies that do not fully meet water quality standards, or where beneficial uses are threatened or impaired.

Water Rights and Beneficial Uses
A search of the water rights on the Natural Resources Information System mapping program located at http://maps2.nris.state.mt.us/mapper/ found surface water rights within 3 miles downstream of the project area for irrigation, domestic use, and lawn/garden use.

Fisheries—Threatened, Endangered and Sensitive Species
Westslope cutthroat trout are listed as a Montana Animal Species of Concern with an 'S2" ranking. An 'S2' designation is given to species or subspecies that "...is at risk because of very limited and/or declining numbers, range, and /or habitat, making it vulnerable to global extinction or extirpation in the state."(Montana Natural Heritage Program and Montana Fish Wildlife and Parks. 2009). The Department of Natural Resources and Conservation has also identified westslope cutthroat trout as a sensitive species (Administrative Rule of Montana (ARM) 36.11.436). DNRC is a signatory to the 2007 (interagency) Memorandum of Understanding and Conservation Agreement for Westslope Cutthroat Trout and Yellowstone Cutthroat Trout.

Bull Trout are also listed as a Montana Animal Species of Concern with the same ranking as Westslope cutthroat trout; however bull trout are also listed as 'threatened" by the US Fish and Wildlife Service under the Endangered Species Act. DNRC is a signatory to the 2000 (interagency) Restoration Plan for Bull Trout in the Clark Fork River Basin and Kootenai River Basin, Montana.

EXISTING CONDITION

Sediment Delivery
The project area is comprised of three separate parcels located in two sections. Two of the parcels are dry and do not contain any intermittent or perennial streams. No sediment delivery from roads or overland flow was noted in these parcels.

The third parcel is bisected by the Clark Fork River. No other streams were found on the parcel during field reconnaissance. No DNRC managed roads on the parcel are located within 300 feet of the river and therefore sediment delivery from DNRC managed roads is very unlikely, however a paved county road crosses the river with a bridge. While some sediment delivery into the Clark Fork River is likely from this road crossing due to winter sanding and debris on vehicles, maintenance of this road is not within the scope of the analysis.

Fish Habitat Parameters

Recruitable woody debris along the Clark Fork River has been reduced over the last century due to highway construction, residential development, silviculture activities and recreational facilities. Within the state parcels, the recruitable woody debris is abundantly available as little or no timber harvest has occurred within 100 feet of the river. As part of this project, no harvest is proposed within 100 feet of the stream which would retain all of the presently available recruitable woody debris. Because of the lack of harvest near the river, no further analysis of recruitable woody debris is deemed necessary.

Other fisheries parameters that may be affected by timber harvest include (1) stream temperature due to changes in shading from riparian vegetation, and (2) increases or decreases and changes in channel complexity—generally due to increases or decreases in woody debris. While no stream temperature data was collected on the Clark Fork River, the current shading level is provided by a fully-stocked, mature stand in the riparian area. The fully stocked riparian stand also currently provides the ability to add to channel complexity.

ENVIRONMENTAL EFFECTS

Description of Alternatives

No Action Alternative

No timber harvest or associated activities would occur under this alternative.

Action Alternative

Six units totaling approximately 227 acres would be commercially harvested under the Action Alternative. Three of the six units would be within 950 feet of the Clark Fork River however; there are no SMZs in any of the units. All units would be harvested using conventional ground-based equipment. Approximately 1.7 miles of road would be maintained or have minor drainage improvements installed as necessary.

Direct and Indirect Effects

Sediment Delivery and Fish Habitat Parameters

No Action Alternative

Under this alternative, no timber harvest or related activities would occur. No direct or indirect impacts to water quality from sediment delivery would be expected. No changes to fisheries habitat parameters (stream temperature and channel complexity) would be expected beyond those that occur naturally.

Action Alternative

Sediment Delivery

Under the action alternative, no new stream crossings would be installed. Because existing DNRC controlled roads are located well away from streams and no new stream crossings or roads near streams are proposed, the risk of increased sediment delivery from roads is very low and unexpected. Hauling on the bridge across the Clark Fork River may result in additional sediment that could enter the river, however the potential increase would be very small or immeasurable and result in a very low risk of measureable impacts.

Past monitoring of DNRC timber harvests has shown erosion on approximately 6 percent of the sites monitored, although no water-quality impacts from the erosion were found (*DNRC 2004*). These sites were harvested during the summer period and the erosion was attributed to inadequate skid trail drainage. By limiting erosion, the risk of sediment delivery reduced.

No harvesting would occur within the SMZ any stream; additional no harvest would occur within 100 feet of a fish-bearing stream. As per administrative rules (ARM 36.11.304), no equipment would be operated within the 50 or 100-foot SMZ.

During a review of BMP effectiveness including stream buffer effectiveness, *Raskin et al*, found that 95 percent of erosion features (disturbed soil) greater than 10 meters (approximately 33 feet) from the stream did not deliver sediment. His findings indicated that the main reasons stream buffers are effective include 1) keeping active erosion sites away from the stream, and 2) stream buffers may intercept and filter runoff from upland sites as long as the runoff is not concentrated in gullies or similar features (*Raskin et al 2006*).

Fish Habitat Parameters
Because no harvest is proposed within 100 feet of any fish bearing stream—namely the Clark Fork River—no reduction in riparian vegetation would result from this alternative. By retaining the vegetation, stream shading would be minimally reduced and therefore, only a very low risk of increases in stream temperature from this alternative would result. In addition, the retained vegetation along the Clark Fork River would be available for recruitment and increased channel complexity.

Cumulative Watershed Effects

Sediment Delivery and Fish Habitat Parameters
No Action Alternative
No additional cumulative effects beyond those described in the existing condition would be expected.

Action Alternative
Sediment Delivery and Fish Habitat Parameters
There would be a low risk of additional cumulative effects from the implementation of this alternative beyond those described under the existing condition and direct/indirect effects because:

1) All operations would occur using appropriate forestry BMPs. This would reduce the potential for soil displacement and subsequent sediment transport, and
2) The lack of stream crossings and roads near streams are not present to act as a conduit for sediment.
3) SMZ harvest would not occur which reduces the potential for soil displacement within the stream buffer.
4) Riparian buffers of 100 feet would be retained which would maintain the available trees for channel complexity and limit the reduction in stream shading.

In summary, the risk of adverse cumulative effects to water quality and fisheries habitat would be low if the action alternative were selected.

REFERENCES:

Montana Natural Heritage Program and Montana Fish Wildlife and Parks. 2009. Montana Animal Species of Concern. Helena, MT: Montana natural Heritage Program and Montana Department of Fish Wildlife and Parks. 17pp.

Edward B. Raskin, Casey J. Clishe, Andrew T. Loch, Johanna M. Bell (2006). Effectiveness of Timber harvest Practices for Controlling Sediment Related Water Quality Impacts. Journal of the American Water Resources Association 42 (5), 1307–1327.

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

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. During the initial scoping, issues were identified by the internally and from the public regarding soil impacts. The following issue statements were expressed from comments regarding the effects of the proposed timber harvesting:

**Ground based harvest techniques can displace and compact soils which can adversely affect the hydrologic function, structure and long-term productivity of the impacted area*

**Reduced infiltration capacity of an impacted soil can result in overland flow and off-site erosion, typically localized to main skid trails and log landing sites.*

**Removal of both coarse and fine woody material off-site during timber harvest operations can reduce nutrient pools required for future forest stands and can affect the long-term productivity of the site.*

ANALYSIS AREA

The project area for this proposal is approximately 1,480 acres. The project area contains 13 individual soil types however timber harvesting is proposed on only 10 of the soil types. The analysis area for soil impacts will be the area within harvest units and where proposed road activities would take place. This analysis area will adequately allow for disclosure of existing conditions and direct, indirect, and cumulative impacts. This analysis also looks at cumulative effects for the entire project area.

ANALYSIS METHODS

Methods for disclosing impacts include using general soil descriptions and the management limitations for soil. This analysis will qualitatively assess the risk of negative effects to soils from erosion, compaction, and displacement from each alternative, using insight from previously collected soils-monitoring data from over 70 DNRC postharvest monitoring projects.

Coarse woody debris will be evaluated by comparing pre-project conditions with recommended levels. Mitigation measures will be refined using these data.

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 *Soil Survey of Sanders and Parts of Lincoln and Flathead Counties, Montana Parts I and II (NRCS, 1996)* provides soil information and maps of soils in the project area. Thirteen soil types were identified in the project area although only ten have activities proposed. *TABLE ST-1 - PROJECT AREA SOIL DESCRIPTIONS* provides a brief description of the soils within the project area. Maps of the soils are in the project file or can be accessed on the internet via the Natural Resources Conservation Service's Web Soil Survey at http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx .

The Plains Unit is dominated by partially metamorphic, sedimentary rocks from the 600-million year old Belt Supergroup. The PreCambrian rocks in this area are generally comprised of argillites, quartzites and siltites. (Collins and Ottersberg, 1985). These general rock types tend to be stable with a low erosion potential. Overlying these sediments is a layer of loess influenced volcanic ash deposited and redeposited from Mount Mazama approximately 6700 years ago. The presence of volcanic ash or lacustrine silts may increase the erosion potential depending upon slope, vegetation and surface rock.

COURSE WOODY DEBRIS

Course woody debris was measured during field review on several transects in each parcel. All woody debris was measured along 36 transects, each 100 feet in length, using methodology from the *Handbook for Inventorying Downed Woody Material* (Brown 1974). Over all transects the average coarse woody debris was estimated at 8.25 tons per acre. Areas were recent timber harvest or salvage had occurred had a higher volume of coarse woody debris (11 tons/ acre) than areas where no salvage operations has occurred in several decades (4.9 tons/acre).

CUMULATIVE EFFECTS

DNRC strives to maintain soil productivity by limiting cumulative soil impacts to 15 percent or less of a harvest area, as noted in the State Forest Land Management Plan (*DNRC, 1996*). As a recommended goal, if existing detrimental soil effects exceed 15 percent of an area, proposed harvesting should minimize any additional impacts. Harvest proposals on areas with existing soil impacts in excess of 20 percent should avoid any additional impacts and include restoration treatments, as feasible, based on site-specific evaluation and plans. Past monitoring on DNRC timber sales from 1988 to 2007 has shown an average of 13.9 percent soil impacts across all parent materials. Stratifying the results by texture similar to the majority of the proposed harvesting shows an average of approximately 10.5 percent of the harvest areas impacted by displacement, erosion or severe compaction.

Cumulative effects from past and current uses on the proposed harvest units are limited, although evidence of selective or salvage actions is present in some of the proposed harvest areas. Recent timber sale and salvage activity has occurred in the southwest quarter of section 36 which is included in some of the proposed units; additional timber harvest and salvage activity has occurred in the 80 acre parcel in section 22. During field reconnaissance, it was noted that impacts in these areas are limited to skid trails and roads. Field observations during pace transects indicate a level of impacts from skid trail spacing and vegetation conditions. The northeast corner of section 36 which has not been entered commercially for several decades had impacts covering an estimated 4.1 percent of the area. The impacts found are primarily existing skid trails that are vegetated, but the growth was obviously less vigorous than areas not impacted by a skid trail. More recently harvested areas have impacts covering up to 11.2 percent of the harvest area. All parcels included in this project exhibited between 4.1 and 11.2 percent impacts. This level is below the recommended goal of 15 percent.

Other uses in the project include small forest product removals such as firewood gathering, fence post cutting, and Christmas tree harvesting. Evidence of cattle grazing was found in some of the area; however the impacts were limited to compaction on trails.

Note: For the table below,

** Erosion Potential is based on slope and soil erosion factor K**. The soil loss is caused by sheet or rill erosion in off-road or off-trail areas where 50 to 70 percent of the surface has been exposed by logging, grazing, mining, or other kinds of disturbance. The hazard is described as slight (low), moderate, severe, or very severe. A rating of slight indicates that erosion is unlikely under ordinary climatic conditions; moderate indicates that some erosion is likely and that erosion-control measures may be needed; severe indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised; and very severe indicates that significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion–control measures are costly and generally impractical. (NRCS, 1996)*

***Erosion Factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water. (NRCS, 1996)*

TABLE ST-1 - PROJECT AREA SOIL DESCRIPTIONS

Soil type	Name	Soil & Vegetation Descriptions	Management Considerations	
			K factor**/ erosion potential	Comments
200	River Outwash	Unstable, flooded areas of sandy or gravelly sediments that support little or no vegetation.	Not rated	No harvest is proposed
122G	Winkler, cool-Sharrott, cool-Rubble land complex 40-85% slopes	The Winkler series, which covers the largest portion of this map unit, is comprised of very deep soils that are somewhat excessively well drained. Vegetation is ponderosa pine, Douglas fir and western larch over an understory of shrubs and forbs.	K=0.15 Off trail erosion: Very Severe Road/Trail erosion: Severe Rutting hazard: Slight	
32F	Mitten gravelly ashy silt loam 35-60% slopes	The Mitten series is derived from colluviium under volcanic ash. The series is typically vegetated with forest vegetation, in this case ponderosa pine, Douglas fir and western larch over an understory of shrubs and forbs. This landtype is somewhat excessively well drained with a moderately rapid permeability.	K=0.17 Off trail erosion: Severe Road/Trail erosion: Severe Rutting hazard: Slight	
411E	Sacheen-rock outcrop complex 8-30% slopes	Eolian deposits are the parent materials for these stream terraces that are somewhat excessively well drained. Typical surface soils are loamy fine sand. Vegetation is ponderosa pine and Douglas-fir overstory with grasses, forbs and shrubs comprising the understory. Rock outcrops are present in an estimated 30% of this map unit.	K=0.20 Off trail erosion: Moderate Road/Trail erosion: Severe Rutting hazard: Moderate	
41C	Sacheen loamy fine sand 2-8% slopes	Soils are somewhat excessively well drained on these stream terraces comprised of loamy fine sand from Eolian deposits. Vegetation is generally ponderosa pine with an understory of grasses and shrubs, although Douglas-fir may be present.	K=0.20 Off trail erosion: Slight Road/Trail erosion: Moderate Rutting hazard: Moderate	No harvest is proposed on this soil type.
421E	Selon fine sandy loam, moist 15-30% slopes	Stream terraces are developed from alluvium. Surface soils are well drained and typically have a fine sandy loam texture. Vegetation is dominated with ponderosa pine, Douglas-fir and grand fir over a variety of dry site shrubs, forbs and grasses.	K=0.20 Off trail erosion: Moderate Road/Trail erosion: Severe Rutting hazard: Severe	
473D	Elkrock-Selon complex 4 to 15% slopes	This soil is a combination of the Elkrock and Selon series'. Both series are derived from alluvium and are found on stream terraces. Soils are well drained to somewhat excessively well-drained. Vegetation consists of Douglas fir, western larch and ponderosa pine over a shrub and forb understory.	K=0.20 Off trail erosion: Slight Road/Trail erosion: Moderate Rutting hazard: Severe	
60B	Bonnach gravelly ashy silt loam 0-4% slopes	Soils are well drained on these stream terraces comprised of alluvium or outwash with a volcanic ash influence. Surface soils are gravelly ashy silt loam. Vegetation is generally cool and wet with a presence of grand fir and queencup beadlily.	K=0.15 Off trail erosion: Slight Road/Trail erosion: Slight Rutting hazard: Slight	
61B and 61D	Scotmont ashy fine sandy loam 0 to 15% slopes	Lake terraces and lake plains are the typical landforms of this map unit derived from glacial lake deposits. The ashy fine sandy loam surface soils are well drained and support Douglas-fir, grand fir and an understory of grasses and forbs.	K=0.24 Off trail erosion: Slight Road/Trail erosion: Slight Rutting hazard: Severe	No harvest is proposed on soil type 61B.
62D	Beaverdump gravelly ashy loam 4-15% slopes	This somewhat excessively well drained, gravelly loam soil is comprised of volcanic ash over alluvium/outwash on stream terraces. The series is typically vegetated with forest vegetation, in this case ponderosa pine, Douglas fir and western larch over an understory of shrubs and forbs.	K=0.17 Off trail erosion: Slight Road/Trail erosion: Moderate Rutting hazard: Severe	
641D	Lionwood-Scotmont-Whitepine complex 4-15% slopes	This complex is typically found on terraces of lakes or areas adjacent to lakes. Soils are sandy and silty loams that are well drained and support a vegetative cover of conifers. The understory is predominately forbs however some shrubs are present.	K=0.37 Off trail erosion: Moderate Road/Trail erosion: Severe Rutting hazard: Severe	
85D	Whitepine ashy silt loam 4-15%	This series is derived from glacial lake deposits and is located near lakes on terraces. The soils are well drained, however the permeability is very slow. Vegetation is similar to that found on the Beaverdump soils 62D.	K=0.49 Off trail erosion: Moderate Road/Trail erosion: Severe Rutting hazard: Severe	

ENVIRONMENTAL EFFECTS

DESCRIPTION OF ALTERNATIVES

- *No-Action Alternative*

  No timber harvesting or associated activities would occur under this alternative.

- *Action Alternative*

- Six units totaling approximately 227 acres would be managed with commercial harvest under this alternative. The harvest may be completed under summer or winter conditions. In addition, approximately 1.7 miles of road would be maintained or have minor drainage improvements installed as necessary.

ALTERNATIVE EFFECTS ON SOILS

- *Direct and Indirect Effects of the No-Action Alternative on Soils*

  No timber harvesting 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.

- *Direct and Indirect Effects of the Action Alternative on Soils*

  To provide an adequate analysis of potential impacts to soils, a brief description of implementation requirements is necessary. *ARM 36.11.422 (2)* and *(2)(a)* state that appropriate BMPs shall be determined during project design and incorporated into implementation. To ensure that 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 harvesting operations:

  1) Limit equipment operations to periods when soils are relatively dry, (less than 20 percent), 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-based 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 how many additional trails are needed. Trails that do not comply with BMPs (i.e. trails in draw bottoms) 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 of less than 40 percent unless the operation can be completed without causing excessive erosion. Steeper areas may require other methods such as adverse skidding to a ridge or winchline skidding from more moderate slopes of less than 40 percent.

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

  5) Slash disposal - Limit the combination of disturbance and scarification to 30 to 40 percent of the harvest units. No dozer piling on slopes over 35 percent; no excavator piling on slopes over 40 percent unless the operation can be completed without causing excessive erosion. Consider lopping and scattering or jackpot burning on the steeper slopes. Accept disturbance incurred during skidding operations to provide adequate scarification for regeneration.

  6) Retain 10 to 15 tons of large woody debris and a majority of all fine litter feasible following harvesting operations. On units where whole tree harvesting is used, implement one of the following mitigations for nutrient cycling: 1) use in-woods processing equipment that leaves slash on site; 2) for whole-tree harvesting, return-skid slash and evenly distribute within the harvest area; or 3) cut tops from every third bundle of logs so that tops are dispersed as skidding progresses.

  Considering data from the *DNRC SOIL MONITORING REPORT (DNRC, 2004)*, the implementation of Forestry BMPs 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

harvesting implementation departed from BMPs, such as limiting ground-based skidding to slopes of 40 percent or less or operating only on dry, frozen or snow-cover soils.

Comparing the soil type map, field reconnaissance notes, and topographic map features with the proposed harvest unit map indicates that ground-based skidding would occur on slopes of up to 40 percent under this alternative. The extent of impacts expected would likely be similar to those reported by *Collins (DNRC, 2004)*, or approximately 10.5 to 13.9 percent of the harvest area for summer harvesting.

- *Cumulative Effects of the Action Alternative to Soils*

  Cumulative effects would be controlled by limiting the area of adverse soil impacts to less than 15 percent of the harvest units (as recommended by the SFLMP) through implementation of BMPs, skid trail planning on tractor units, and limiting operations to dry or frozen conditions. Future harvesting 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 for long-term soil productivity.

  By designing the proposed harvesting operations with soil-moisture restrictions, season of use, and method of harvesting, the risk of unacceptable long-term impacts to soil productivity from compaction and displacement would be low. Because the existing impact is below the goals recommended by the SFLMP and the action alternative would be expected to result in impacts below the recommended level, cumulative effects would likely remain below the 15 percent target.

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.

NRCS, 1996. MT651-*Soil Survey of Sanders and Parts of Lincoln and Flathead Counties, Montana Parts I and II*. United States Department of Agriculture Natural Resources Conservation Service.

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

Brown, James K. 1974. *Handbook for Inventorying Downed Woody Material*. USDA Forest Service General Technical Report INT-16. Intermountain Forest and Range Experiment Station, Ogden, UT. 24 pp.

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. DNRC FM Rules and several comments during initial scoping led to the following list of issues:

- 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.
- 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.
- Timber harvesting and associated activities could alter cover, increase access and reduce secure areas, which could adversely affect grizzly bears by displacing grizzly bears from important habitats and/or increasing risk to bears of human-caused mortality.
- Timber harvesting and associated activities could reduce bald eagle nesting and perching habitats and/or disturb nesting bald eagles.
- 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.
- 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.
- 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.
- 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 planned future agency actions have been taken into account for the cumulative effects analysis.

Analysis Area

In this section the discussions will focus on 2 areas of different scale. The first will be the "project area", which consists of the state managed portions of section 36 in T22N R30W and section 22 in T23N, R30W. The parcels range from 2,360 to 3,120 feet in elevation and are largely on relatively flat to westerly aspects. The parcel is dominated by ponderosa pine, Douglas-fir, Douglas-fir/western larch, and mixed conifers. The second scale or the "cumulative effects analysis area" relates to the surrounding landscape for assessing cumulative effects. 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 Alternative and 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 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: 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.

Analysis Area

Direct and indirect effects were analyzed on the project area. Cumulative effects were analyzed on the on the 8 sections surrounding around each parcel as well as the remaining portion of the section in which the parcel is found. 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 timber harvesting, amount of densely forested habitats, and connectivity.

EXISTING ENVIRONMENT

The proposed project area currently contains approximately 169 acres of mature stands (100+ years in age) of reasonably closed canopy western larch/Douglas-fir and ponderosa pine. The stands in the state parcels are fairly well interconnected, but contain limited habitats for wildlife requiring forested interior conditions due to fragmentation and land ownership patterns.

Presently roughly half of each of the cumulative effects analysis areas (47.4% in the Spring Creek cumulative effects analysis area and 51.9% of the Thompson Falls cumulative effects analysis area) are not in mature, forested conditions due to residential clearing, agriculture, open water, and other past harvesting. Ongoing harvesting on approximately 75 acres of DNRC-managed lands in the Spring Creek cumulative effects analysis area is removing components of mature forested stands. Existing and regenerating forested stands are largely dominated by western larch/Douglas-fir, ponderosa pine and mixed conifers. Human developments and agricultural clearing are common on the private ownerships across much of each of the cumulative effects analysis areas. Additionally, considerable open water exists in each of the cumulative effects analysis areas, which contributes to overall landscape fragmentation. Today, the mosaic of ownership and diversity of past management within the cumulative effects analysis area have compromised connectivity and forest-interior habitats to a degree. Potential barriers to wildlife movements in the cumulative effects analysis area include agricultural areas, human developments, the Clark Fork River, and the extensive road network.

ENVIRONMENTAL EFFECTS

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. Individual trees and possibly pockets would continue to die and create openings where younger trees could become established. 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 denser stands of shade-tolerant tree species would benefit, while those requiring conditions likely found under natural disturbance regimes would continue to be underrepresented. Habitats for species that require younger stands would continue to decline with the advances in succession within the units harvested 25-35 years ago. Thus, since 1) no changes to existing stands would occur, 2) no appreciable changes to forest age, the distribution of dense forested cover, or 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 234 acres of ponderosa pine, western larch/Douglas-fir and mixed conifers would be largely removed on the state parcel, including approximately 102 acres of the 169 acres of mature stands with a reasonably closed canopy. These conditions would lead to younger, more open stands, which could interrupt movement by species requiring extensive, connected forested habitats, if they were using the area. Habitats for wildlife species requiring appreciable forested-interior habitats would be reduced and extensive use by those species would not be anticipated. The changes in stand age and density with the proposed harvesting would likely reduce habitats for species associated with mature stands, which have benefited from the increasing stand ages and densities caused by modern fire suppression. In general, habitat conditions would improve for species adapted to the more open forest condition, while declining for species that prefer dense, mature forest conditions. Connectivity between forested stands in the state parcels would be reduced. Thus, since 1) harvesting would reverse succession in several stands, reducing stand age and the amount of forested cover, 2) forested interior habitats may be slightly reduced, 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

The surrounding landscapes in each of the cumulative effects analysis areas are a mosaic of ownerships subject to a host of management regimes. Past harvesting has reduced the amount of area in each of the cumulative effects analysis areas that are supporting mature, forested habitats; ongoing harvesting on 75 acres of DNRC-managed lands in the Spring Creek cumulative effects analysis area would continue reducing forested habitats. With this alternative, stands in the project area would continue to contribute to the amount of mature forested stands in the cumulative effects analysis area. Additionally, stands in the cumulative effects analysis area that have been harvested in the last 30 or more years would start developing mature forest stand characteristics through time. No appreciable changes to the amount of mature, forested habitats, level of harvesting, or connectivity would be anticipated; however through time, some improvements in each of these are likely with advances in succession. Habitats for interior forested wildlife species would still largely be a minor component of the cumulative effects analysis areas. 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 each of the cumulative effects analysis areas.

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

Diverse ownership patterns and management regimes within the cumulative effects analysis area have created a mosaic of habitat conditions in the cumulative effects analysis area. Past harvesting has reduced mature forest stands within the cumulative effects analysis area and the removal of another 234 acres with this project would decrease the amount of the cumulative effects analysis areas supporting mature forested habitats by 1.4 % (80 acres, Spring Creek cumulative effects analysis area) and 2.7% (164 acres, Thompson Fall cumulative effects analysis area). Ongoing harvesting on DNRC-managed lands in the Spring Creek cumulative effects analysis area would continue to reduce forested cover on approximately 75 acres. Some of the stands on adjacent parcels would continue maturing and start moving into the mature, forested class in the future. Since connectivity in the cumulative effects analysis areas are rather limited, any reductions in forested cover would have marginal effects on landscape connectivity. Wildlife species favoring dense stands of shade-tolerant tree species and those species requiring larger areas of mature forests would see a reduction in available habitats within the cumulative effects analysis areas while species favoring earlier seral stage habitats would see an increase in available habitats. Generally, this alternative would further reduce future forested interior habitats in each of the cumulative effects analysis areas. Thus, since 1) harvesting would remove mature stands, further reducing the amount of forested cover in each of the cumulative effects analysis areas, 2) no appreciable changes to landscape connectivity would occur since connectivity is rather limited, 3) forested interior habitats may be slightly reduced and future development of these habitats would be slowed, and 4) 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 each of the cumulative effects analysis areas.

SNAGS AND COARSE WOODY DEBRIS

Issue: 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 important components of the forested ecosystems. Five primary functions of deadwood in the forested ecosystems are: 1) increase structural diversity, 2) alter canopy microenvironment, 3) promote biological diversity, 4) provide important 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 species. Larger diameter, taller snags tend to provide nesting sites, while shorter snags and stumps tend to provide feeding sites for a variety of birds and mammals.

Coarse woody debris provides food sources, areas with stable temperatures and moisture, shelter from the environment, lookout areas, and food storage sites for several wildlife species. Small mammals, such as red-

backed voles (*Clethrionomys gapperi*), to large mammals, such as black bears (*Ursus americana*), rely on deadwood for survival and reproduction. The size, length, decay, and distribution of woody debris affect their capacity to meet these life requisites. Logs less than 6 feet in length tend to dry out and provide limited habitat for wildlife species. Single scattered downed trees could provide lookout and travel sites for squirrels or access under the snow for small mammals and weasels, while log piles provide foraging sites for weasels and denning sites for Canada lynx.

Analysis Area

Direct and indirect effects were analyzed on the project area. Cumulative effects were analyzed on the on the 8 sections surrounding around each parcel as well as the remaining portion of the section in which the parcel is found. 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, 0-3 (range: 0-6.6) variably spaced medium and large (> 16" dbh) snags per acre and 11 tons of coarse woody debris per acre were observed in the project area. The snags and coarse woody debris in the project area exhibit the range of sizes and decay classes, ranging from small to large and sound to almost fully decayed. Legal and illegal motorized human access to portions of the project area has reduced available snags and coarse woody debris due to firewood and forest product gathering activities.

Within the cumulative effects analysis areas, the ownership patterns are a mosaic of small private owners and USFS-managed lands. Within the cumulative effects analysis area, past harvesting and forest product gathering has limited snag and coarse woody debris densities in much of the area. Ongoing harvesting on approximately 75 acres of DNRC-managed lands in the Spring Creek cumulative effects analysis area is removing snags and snag recruits while potentially increasing coarse woody debris. Areas of non-forested habitats also lack any snags and coarse woody debris.

ENVIRONMENTAL EFFECTS

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

No direct changes in the deadwood resources would be expected. Existing, limited 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 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 234 acres in the project area. 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 proposed units. However, some of 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. Snag loss could continue after the project due to legal and illegal

firewood and forest product gathering, particularly along open roads and property boundaries. Within the harvested units, it could take 40-80 years to develop 10-20 inch dbh trees at current stand densities that could serve as snags and downed woody material in the future. Future snag quality in the harvested units 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. Given the amounts, range of variability in sizes and decay classes of snags and coarse woody debris present in the project area, prescriptions aiming to maintain a variety of these resources would benefit the suite of species that rely on these habitat components. No changes in motorized human access would occur, thus continued use of the project area for legal and illegal firewood and forest product gathering would continue; increased sight distances could lead to an increased removal of existing snags and coarse woody debris. Thus, since 1) harvesting would reduce snag, snag recruitment trees, and CWD, and 2) no changes in motorized human access 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 within the stands due to advances in succession. Snags have been retained during some of the past harvesting in the cumulative effects analysis area. Snags and recruits would continue to be removed on approximately 75 acres of DNRC-managed lands being treated in the Spring Creek cumulative effects analysis area. However, firewood and other forest product gathering in the vicinity have also reduced these deadwood resources. Portions of the cumulative effects analysis area that are non-forested would continue to lack snags and coarse woody debris. 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

Snags and coarse woody debris would be reduced on much of the project area for potentially 40 to 80 years until similar-sized trees have grown within harvested stands to current densities. Limited numbers of snags have been retained during some of the past harvesting on private ownerships in the cumulative effects analysis area. Firewood and other forest product gathering in the vicinity have also reduced these deadwood resources. Additionally, 20% (Spring Creek cumulative effects analysis area) and 22% (Thompson Fall cumulative effects analysis area) of the analysis areas are non-forested agricultural fields, open water, and human developments that lack snags and coarse woody debris. The ongoing harvesting on approximately 75 acres of DNRC-managed lands in the cumulative effects analysis area would continue removing snags and snag recruits while potentially increasing coarse woody debris. The losses of snags and coarse woody debris under this alternative would be additive to the previous harvests 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. Wildlife species that rely on snags and coarse woody debris in the cumulative effects analysis area would be expected to persist at similar levels, albeit slightly lower numbers on proposed harvest sites following treatment. Thus, since 1) a slight, but cumulative amount of the cumulative effects analysis area would be harvested reducing snags and snag recruit trees while increasing CWD levels, 2) no changes to human access or level of 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 THE PROPOSED PROJECT

SPECIES		DETERMINATION - BASIS
Threatened and Endangered Species	Grizzly Bear (*Ursus arctos*) Habitat: recovery areas, security from human activity	**Included** – Portions of the project area are within the 'occupied habitat' area immediately adjacent to the Vermillion subunit of the Cabinet-Yaak Grizzly Bear Recovery Zone, and yet some other areas are outside of areas expected to be used by grizzly bears.
	Canada Lynx (*Felis lynx*) Habitat: Subalpine hab. types, dense sapling, old forest, deep snow zone	No further analysis conducted – The project area occurs outside of the elevations and habitat types where lynx are commonly found in Montana. No lynx habitats were identified in the project area. Thus, no direct, indirect, or cumulative effects to Canada lynx would be expected to occur as a result of wither alternative.
Sensitive Species	Bald eagle (*Haliaeetus leucocephalus*) Habitat: late-successional forest <1 mile from open water	**Included—**Portions of the project area are within the Child's Landing and Blue Slide Road bald eagle nest territories.
	Black-backed woodpecker (*Picoides arcticus*) Habitat: mature to old burned or beetle-infested forest	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 (*Plethodon idahoensis*) Habitat: waterfall spray zones, talus near cascading streams	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 (*Tympanuchus Phasianellus columbianus*) Habitat: grassland, shrubland, riparian, agriculture	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 (*Gavia immer*) Habitat: cold mountain lakes, nest in emergent vegetation	No further analysis conducted – No suitable lake habitats occur 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 (*Martes pennanti*)	**Included** – Potential fisher habitats occur in the project area.

	Habitat: dense mature to old forest <6,000 ft. elev. and riparian	
	Flammulated owl (*Otus flammeolus*) Habitat: late-successional ponderosa pine and Doug.-fir forest	**Included** –Suitable dry ponderosa pine and Douglas-fir habitats occur within the project area.
	Gray Wolf (*Canis lupus*) Habitat: ample big game pops., security from human activity	No further analysis conducted – The project area is over 9 air miles from the annual home range for the Fishtrap pack.
	Harlequin duck (*Histrionicus histrionicus*) Habitat: white-water streams, boulder and cobble substrates	No further analysis conducted – No suitable high-gradient stream or river habitats occur in the project area. No direct, indirect or cumulative effects to harlequin ducks would be expected to occur as a result of either alternative.
	Northern bog lemming (*Synaptomys borealis*) Habitat: sphagnum meadows, bogs, fens with thick moss mats	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 (*Falco peregrinus*) Habitat: cliff features near open foraging areas and/or wetlands	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 (*Dryocopus pileatus*) Habitat: late-successional ponderosa pine and larch-fir forest	**Included** – Mature western larch/Douglas-fir and ponderosa pine habitats exist in the project area.
	Townsend's big-eared bat (*Plecotus townsendii*) Habitat: caves, caverns, old mines	No further analysis conducted –No suitable caves or mine tunnels are known to occur in the project area. Thus, no direct, indirect or cumulative effects to Townsend's big-eared bats are anticipated as a result of either alternative.
Big Game Species	Big Game Winter Range	**Included** – White-tailed deer, mule deer, and elk winter range exists in the 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, 2 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" under this act.

GRIZZLY BEAR

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

INTRODUCTION

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

Analysis Area

Direct and indirect effects were analyzed on the project area. Cumulative effects were analyzed on a 29,014-acre analysis area that is the southeastern portion of the "occupied habitat" map that includes the project area and as adjacent to the Mount Headley and Vermillion subunits of the Cabinet-Yaak Grizzly Bear Recovery Zone. The analysis area consists of small, privately managed lands (15,857 acres), lands managed by the USFS (11,867 acres) and only a minor DNRC component (883 acres).

Analysis Methods

Effects were analyzed using a combination of field evaluations, aerial photograph interpretation, and GIS analysis. Factors considered within this analysis include level of human disturbance, availability of timbered stands for hiding cover, and miles of open roads.

EXISTING ENVIRONMENT

The state parcel in section 22 is adjacent to the Vermillion subunit of the Cabinet-Yaak Grizzly Bear Recovery Zone (USFWS 1993), and is in the "occupied habitat" as mapped by grizzly bear researchers and managers to address increased sightings and encounters of grizzly bears in habitats outside of recovery zones (Wittinger, 2002). However, the state parcels in Section 36 are outside of both the Mount Headley subunit of the Cabinet-Yaak Grizzly Bear Recovery Zone (USFWS 1993) and the "occupied habitat" area. Use of the parcels in this section is unlikely and will not be discussed further. Thus the remaining portion of the grizzly bear analysis will only cover the state parcel in section 22 and surrounding area. Use of this parcel by grizzly bears is possible at any time. Presently, no open roads exist in the parcel and human disturbance levels are fairly limited. Hiding cover is common across the state parcel.

Portions of the analysis area receive low human use, while the majority of the analysis area experiences extensive human use and associated disturbance. Habitats across the cumulative effects analysis area are a combination of age classes, ranging from recently harvested stands to mature stands. Agricultural areas and areas of human disturbance dominate the lower elevations on private ownerships. Portions of the cumulative effects analysis area have been harvested recently, while others have seen limited or no harvest in the past.

Ongoing harvesting associated with the Mosquito Creek timber sale project and the Deep Creek projects in the cumulative effects analysis area could provide some elevated disturbance to grizzly bears while altering hiding cover for grizzly bears. Human disturbance levels and level of forest harvesting are both closely tied to road access. Access, particularly open road access, varies across the analysis area, with portions being very accessible while other portions are less accessible.

ENVIRONMENTAL EFFECTS

Direct and Indirect Effects of the No-Action Alternative on grizzly bears

No direct effects to grizzly bears would be expected. No changes to the level of disturbance to grizzly bears would be anticipated. Foraging opportunities might decline due to the lack of diversity in habitat such as forest edge and younger age-class stands. No changes in open-road densities or hiding cover would be anticipated. Thus, since 1) no changes in available habitats would occur, or 2) no changes to the level of human disturbance or open road densities would be anticipated, no direct or indirect effects to grizzly bears would be anticipated.

Direct and Indirect Effects of the Action Alternative on grizzly bears

This alternative might affect grizzly bears directly through increased road traffic, noise, and human activity, and indirectly by altering the amount of hiding cover and forage resources, should bears occur in the area. Grizzly bear hiding cover would be reduced on 80 acres in the short-term, however it would improve with time as shrub and tree regeneration proceeds. Short-term increases in open road densities associated with harvesting activities would be anticipated, but all roads in section 22 would revert to present conditions after the proposed harvesting and associated activities were completed. Thus, since 1) long-term open road densities would not change, and 2) hiding cover losses would be short-lived; minor adverse direct or indirect effects to grizzly bears in the local area would be expected.

Cumulative Effects of the No-Action Alternative on grizzly bears

Motorized access to the area and open road densities would remain unchanged. Existing forested stands throughout the cumulative effects analysis area would be expected to persist into the future; regenerating stands are either presently providing hiding cover and forage resources, or would be expected to do so in the near future. Extensive human development and associated disturbance in the cumulative effects analysis area limits likelihood of grizzly bear use; present levels of human disturbance would be expected to continue into the future. Ongoing activities on DNRC-managed lands, as well as those on USFS and small private owners would continue. Thus, since 1) no changes in human disturbance levels would be expected, 2) no changes to open road densities would occur, and 3) no further losses of hiding cover would occur, no further adverse cumulative effects would be expected to affect grizzly bears in the cumulative effects analysis area.

Cumulative Effects of the Action Alternative on grizzly bears

The increased use of road systems during the proposed project would temporarily increase human disturbance to grizzly bears within a portion of the cumulative effects analysis area. Proposed activities would occur in the portion of the cumulative effects analysis area already experiencing moderately high levels of human disturbance, largely associated with open roads and private ownerships, and would be away from the more remote portions of the cumulative effects analysis area. No changes in long-term open-road densities would be expected; fairly extensive amounts road systems would persist that would facilitate considerable human access within the cumulative effects analysis area. Reductions in hiding cover would be additive to the reductions from past timber harvesting as well as more permanent land-cover changes in the cumulative effects analysis area; however, appreciable portions of the cumulative effects analysis area are currently providing hiding cover. Ongoing activities on DNRC-managed lands, as well as those on USFS and small private owners would continue. Early successional stages of vegetation occurring in harvest units could provide foraging opportunities that do not exist in some mature stands. Thus, since 1) no changes in long-term open road densities or human disturbance levels would be anticipated despite short-term increases in disturbance levels and open road densities, and 2) hiding cover losses on the state parcel would be short-lived but cover exists across much of the cumulative effects analysis area, minor adverse cumulative effects would be expected to affect grizzly bears.

Sensitive Species

When conducting forest-management activities, DNRC gives special consideration to habitat requirements of several sensitive species. These species are sensitive to human activities, have special habitat requirements that might be altered by timber management, or might become listed under the Federal Endangered Species

Act if management activities result in continued adverse impacts. 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 (MNH) database documented bald eagles, harlequin ducks, flammulated owls, peregrine falcons, and Coeur d'Alene salamanders within 3 miles of the project area. Table W-1 shows how each sensitive species was either included in the following analysis or was removed from further analysis due to habitat availability.

BALD EAGLE

Issue: Timber harvesting and associated activities could reduce bald eagle nesting and perching habitats and/or disturb nesting bald eagles.

INTRODUCTION

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

Analysis Area

Direct and indirect effects were analyzed for activities conducted within the project area. Cumulative effects were analyzed on the overlapping Finley Flats and Child's Landing bald eagle home ranges. This cumulative effects analysis area likely includes the areas used by the bald eagle pairs using the territories.

Analysis Methods

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

EXISTING ENVIRONMENT

A portion of the project area (Section 22, T23N, R30W) is 1.5 miles north of the Finley Flats bald eagle nest, and the Child's Landing bald eagle nest is roughly 2.4 miles north of the state parcels in section 36, T22N, R30W. Approximately 94 acres of the project area occur within 2.5 miles of these nests.

Within the cumulative effects analysis area, approximately 61.5% of the combined home ranges is privately managed, with another 35.4% managed by the USFS, and less than 2% each DNRC-managed lands and open water. Human disturbance, including timber harvesting, residential development, agricultural fields, various forms of recreation, the Highway 200 corridor, and the Burlington Northern Railroad corridor are potential sources of disturbance to the nesting pair. Large emergent trees are somewhat limited in portions of the home range.

ENVIRONMENTAL EFFECTS

Direct and Indirect Effects of the No-Action Alternative on bald eagles

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

Direct and Indirect Effects of the Action Alternative on bald eagles

No harvesting would occur within the nest or primary-use areas associated with the nest location. However, within the home range, proposed timber harvesting would reduce forested canopy on approximately 90 acres within portions of 3 units. While proposed activities are occurring, eagles could be displaced, however, potential for displacement is only expected to affect eagles during the activities and not beyond. Proposed harvesting in the home range could occur at any time when soil moisture conditions warrant, which could include either the early phase of the nesting season (winter harvesting) or during the later stages of the nesting season (end of break-up through August 15). Harvesting the remaining 144 acres outside of the home ranges would not likely affect bald eagles in the area, unless another territory becomes established in the vicinity. Given the distance between the units and the nest site and the general disturbance associated with these territories, mechanized harvesting in the home range should not cause either pair to abandon their nest; however efforts to conduct activities during the non-nesting period (August 16- February 1) would further reduce the risk of disturbing this pair. Reduction of the forested component in these stands decreases the probability of bald eagle use since the increased visibility would increase disturbance distances. Within the home range, prescriptions call for the retention of some large snags and emergent trees that could be used in the future as nest or perch trees as the stands develop around these resources. No changes to human access to any waterbodies and no changes in motorized access to the project area for general recreational would occur, thus no long-term changes in potential disturbance to bald eagles would occur. This analysis is predicated upon the known nest locations and identified nest area, primary use area, and home range, however should a new nest be located closer to the proposed units prior to harvesting, mitigations would be implemented to ensure compliance with the Montana Bald Eagle Management Plan, Habitat Guide for Bald Eagles in Northwestern Montana, and ARM 36.11.429. Thus, since 1) disturbance would be elevated within the territories, 2) neither changes to human access in the home ranges nor access to large waterbodies would occur, and 3) minor changes in the availability of large, emergent trees would be expected, low direct and indirect effects would be expected to affect bald eagles using the territories.

Cumulative Effects of the No-Action Alternative on bald eagles

Nesting bald eagles in the 2 territories would continue to experience varying levels of disturbance from the ongoing recreational use of the Clark Fork River and general vicinity, as well as disturbance associated with Highway 200 and the BNSF railroad. Human developments on private lands would continue to provide potential sources of disturbance to the territories. Emergent trees exist across ownerships in the home range. Concurrently, no other DNRC activities are planned that would increase human disturbance, development, recreation, timber harvesting, or firewood gathering within the home ranges. Thus, since 1) no changes to human disturbance levels would occur, and 2) no changes in the availability of large, emergent trees would be expected, negligible cumulative effects would be expected to affect bald eagles using the cumulative effects analysis area would be anticipated.

Cumulative Effects of the Action Alternative on bald eagles

Nesting bald eagles would continue to experience varying levels of disturbance from the ongoing recreational use of the Clark Fork River and general vicinity, as well as disturbance associated with Highway 200 and the BNSF railroad. Human developments on private lands would continue to provide potential sources of disturbance to the territory. Any potential disturbance and/or noise from the proposed harvesting would be additive to any of these other forms of disturbance, however no changes in bald eagle behavior would be anticipated provided they continue using the same nest site. Emergent trees exist across ownerships in the cumulative effects analysis area, many of which should remain for at least the short term. Concurrently, no other DNRC activities are planned that would increase human disturbance, development, recreation, timber harvesting, or firewood gathering within the cumulative effects analysis area. Thus, since 1) disturbance would be elevated within the territories, 2) no changes in human access in the home range and no change in access to large waterbodies would occur, and 3) negligible changes in the availability of large, emergent trees would be expected, negligible adverse cumulative effects would be expected to affect bald eagles using the cumulative effects analysis area.

FISHER

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

Analysis Area

Direct and indirect effects were analyzed for activities conducted within the project area. Cumulative effects were analyzed on a 35,365-acre area adjacent to the grizzly bear recovery zone and encompassing a portion of the Clark Fork River valley. The scale of this cumulative effects analysis area 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. Effects were analyzed using field evaluations, GIS analysis of potential habitat, and aerial photograph interpretation. Factors considered include amount of suitable fisher habitats, landscape connectivity, and level of human access.

EXISTING ENVIRONMENT

The project area ranges from 2,360 to 3,120 feet in elevation, with approximately 0.9 miles of perennial streams (Clark Fork River). DNRC manages preferred fisher covertypes within 100 feet of Class 1 and 50 feet of Class 2 streams, so that 75 percent of the acreage (trust lands only) would be in the saw-timber size class in moderate to well-stocked density (ARM 36.11.440(1)(b)(i)). Approximately 22 acres are in these riparian areas in the project area along the Class 1 streams. Modeling fisher habitats using SLI data generated an estimate of 147 acres of fisher foraging, resting, denning, and travel habitats (142 upland acres and 5 riparian acres) in the project area (Heinemeyer and Jones 1994). Within the riparian areas, all of the preferred fisher covertypes are moderately or well-stocked and likely support the structural features necessary for use as fisher resting and denning habitats in addition to serving as travel habitats and maintaining landscape connectivity. Considerable amounts of the project area contain a high percentage of ponderosa pine and dry Douglas-fir that are not suitable for fisher use.

Within the cumulative effects analysis area there are roughly 1,233 acres within 100 feet of the 38 miles of perennial streams and 50 feet of the 26 miles of intermittent streams. Much of this acreage is associated with the Clark Fork River. Within the riparian habitats on DNRC-managed lands in the cumulative effects analysis area, roughly 91.3 percent (6.2 of 6.8 acres) of the area in preferred fisher covertypes presently provides structural features necessary for use as fisher resting and denning habitats, which exceeds the required threshold of 75 percent. Additionally, roughly 440 acres of upland fisher habitats exist on DNRC-managed lands in the cumulative effects analysis area. Preferred fisher covertypes are somewhat limited in the cumulative

effects analysis area; suitable habitats likely occur on a smaller subset of those lands. The networks of open roads in the cumulative effects analysis area coupled with timber management in the cumulative effects analysis area in the past 40 years has reduced landscape-level connectivity. Ongoing activities associated with the Deep Creek project are altering upland fisher habitats; timber harvesting could continue on other lands within the cumulative effects analysis area. Across the cumulative effects analysis area, landscape connectivity has been compromised with past management.

ENVIRONMENTAL EFFECTS

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

No effects to fishers would be expected under this alternative. Minimal changes to the stands providing fisher habitats would be expected. The limited habitats that are conducive to fisher denning and travel may improve in time due to increases in tree growth and canopy closure; however, foraging opportunities may decline in future decades if disturbance is minimized, as habitats such as edges and younger age-class stands that support a variety of prey species would decline in abundance on the landscape. Human disturbance and potential trapping mortality would be expected to remain similar to 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 or potential for trapping mortality 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

No riparian fisher habitats in the project area would be altered. Approximately, 113 of the 142 acres (79.1%) of upland fisher habitats within the project area would receive treatments, with much of those acres likely being too open for appreciable fisher use. No changes in open roads would be anticipated, which would not likely alter trapping pressure and potential for fisher mortality. Minor reductions in connectivity would be expected where connectivity has already been compromised (see Wildlife-mature forested habitats and landscape connectivity section). Thus, since: 1) harvesting would avoid riparian areas, 2) harvesting would reduce or remove upland fisher habitats, 3) minor reductions in landscape connectivity would occur, 4) harvesting would reduce snag levels, however some of these resources would be retained, and coarse woody debris levels would likely increase, and 5) no changes in motorized human access levels would be anticipated, minor adverse direct and indirect effects to fisher in the project area would be expected.

Cumulative Effects of the No-Action Alternative on fishers

Existing fisher habitats would be retained. Ongoing harvesting of potential upland habitats could slightly alter fisher use of a small portion of the cumulative effects analysis area; otherwise existing fisher foraging, denning, and resting habitats would persist. Habitats on other ownerships could continue to be altered with any ongoing and recently completed timber management activities. Landscape connectivity in the cumulative effects analysis area has been compromised with past management and differing ownership patterns; no further changes to landscape connectivity would be anticipated. Road access within the cumulative effects analysis area would not change; therefore, fisher vulnerability to trapping would remain unchanged. Thus, since: 1) slight reductions in upland fisher habitats would continue on DNRC ownership, 2) any landscape connectivity afforded by the stands on DNRC ownership would not appreciably change, 3) no changes to snags, snag recruits, or coarse woody debris levels would be expected, and 4) no changes to human access or potential for trapping mortality would be anticipated, no further cumulative effects to fishers in the cumulative effects analysis area would be expected.

Cumulative Effects of the Action Alternative on fishers

No further harvesting in the riparian areas would be altered. Thus no changes to riparian habitats would occur and the amount of the cumulative effects analysis area in preferred fisher covertypes meeting structural requirements for fishers on DNRC-managed parcels would not change. The cumulative effects analysis area would exceed the 75% threshold established in ARM 36.11.440(1)(b)(i). Roughly 113 acres of potential upland fisher foraging and travel habitats would be harvested in the cumulative effects analysis area, which would be additive to the losses associated with past timber harvesting, land cover conversion, and human developments, and any ongoing human activities, including the activities associated with the Deep Creek Project on DNRC-managed lands in the cumulative effects analysis area. Negligible changes to landscape connectivity would not be expected to appreciably alter fisher use of the cumulative effects analysis areas. No appreciable changes in human disturbance and potential trapping mortality would be anticipated. Thus, since:

1) harvesting would remove upland fisher habitats, but upland habitats would persist across portions of the cumulative effects analysis area, 2) minor reductions in landscape connectivity would be anticipated, 3) harvesting would partially reduce snags and snag recruits, while increasing the coarse woody debris levels, largely in the smaller-sized pieces, and 4) no changes to motorized human access would occur, minor adverse cumulative effects would be anticipated that would affect fisher in the cumulative effects analysis area.

FLAMMULATED OWL

Issue: 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 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 sections surrounding around each parcel as well as the remaining portion of the section in which the parcel is found. Each of these areas 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 and western larch/Douglas-fir types and these stands are appropriately ponderosa pine and western larch/Douglas-fir types. Within the project area there are approximately 127 acres of flammulated owl habitats. The current conditions may be partially a result of the encroachment by Douglas-fir in the past. During field visits, 0-3 large snags >16" dbh per acre (see Wildlife-Snags and coarse woody debris section) were observed in the project area.

Presently roughly half of each of the cumulative effects analysis areas (48.7% in the Spring Creek cumulative effects analysis area and 51.9% of the Thompson Falls cumulative effects analysis area) is not in forested conditions due to residential clearing, agriculture, open water, and other past harvesting. Existing and regenerating forested stands are largely dominated by western larch/Douglas-fir, ponderosa pine and mixed conifers. Some of the stands harvested in the recent past may be suitable foraging habitats for flammulated owls. Ongoing harvesting on DNRC-managed lands associated with the Deep Creek project would continue to alter limited flammulated owl habitats on up to 75 acres in the Spring Creek cumulative effects analysis area. Human developments and agricultural clearing are common on the private ownerships across much of each of the cumulative effects analysis areas, limiting flammulated owl habitats. Additionally, considerable open water exists in each of the cumulative effects analysis areas. 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. Collectively, the flammulated owl habitats in the cumulative effects analysis area are somewhat limited.

ENVIRONMENTAL EFFECTS

Direct and Indirect Effects of the No-Action Alternative on flammulated owls

Existing flammulated nesting habitats within the project area would continue maturing; likewise younger stands from the past harvesting would also mature 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 affect flammulated owls should they be using existing habitat during the nesting period. Proposed timber harvest would open the canopy while favoring western larch, ponderosa pine, and Douglas-fir. Elements of the forest structure important for nesting flammulated owls, including snags (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 proposed units. Realistically, however, some snags would likely be removed due to safety and/or logistical concerns (see wildlife-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.

Cumulative Effects of the No-Action Alternative on flammulated owls

Flammulated owl habitats would persist in the state parcels. Portions of each of the cumulative effects analysis areas 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. Ongoing harvesting associated with the Deep Creek project (Spring Creek cumulative effects analysis area) would continue to alter limited flammulated owl habitats; 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 cumulative effects would be expected to affect flammulated owls in the cumulative effects analysis areas.

Cumulative Effects of the Action Alternative on flammulated owls

Proposed harvesting would add to the amount in each 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. Within each of the cumulative effects analysis areas, the amount of that has been harvested in the recent past would increase by 1.4% in the Spring Creek cumulative effects analysis area and 2.7% in the Thompson Falls cumulative effects analysis area. Conversely, this reduction in mature forested stands including several stands dominated by ponderosa pine would reduce potential nesting habitats within both of the cumulative effects analysis areas. The portions of each cumulative effects analysis area that are not currently providing flammulated owl habitats would not be 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 each of the cumulative effects

analysis area would be more representative of historic conditions, negligible beneficial cumulative effects would be expected to affect flammulated owls in the cumulative effects analysis areas.

PILEATED WOODPECKER

Issue: 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 on the project area. Cumulative effects were analyzed on the on the 8 sections surrounding around each parcel as well as the remaining portion of the section in which the parcel is found. Each of these areas includes enough area to support a couple of pairs of pileated woodpeckers (Bull and Jackson 1995).

Analysis Methods

To assess potential pileated woodpecker nesting habitats on DNRC-managed lands in the project 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% canopy closure, and was below 5,000 feet in elevation. Foraging habitats are areas that do not meet the definition above, but includes the remaining sawtimber stands below 5,000 feet in elevation with greater than 40% canopy cover. To assess habitat on other ownerships within the cumulative-effects analysis area, aerial photograph interpretation was used to identify stands that appeared to meet the minimum potential foraging habitat. Potential foraging and nesting habitat were not differentiated on other ownerships for this analysis due to data limitations. 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 these mapped potential 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 project area ranges from 2,360 to 3,120 feet in elevation and is dominated by ponderosa pine, western larch, and Douglas-fir. In the project area, potential pileated woodpecker nesting habitat exists on approximately 169 acres and an additional 142 acres of sawtimber stands dominated by western larch/Douglas-fir exist in the project area that are potential foraging habitats. Although nesting habitat is defined differently than foraging habitat, nesting habitat also provides foraging opportunities for pileated woodpeckers. Removal of large western larch and ponderosa pine by past timber-harvesting activity has reduced the quality of habitat for pileated woodpeckers. Large western larch and ponderosa pine exist within the project area, which could become suitable nesting sites and existing ponderosa pine, western larch, and Douglas-fir stands are likely providing foraging habitats. During field visits, a few feeding sites and 0-3 large snags >16" dbh per acre (see Wildlife-Snags and coarse woody debris section) were observed in the project area.

Presently roughly half of each of the cumulative effects analysis areas (47.4% in the Spring Creek cumulative effects analysis area and 51.9% of the Thompson Falls cumulative effects analysis area) is not in forested conditions due to residential clearing, agriculture, open water, and other past harvesting. Existing and regenerating forested stands are largely dominated by western larch/Douglas-fir, ponderosa pine and mixed

conifers. Some of the stands harvested in the recent past should start developing conditions suitable for pileated woodpecker foraging in the future; development of nesting habitats is far more distant in most of those stands. Ongoing harvesting associated with the Deep Creek project is altering up to 75 acres of potential pileated woodpecker nesting and foraging habitats. Human developments and agricultural clearing are common on the private ownerships across much of each of the cumulative effects analysis areas, limiting pileated woodpecker habitats. Additionally, considerable open water exists in each of the cumulative effects analysis areas. Collectively, low to moderate levels of pileated woodpecker habitats exist in each of the larger cumulative effects analysis areas.

ENVIRONMENTAL EFFECTS

Direct and Indirect Effects of the No-Action Alternative on pileated woodpeckers

No direct effects would be anticipated under this alternative. Ponderosa pine, western larch, and Douglas-fir trees in the project area would continue to grow and die over time, providing nesting and foraging habitats. As these trees die, replacement shade-intolerant trees would be underrepresented in the stand unless other disturbances influence the stands, allowing for their regeneration. Therefore, a reduction in suitable nesting trees would be likely over time. Thus, habitat sustainability and quality for pileated woodpeckers would gradually increase through time, and then decline. Thus, since 1) no harvesting would occur, 2) no changes in the amount of continuously forested habitats would be anticipated, and 3) long-term, succession-related declines in the abundance of shade-intolerant tree species, which are valuable to pileated woodpeckers, would be anticipated, no direct and indirect effects to pileated woodpeckers in the project area would be expected.

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 could be temporarily displaced by the proposed harvesting and road-building activities. Elements of the forest structure important for nesting pileated woodpeckers, 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 proposed units. Realistically, however, some snags would likely be removed due to safety and/or logistical concerns (see Wildlife-snags and coarse woody debris section), which further affects pileated woodpeckers now and into the future. After the proposed harvesting, 234 acres in the units proposed to receive seedtree and shelterwood prescriptions would be too open to be considered pileated woodpecker habitat. This would largely render much of the project area unsuitable for pileated woodpecker use for a few decades. The silvicultural prescriptions would retain healthy western larch, ponderosa pine, and Douglas-fir while promoting the regeneration of these same species, which would benefit pileated woodpeckers in the future by providing nesting, roosting, and foraging habitats. Thus, since harvesting would 1) reduce the amount of continuous forested habitats available, 2) some snags and snag recruits would be lost, 3) mitigation measures to retain a minimum of 2 snags per acre and 2 snag recruits per acre, and 4) prescriptions would promote seral species in the proposed units, moderate adverse direct and indirect effects to pileated woodpeckers in the project area would be expected.

Cumulative Effects of the No-Action Alternative on pileated woodpeckers

Ponderosa pine, western larch, and Douglas-fir trees would continue to grow and die over time in the project area, providing nesting and foraging habitats. Through time, conversion of stands to shade-tolerant species would reduce nesting substrates for pileated woodpeckers. Less than half of each of the cumulative effects analysis areas are presently in mature ponderosa pine, western larch, and Douglas-fir cover types that provide nesting and foraging habitats for pileated woodpeckers. Those nesting and foraging habitats on the state parcels, which contributes to some of the larger blocks of mature forested habitats in the cumulative effects analysis areas, would continue functioning as such for the foreseeable future. Much of the remaining acreage in each of the cumulative effects analysis areas is in non-forested types or were harvested in the last 20-40 years and do not possess qualities that make them highly suitable for pileated woodpecker nesting or foraging, although small patches of habitats exist in some of these areas. Ongoing harvesting on DNRC-managed lands would continue, as would activities on other ownerships. Thus, since 1) existing stands across the cumulative effects analysis areas would continue to age, contain increasingly larger trees, continue becoming more structurally diverse, and experience more mortality that could provide better foraging and nesting habitats, and 2) no further reductions in continuous forested habitats would occur, negligible beneficial cumulative effects would be expected to affect pileated woodpeckers in each of the cumulative effects analysis areas.

Cumulative Effects of the Action Alternative on pileated woodpeckers

Reductions in pileated woodpecker habitat would be expected. Elements of the forest structure important for nesting pileated woodpeckers, including snags (a minimum of 2 snags per acre >21 in. dbh where they exist, otherwise the next largest size class), CWD (10-15 tons per acre), numerous leave trees, and snag recruits (a minimum of 2 large trees per acre >21 in. dbh where they exist, otherwise the next largest size class) would be retained in the proposed units. However, the 234 acres included in proposed units would largely be too open for appreciable pileated woodpecker use after harvesting. Within each of the cumulative effects analysis areas, the amount of that has been harvested in the recent past would increase by 1.4% in the Spring Creek cumulative effects analysis area and 2.7% in the Thompson Falls cumulative effects analysis area; these reductions in available pileated woodpecker habitats would be additive to the past losses associated with timber harvesting and clearing that has occurred in the cumulative effects analysis areas. Within those stands harvested in the last 20-40 years mature, future foraging habitat is, however, developing and may be suitable in the next 30-50 years. Ongoing harvesting on DNRC-managed lands would continue, as would activities on other ownerships. Thus, since 1) harvesting would reduce the amount of continuous forested habitats available, 2) some snags and snag recruits would be lost, 3) mitigation measures to retain a minimum of 2 snags per acre and 2 snag recruits per acre, and 4) prescriptions would promote seral species in a small portion of each of the cumulative effects analysis areas, minor adverse cumulative effects to pileated woodpeckers in the cumulative effects analysis areas would be expected.

BIG GAME WINTER RANGE

Issue: 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

Since white-tailed deer are more sensitive to winter range needs than mule deer or elk, the remainder of this analysis will focus upon white-tailed deer winter range. Direct and indirect effects were analyzed on the winter range in the project area. Cumulative effects were analyzed on the contiguous 149,695-acre white-tailed deer winter range that includes the project area. This scale includes enough area to support hundreds of white-tailed deer.

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 the entire project area as white-tailed deer and elk winter range. Additionally, approximately 274 acres were identified as mule deer winter range in the project area. These winter ranges are part of larger white-tailed deer (149,695 acres), mule deer (73,331 acres), and elk winter ranges (187,577 acres). Winter snow depths and suitable microclimates influence big game distribution and use within the vicinity. Mature Douglas-fir/western larch, ponderosa pine, and mixed conifer stands in the project area are providing attributes facilitating use by wintering big game. Proximity to human developments and open roads has likely slightly reduced winter range 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 recent past, harvesting on DNRC lands within this area has reduced thermal cover and snow intercept on roughly 781 acres with the Mosquito Creek, Trout Creek, and Deep Creek Timber Sale Projects. Additionally, several small salvage projects altered winter range attributes, but due to their nature, limited effects to winter range capacity was realized. These reductions are additive to past reductions on other ownerships in the cumulative effects analysis area. Human disturbance within the winter range is largely associated with the Clark Fork River and Highway 200. Additional disturbance to the winter range is likely from recreational snowmobile use, other winter recreation, and commercial timber harvesting, which likely influences wintering big game.

ENVIRONMENTAL EFFECTS

Direct and Indirect Effects of the No-Action Alternative on big game winter range

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 in the project area would be anticipated.

Direct and Indirect Effects of the Action Alternative on big game winter range

Some displacement would be expected as a result of the proposed harvesting operations if activities were conducted in the winter period. However, winter logging provides felled tree tops, limbs, and slash piles that could concentrate feeding deer during nighttime and quiet periods when logging operations are shut down. Increasing short-term forage availability in this manner may partially offset some of the effects associated with temporary displacement caused by logging disturbance. This short-term benefit would not be expected to offset impacts associated with removal of thermal cover over the long-term (several decades). The seedtree and shelterwood prescriptions on 234 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 that logging activities would create disturbance in this area, and 2) a high percentage of the winter range in the project area would be altered, minor adverse direct or indirect effects to big game winter range in the project area would be expected.

Cumulative Effects of the No-Action Alternative on big game winter range

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 private lands and DNRC-managed 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. Those areas that have been converted to agriculture or other human developments would not be expected to provide thermal cover or snow intercept in the future. Human disturbance levels would be anticipated to continue at similar levels. Thus, minor positive cumulative effects to the larger big game winter range would be expected.

Cumulative Effects of the Action Alternative on big game winter range

Thermal cover would be largely removed from approximately 234 acres of the deer and elk 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 ongoing timber sales, but would be partially offset by the increased forage availability that would occur. 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 larger big game winter range would be expected.

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Attachment III:

Harvest Unit Prescriptions

Timber Harvest History

Section 36, Township 22 North, Range 30 West. (Harvest Units 1, 2, 3, and 4)
Section records indicate past harvesting activities dating back to 1959. Between 1959 and 2001 many small volume permits have been issued, totaling approximately 6.7 MMBF. The majority of the volume removed was lodgepole pine, with lesser amounts of western larch, Douglas-fir, ponderosa pine and grand fir removed. Aside from firewood permits, the section appears to have been idle since that time. This section is within the Thompson Falls Impact Zone as identified by the Montana / Idaho State Airshed Group. The beneficiary for this section is the Common Schools Trust Grant (C.S.).

Section 22, Township 23 North, Range 30 West. (Harvest Units 5 and 6)
Section records indicate timber harvesting dating back to 1952 when approximately 250MBF of Douglas-fir and ponderosa pine was removed. In 2001, this parcel was harvested as part of the Blue Slide Timber Sale #1388. At that time approximately 556MBF was removed. Since that time activity has been limited to small salvage permits and firewood. The beneficiary for this parcel is the Deaf and Blind Trust Grant (D.D.A.).

Harvest Unit Prescriptions

Harvest Unit: 1 **Harvest Unit Acres:** 70

Legal description: S36, T22N, R30W

Elevation: 2440 – 2600' **Slope:** 0 - 20% **Aspect:** Flat to Westerly

Habitat Type: ABGR/CLUN-CLUN, PSME/SYAL-CARU

Current Cover Type: Mixed conifer, ponderosa pine.

Desired Future Condition: ponderosa pine

Soil Type: Lionwood-Scotmont-Whitepine Complex. Very deep, well drained loam; fine sandy loam; silt loam.

Description of Current Stand:
This unit is comprised of two stands as identified in the Stand Level Inventory (SLI). The current multi storied stand consists of ponderosa pine (51%), western larch (24%), Douglas-fir (21%) grand fir (approximately 2%) Lodgepole pine (approximately 2%) and scattered western hemlock (less than 1%). Tree diameters in the overstory range 12 – 29" DBH, heights range from 70 – 120 feet tall and the tree ages range from 80 – 105 years of age. This stand is likely a result of the great fires of 1910. The second story is primarily Douglas-fir and lodgepole pine of 6 – 12" DBH. The lower story tree heights range from 50 – 75 feet tall and ages range from approximately 56 – 85 years of age. The regeneration is overwhelmingly grand fir and Douglas-fir due to the closed canopy. No SMZ's exist within the harvest unit.

The lodgepole pine is infested with Mountain pine beetle (*Dendroctonus ponderosae*) and Western pine beetle (*Dendroctonus brevicomis*) is active in the ponderosa pine. Indian paint fungus (*Ecinodontium tinctoruim*) is active in the grand fir, while Pini rot (*Phellinus pini)* is active in the western larch. Intensive fire wood harvesting is evidence of this insect and disease activity.

Treatment Objectives:

- Remove unhealthy trees, as wells as those with poor vigor from the overstory to promote long term forest health.

- Open the stand to reduce susceptibility to bark beetle infestations.
- Scarify the site sufficiently to make an available seedbed and encourage natural regeneration of desired future condition species.
- Promote natural regeneration of ponderosa pine and western larch.

Prescribed Treatment:

- Seed tree harvest, leave tree marking.
- Retain healthy trees with good crown and bark characteristics, on a variable spacing of 50 - 55 feet, leaving 15 - 20 trees per acre (TPA).
- Favor leaving dominant and co-dominant ponderosa pine, western larch and Douglas-fir, in that order.
- Remove trees affected by insects, rot, dwarf mistletoe or other diseases as well as over-mature individuals.
- Retain at least two trees per acre greater than 21" DBH, and two snags or snag recruits per acre greater than 21" DBH or the next largest size class available.

Harvest Method:

- Ground based harvesting with whole tree or tree length skidding on dry, frozen or snow covered ground.
- Utilize existing roads and skid trails that do not violate Best Management Practices (BMP).
- Existing temp roads and any constructed roads would be closed to vehicle traffic following harvest activity.

Hazard Reduction:

- Pile and burn slash in excess of down woody material requirements.
- Grinding or chipping landing piles may be considered as an alternative to burning.

Site Preparation and Regeneration:

- Spatial openings created by the proposed treatment should provide opportunities for establishment of natural regeneration.
- Machine pile and scarify following harvest to promote natural regeneration.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from time of harvest, and the need for supplemental planting determined.
- The stand should be evaluated for pre-commercial thinning and overstory removal treatments approximately 15 - 20 years from time of harvest.
- The 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.

Harvest Unit: 2 **Harvest Unit Acres:** 40

Legal description: S36, T22N, R30W.

Elevation: 2360' – 2400' **Slope:** 0% **Aspect:** flat

Habitat Type: PSME/PHMA-PHMA, PSME/PHMA-CARU, ABGR/CLUN-ARNU

Current Cover Type: ponderosa pine, Western larch/Douglas-fir, Douglas-fir, Mixed conifer

Desired Future Condition: western larch/Douglas-fir

Soil Type: Bonnash gravelly silt loam. Very deep, well drained, gravelly silt loam.

Description of Current Stand:

This unit is comprised of seven stands as identified in the Stand Level Inventory (SLI). The stand is best described as single storied with areas of advanced regeneration of late succesional species. Openings created

by past use as the town dump are void of natural regeneration. The overstory consists of western larch (56%), Douglas-fir (42%), and Engelmann spruce (2%), with scattered ponderosa pine. Grand fir, Douglas-fir, lodgepole pine and western hemlock make up the understory and regeneration. The overstory tree diameters range from 10 – 21", heights range from 75 – 95 feet tall and ages range from 75 – 100 years of age. This stand appears to be the result of the great fires of 1910. The second story trees diameters range from 6 – 9", heights range from 45 – 70 feet tall and ages range from 65 – 75 years of age. A grand fir removal on this site in 2006 did not open the stand sufficiently to encourage preferred regeneration.

The Clark Fork River parallels this unit to the East. Harvest unit boundaries have been established so that no harvesting would occur within 100' of the river. No SMZ's exist within the harvest unit.

Indian paint fungus (*Ecinodontium tinctoruim*) is common in the grand fir that remains. Much of the western larch in the overstory is infected with Pini rot (*Phellinus pini*). Western gall rust (*Endocronartium harknessii*) and Mountain pine beetle (*Dendroctonus ponderosae*) are active in the lodgepole pine.

Treatment Objectives:

- Remove unhealthy trees, as wells as those with poor vigor from the overstory to promote long term forest health.
- Open the stand to reduce susceptibility to bark beetle infestations.
- Scarify the site sufficiently to make an available seedbed and encourage natural regeneration of desired future condition species.
- Promote natural regeneration of preferred tree species, primarily ponderosa pine and western larch.

Prescribed Treatment:

- Seed tree harvest. Leave tree marking.
- Retain healthy trees with good crown and bark characteristics, on a variable spacing of 50 - 60 feet, leaving 12 - 15 TPA.
- Favor leaving dominant and co-dominant western larch, ponderosa pine and Douglas-fir, in that order.
- Remove trees affected by insects, root rot, dwarf mistletoe or other diseases as well as over-mature individuals. .
- Retain at least two trees per acre greater than 21" DBH, and two snags or snag recruits per acre greater than 21" DBH or the next largest size class available.

Harvest Method:

- Ground based harvesting with whole tree skidding on dry, frozen or snow covered ground.
- Utilize existing roads and skid trails that do not violate BMP.
- Existing roads and any constructed temp roads and skid trails would be closed to vehicle traffic following harvest activity.

Hazard Reduction:

- Pile and burn excess slash at landings.
- Grinding or chipping landing piles may be considered as an alternative to burning.

Site Preparation and Regeneration:

- Machine pile and scarify following harvest as needed to promote natural regeneration.
- Planting with a mix of western larch, ponderosa pine and disease resistant western white pine seedlings is suggested following harvest.

Anticipated Future Treatments:

- The stand should be evaluated for pre-commercial thinning and overstory removal approximately 15 years from time of harvest.
- The 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.

Harvest Unit: 3 **Harvest Unit Acres:** 19

Legal description: S36, T22N, R30W.

Elevation: 2360' – 2400' **Slope:** 0 - 15% **Aspect:** SW

Habitat Type: ABGR/CLUN-ARNU, PSME/SYAL-CARU,

Current Cover Type: ponderosa pine, mixed conifer

Desired Future Condition: western larch/Douglas-fir.

Soil Type: Elkrock-Selon Complex, Sacheen-Rock outcrop complex. Very deep, somewhat excessively well drained, gravelly silt loam to loamy fine sand.

Description of Current Stand:

This unit is comprised of two stands as identified in the Stand Level Inventory (SLI). The current two storied stand consists of: ponderosa pine (39%), Douglas-fir (39%), western larch (12%) and grand fir (10%). The overstory tree diameters range from 13- 29", heights range from 70 – 115 and ages range from 78 to 105 years of age. This story appears to be the result of the great fires of 1910. A few scattered remnants greater than 120 years of age appear to have survived the fires. The second story consisting primarily of Douglas-fir and grand fir, range from 6 – 13" DBH, heights range from 40 – 65 feet tall and ages range from 60 – 80 years of age.

Lodgepole pine is largely absent from the stand due to a lodgepole pine removal and commercial thinning approximately 15 years ago. Increment boring of the residual stand in the treated area shows the corresponding release at that time. Regeneration of preferred early seral species is scarce, and typically limited to grand fir and Douglas-fir in patches. No SMZ's exist within the harvest unit.

Western pine beetle (*Dendroctonus brevicomis*) has been noted in the ponderosa pine and Indian paint fungus (*Ecinodontium tinctoruim*) is common in the grand fir.

Treatment Objectives:

- Remove unhealthy trees, as wells as those with poor vigor from the overstory to promote long term forest health.
- Scarify the site sufficiently to make an available seedbed and encourage natural regeneration of desired future condition species.
- Reduce fuel loading and ladder fuels in the stand.
- Promote natural regeneration of ponderosa pine and western larch.

Prescribed Treatment:

- Shelterwood to seed tree harvest, cut tree marking for aesthetic quality.
- Retaining groups of healthy trees with good crown and bark characteristics, on a variable spacing of 40 - 45 feet, retaining approximately 20 - 30 TPA.
- Favor leaving dominant and co-dominant western larch, ponderosa pine and Douglas-fir, in that order.
- Remove trees affected by insects, root rot, dwarf mistletoe or other diseases as well as over-mature individuals.
- Retain at least two trees per acre greater than 21" DBH, and two snags or snag recruits per acre greater than 21" DBH or the next largest size class available.

Harvest Method:

- Ground based harvesting with whole tree skidding on dry, frozen or snow covered ground.
- Utilize existing roads and skid trails that do not violate BMP.
- Any constructed temp roads and skid trails would be closed to vehicle traffic following harvest activity.

Hazard Reduction:

- Pile and burn excess slash at landings.
- Grinding or chipping landing piles may be considered as an alternative to burning.

Site Preparation and Regeneration:

- Machine pile and scarify following harvest as needed to promote natural regeneration.

- Inter-planting with a mix of western larch, ponderosa pine and disease resistant western white pine is suggested.

Anticipated Future Treatments:

- The stand should be evaluated for pre-commercial thinning and overstory removal approximately 15 years from time of harvest.
- 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.

Harvest Unit: 4 **Harvest Unit Acres:** 19

Legal description: S36, T22N, R30W.

Elevation: 2400' **Slope:** flat **Aspect:** W

Habitat Type: PSME/PHMA-CARU

Current Cover Type: ponderosa pine

Desired Future Condition: western larch/Douglas-fir.

Soil Type: Elkrock-Selon Complex, Sacheen-Rock outcrop complex. Very deep, somewhat excessively well drained, gravelly silt loam to loamy fine sand.

Description of Current Stand:

This unit is comprised of one stand as identified in the Stand Level Inventory (SLI). The current multi storied stand is comprised of Douglas-fir (71%), western larch (23%), ponderosa pine (6%) with less than 1% of grand fir and lodgepole pine. The overstory tree diameters range from 10 – 30" DBH, heights range from 90 – 120 feet tall and ages range from 90 – 135 years old. This story appears to be the result of the great fires of 1910.

The second story Douglas-fir actively taking over the overstory and closing the canopy. The remaining lodgepole pine is scattered and was largely removed during a lodgepole pine removal and commercial thinning approximately 15 years ago. Increment boring of the residual stand in the treated area shows the corresponding release at that time. Regeneration on this site is very scarce, and limited to grand fir and Douglas-fir. No SMZ's exist within the harvest unit. Western pine beetle (*Dendroctonus brevicomis*) is evident in the ponderosa pine. Currently the site receives heavy use by stock grazing and firewood gathering.

Treatment Objectives:

- Remove unhealthy trees, as wells as those with poor vigor from the overstory to promote long term forest health.
- Scarify the site sufficiently to make an available seedbed and encourage natural regeneration of desired future condition species.
- Promote natural regeneration of ponderosa pine and western larch.
- Reduce fuel loading and ladder fuels in the stand.
- Retain a stocking level sufficient for visual screening of neighboring homes.

Prescribed Treatment:

- Shelterwood harvest, cut tree marking for aesthetic quality.
- Retaining groups of healthy trees with good crown and bark characteristics, on a variable spacing of 30 - 40 feet, retaining approximately 30 - 50 TPA.
- Favor leaving dominant and co-dominant western larch, ponderosa pine and Douglas-fir, in that order.
- Remove trees affected by insects, root rot, dwarf mistletoe or other diseases as well as over-mature individuals.
- Retain at least two trees per acre greater than 21" DBH, and two snags or snag recruits per acre greater than 21" DBH or the next largest size class available.

Harvest Method:

- Ground based harvesting with whole tree skidding on dry, frozen or snow covered ground.
- Utilize existing roads and skid trails that do not violate BMP.
- Existing temp roads and any constructed temp roads and skid trails would be closed following harvest activity.

Hazard Reduction:

- Pile and burn excess slash at landings.
- Grinding or chipping landing piles may be considered as an alternative to burning.

Site Preparation and Regeneration:

- Machine pile and scarify following harvest as needed to promote natural regeneration
- Planting with a mix of western larch, ponderosa pine and disease resistant western white pine is suggested.

Anticipated Future Treatments:

- This stand would be considered for more active weed management and grazing would be suspended due to the high occurrence of noxious weeds in this stand.
- The stand should be evaluated for pre-commercial thinning and overstory removal approximately 15 years from time of harvest.
- 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.

Harvest Unit: 5 **Harvest Unit Acres:** 35

Legal description: S22, T23N, R30W.

Elevation: 2560' – 2680' **Slope:** 0 - 20% **Aspect:** W

Habitat Types: ABGR/LIBO-LIBO, ABGR/CLUN-CLUN.

Current Cover Types: Mixed conifer, Western larch/Douglas-fir

Desired Future Condition: Western larch / Douglas-fir

Soil Type: Very deep, well drained to excessively well drained, gravelly loam or gravelly silt loam.

Description of Current Stand:

This parcel was harvested in 2001 during the Blue Slide Timber Sale. At that time the silvicultural prescription was described as: Selection (a combination of sanitation/salvage and commercial thin/tree improvement) type harvest. The target stocking remaining after harvest was 170 trees per acre (16' spacing), approximately 80 – 100 square feet of basal area. According to the Blue Slide EA; the majority of the overstory is a stand resulting from the great fires of 1910, while a few relics remain having survived the great fires.

This unit is comprised of two stands as identified in the Stand Level Inventory (SLI). The current stand is two storied, comprised of Douglas-fir (30%), western larch (30%), grand fir (25%), western hemlock (10%). Lodgepole pine, Engelmann spruce, western red cedar and western white pine also occur in the stand. The overstory tree diameters range from 13 – 30", heights range from 60 – 120 feet tall, and ages range from 70 to 105 years of age. The second story tree diameters range from 6 to 12", heights range from 25 to 65 feet tall and ages range from 45 – 65 years of age. Douglas-fir and grand fir dominate the understory regeneration.

As regeneration was not a priority of the previous harvest, the site has not opened sufficiently to allow regeneration of preferred early seral species. No SMZ's exist within the harvest unit.

Western pine beetle (*Dendroctonus brevicomis*) is evident in the ponderosa pine and Indian paint fungus (*Ecinodontium tinctoruim*) is very common in the grand fir, the sampled western hemlock also had a high

instance of stem decay. Pini rot (*Phellinus pini)* is active in the western larch. Intensive fire wood harvesting is evidence of this insect and disease activity.

Treatment Objectives:

- Remove unhealthy trees, as wells as those with poor vigor from the overstory to promote long term forest health.
- Open the stand to reduce susceptibility to bark beetle infestations, and promote natural ponderosa pine and western larch regeneration.
- Remove timber types highly susceptible to root rot, stem decay and bark beetles.
- Scarify the site sufficiently to make an available seedbed and encourage natural regeneration.

Prescribed Treatment:

- Seed tree harvest, leave tree marking.
- Retain healthy trees with good crown and bark characteristics, on a variable spacing of 60 - 65 feet, leaving 10 - 12 trees per acre. Group selection where appropriate.
- Favor leaving dominant and co-dominant, western larch, ponderosa pine and Douglas-fir, in that order.
- Remove trees affected by insects, root rot, dwarf mistletoe or other diseases as well as over-mature individuals.
- Retain at least two trees per acre greater than 21" DBH, and two snags or snag recruits per acre greater than 21" DBH or the next largest size class available.

Harvest Method:

- Ground based harvesting with whole tree or tree length skidding on dry, frozen or snow covered ground.
- Utilize existing roads and skid trails that do not violate Best Management Practices (BMP).

Hazard Reduction:

- Pile and burn slash in excess of down woody material requirements.

Site Preparation and Regeneration:

- Machine pile and scarify, jackpot or broadcast burn where appropriate.
- Spatial openings created by the proposed treatments should provide opportunities for establishment of natural regeneration.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from time of harvest, and the need for supplemental planting determined.
- The stand should be evaluated for pre-commercial thinning and overstory removal treatments approximately 20 years from time of harvest.
- The 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.

Harvest Unit: 6 **Harvest Unit Acres:** 44

Legal description: S22, T23N, R30W.

Elevation: 2680' – 3120' **Slope:** 20 - 40% **Aspect:** W

Habitat Type: PSME/LIBO-CARU, PSME/LIBO-SYAL,

Current Cover Type: Douglas-fir

Desired Future Condition: western larch/Douglas-fir

Soil Type: Very deep, well drained to excessively well drained, gravelly loam or gravelly silt loam.

Description of Current Stand:

This parcel was harvested in 2001 during the Blue Slide Timber Sale. At that time the silvicultural prescription was described as: Selection (a combination of sanitation/salvage and commercial thin/tree improvement) type harvest. The target stocking remaining after harvest was 170 trees per acre (16' spacing), approximately 80 – 100 square feet of basal area. According to the Blue Slide EA; the majority of the overstory is a stand resulting from the great fires of 1910, while a few relics remain having survived the great fires.

This unit is comprised of two stands as identified in the Stand Level Inventory (SLI). The current stand is single storied, comprised of Douglas-fir (45%), ponderosa pine (21%), western larch (17%), and lodgepole pine (17%). The overstory tree diameters range from 10 – 30", heights range from 60 – 120 feet tall, and ages range from 50 to 100 years of age. Scattered large diamter ponderosa pine represent survivors of the great fire. These relics are generally 36 – 38" DBH, 120 – 130 feet tall and 120 – 150 years of age.

As regeneration was not a priority of the previous harvest, the site has not opened sufficiently to allow regeneration of preferred early seral species. No SMZ's exist within the harvest unit.

Mountain pine beetle (*Dendroctonus ponderosae*) is active in the lodgepole pine, and Western pine beetle (*Dendroctonus brevicomis*) is active in the ponderosa pine. Root rot is occurring in the Doulgas-fir with increasing intensity, while Douglas-fir beetle (*Dendroctonus pseudotsugae)* killing the weakened trees. There is evidence of extensive firewood gathering on the parcel.

Treatment Objectives:

- Remove unhealthy trees, as wells as those with poor vigor from the overstory to promote long term forest health.
- Open the stand to reduce susceptibility to bark beetle infestations, and promote natural ponderosa pine and western larch regeneration.
- Remove timber types highly susceptible to root rot, stem decay and bark beetles.
- Scarify the site sufficiently to make an available seedbed and encourage natural regeneration.

Prescribed Treatment:

- Seed tree harvest, leave tree marking.
- Retain healthy trees with good crown and bark characteristics, on a variable spacing of 50 - 55 feet, leaving 15 - 20 trees per acre.
- Favor leaving dominant and co-dominant ponderosa pine, western larch and Douglas-fir in that order.
- Remove trees affected by insects, root rot, dwarf mistletoe or other diseases.
- Retain at least two trees per acre greater than 21" DBH, and two snags or snag recruits per acre greater than 21" DBH or the next largest size class available.

Harvest Method:

- Ground based harvesting with whole tree or tree length skidding on dry, frozen or snow covered ground.
- Utilize existing roads and skid trails that do not violate Best Management Practices (BMP).

Hazard Reduction:

- Pile and burn slash in excess of down woody material requirements.
- Grinding or chipping landing piles may be considered as an alternative to burning.

Site Preparation and Regeneration:

- Machine pile and scarify, jackpot or broadcast burn the unit where appropriate.
- Spatial openings created by the proposed treatments should provide opportunities for establishment of natural regeneration.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from time of harvest, and the need for supplemental planting determined.
- The stand should be evaluated for pre-commercial thinning and overstory removal treatments approximately 20 years from time of harvest.
- The 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.

Attachment IV

Mitigations

Roads:

A transportation system minimizing road miles and meeting all Best Management Practices (BMP) has been designed by DNRC.
New road construction proposed in association with this project totals approximately 0.6 miles. There would be recondition and improvement of existing roads totaling approximately 2.0 miles, involving road surface drainage and opening for safe hauling traffic. The purchaser would have the option of using existing roads and skid trails for skidding and hauling during the course of the sale. Upon completion of road work, all haul roads would meet BMP standards.
Following harvest activities approximately 0.6 miles of existing temp roads would be decommissioned, grass seeded and fertilized. New construction, reconditioned and improved roads would be water barred, grass seeded and fertilized at the direction of the Forest Officer, as well as closed to vehicle traffic.

Wildlife:

The following mitigation measures have been incorporated into the proposed project.

- 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).

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

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

- Effectively close roads after the proposed activities to reduce the potential for unauthorized motor vehicle use and/or loss of snags to firewood gathering.

- Reduce views into harvest units along the open road where feasible using a combination of topography, group retention, roadside vegetation buffers, and retention of pockets of advanced regeneration.

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

Soils:

1) Limit 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. Dozer piling should be limited to periods when soil moistures are less than 18%.

2) On ground skidding units, 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 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 40% 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 40%.

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. Accept disturbance incurred during skidding operations to provide adequate scarification for regeneration.

6) Retain 10 to 15 tons large woody debris and a majority of all fine litter feasible following harvest. On commercial thin units where whole tree harvesting is used implement one of the following mitigations for nutrient cycling; 1) use in woods processing equipment that leaves slash on site, 2) for whole tree harvest, return skid slash and evenly distribute within the harvest area, or 3) cut off tops from every third bundle of logs so that tops are dispersed as skidding progresses.

Regeneration:

Proposed harvest units 2, 3 and 4 would be nominated for planting seedlings of historic timber types and desired future condition species: ponderosa pine, western larch and rust resistant western white pine. In the other units the need to plant seedlings of historic timber types and desired future condition species: ponderosa pine, western larch and rust resistant western white pine will be evaluated within roughly five years of harvest.

Hydology:

All rules and regulations pertaining to the Streamside Management Zone (SMZ) Law would be followed. No harvesting within SMZ areas would occur under the proposed action. All operations would follow appropriate forestry BMPs. This would reduce the potential for soil displacement and subsequent sediment transport.

Weed Management:

Roads and skid trail approaches would be seeded and spot treated with chemicals following construction and project completion. Prior to entering the site, off-road logging equipment would be cleaned and inspected through the timber sale contact to avoid seed migration. Roads would be closed following the sale to avoid migration of weed seed into the area. Post-harvest, the project area would be included in the Plains Unit's integrated weed management program.

Air Quality:

Efforts would be made to dispose of logging slash by means other than burning such as: chipping or grinding.

Attachment V

Consultants and References

Preparers:

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