MONTANA DNRC, NORTHWESTERN LAND OFFICE, PLAINS UNIT

ENVIRONMENTAL ASSESSMENT

For the

Thompson Face Timber Sale

Prepared by: Kyle Johnson, Management Forester

March, 2013

Table of Contents

MEMORANDUM

To: Kyle Johnson, Management Forester, Plains Unit

From: Larry Ballantyne, Plains Unit Resource Program Manager

Date: July 31, 2012

RE: Thompson Face Timber sale

Primary Objective

The primary objective of the Thompson Face Timber Sale is to harvest approximately 7,000 tons (1.305 MMBF) of sawlogs from Section 26, T24N, R27W, producing and estimated $ 140,000.00 in revenue for the Common School (CS) Trust, plus an additional $ 33,000.00 in Forest Improvement (FI) fees. Timber volume and revenue would contribute to the Northwestern Land Office sale program targets for FY 2013.

Secondary Objectives

Minimize losses in merchantable timber volume resulting from mortality due to highly advanced insect activity and an epidemic level of disease(s) present in the mature timber component found on this section.

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

Management Directives

In planning and preparing this project, management direction of the Montana State Forest Land Management Plan (SFLMP) and associated Administrative Rules shall followed. All applicable Streamside Management Zone (SMZ) rules and regulations will be met. Montana Best Management Practices (BMP) will be applied in all instances. Directives associated with the pending implementation of the Montana Habitat Conservation Plan (HCP) and the Administrative Rules for HCP implementation will be addressed as applicable at the time of project analysis.

CHECKLIST ENVIRONMENTAL ASSESSMENT

Project Name:	**Thompson Face Timber Sale**
Proposed Implementation Date:	July, 2013
Proponent:	Montana Department of Natural Resources and Conservation, Plains Unit
Location:	Section 26, Township 24 North, Range 27 West
County:	Sanders

I. TYPE AND PURPOSE OF ACTION

The Department of Natural Resources and Conservation (DNRC) is proposing to harvest approximately 7,000 tons (1.3 MMBF) of timber in the Thompson River drainage, roughly 25 air miles Northwest of Plains, Montana, in Sanders County. The project would involve ground and cable based harvest systems, mechanical slash piling and slash pile burning over 165 acres. This action would produce an estimated $140,000.00 for the Common Schools (CS) Trust Grant, and approximately $33,000.00 in Forest Improvement Fees. The proposed action would reduce fuel loading and related wildfire risk, maintain and improve forest health, promote historic timber types and increase forest productivity beneficial to future trust actions

The proposed action would include approximately 1.1 miles of new road construction and approximately 0.5 miles of existing road reconditioning. Additionally, approximately 14.6 miles of existing system roads would be maintained and improved as needed to meet Forestry Best Management Practices (BMPs). For more specific project information refer to 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).
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.

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. List number of individuals contacted, number of responses received, and newspapers in which notices were placed and for how long. Briefly summarize issues received from the public.

Public comment and involvement was solicited in the follow ways:

- July, 2012: Scoping letters were sent to adjacent landowners and interested parties for a complete list of individuals and groups that received scoping notices, refer to the project file at the Plains Unit.
- July, 2012: Newspaper advertisements ran in the Sanders County Ledger, the Clark Fork Valley Press, and the Missoulian.
- DNRC foresters and specialists visited the project site throughout the 2012 field season.

From these solicitations for comment, the following comments or issues were received and assisted in defining issues surrounding the proposed project:

- Concern regarding fire hazard from dead trees, no concerns over proposed timber harvest: Glen Cavanough.
- Comments regarding proximity to cabin sites, no additional concern over timber harvest: Katie Rosenow and Patrick Fitzimmor.

In addition to the above listed comments, the following individuals or groups submitted statements of support regarding the proposed project.

- Sanders County Board of Commissioners
- FH Stoltze Land and Lumber Company
- Ed Benton

DNRC specialists and foresters identified hydrological, soils, wildlife, cultural and vegetative concerns for the Action Alternative as well as 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:

Examples: cost-share agreement with U.S. Forest Service, 124 Permit, 3A Authorization, Air Quality Major Open Burning Permit.

Incidental Take Permit – U.S. Fish and Wildlife Service

DNRC is managing the habitats of threatened and endangered species on this project by implementing the Montana DNRC Forested Trust Lands Habitat Conservation Plan (HCP) and the associated Incidental Take Permit (Permit) that was issued by the United States Fish & Wildlife Service (USFWS) in February of 2012 under Section 10 of the Endangered Species Act. The HCP identifies specific conservation strategies for managing the habitats of grizzly bear, Canada lynx, and three fish species: bull trout, westslope cutthroat trout, and Columbia redband trout. This project complies with the HCP. The HCP can be found at www.dnrc.mt.gov/HCP.

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. ALTERNATIVE DEVELOPMENT:
Describe alternatives considered and, if applicable, provide brief description of how the alternatives were developed. List alternatives that were considered but eliminated from further analysis and why.

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 management activity would occur. No timber harvesting 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 direct, indirect, and cumulative effects 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 direct, indirect, and 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 Watershed and 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 (i.e. particulate matter from road use or harvesting, slash pile burning, prescribed burning, etc)? Identify the Airshed and Impact Zone (if any) according to the Montana/Idaho Airshed Group. Identify direct, indirect, and cumulative effects to air quality.

The proposed project is located in Montana State Airshed 2 as designated by the Montana/Idaho Airshed Group. Particulate matter may be introduced into the Airshed from the burning of logging slash. All burning would be conducted following the rules, regulations, and procedures of the DNRC major open burning permit and the Montana/Idaho Airshed Group operations guide.

Impacts are expected to be minor and temporary as all slash burning would be conducted burning on days with good to excellent dispersion when smoke would not be expected to impair visibility. Therefore, 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 direct, indirect, and cumulative effects to vegetation.

Tree removal through timber harvesting would cause changes in the vegetative structure, overall stand age and density of the project area.
Silvicultural prescriptions have been developed to keep stands moving towards desired future conditions (DFC) through the removal of diseased, insect infested, over mature and non-preferred shade tolerant timber species.

No stands in the project area meet the old growth requirements as defined by Green et al. (1992). Therefore no effects to old growth are likely to occur with the action or no action alternative.
No vegetative Species of Concern as identified by the Montana Natural Heritage Program were listed as occurring within Township 24 North, Range 27 West. Therefore, no effects to vegetative Species of Concern are likely to occur from the Action Alternative.

For more information on the vegetation of the project area see: Attachment II, Resource Analyses, Vegetation Analysis. Further 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).

8. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS:

Consider substantial habitat values and use of the area by wildlife, birds or fish. Identify direct, indirect, and cumulative effects to fish and wildlife.

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 Wildlife Analysis and the Fisheries Analysis, no substantial direct, indirect or cumulative impacts to wildlife, birds or fish are expected to result from the implementation of the Action Alternative.

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 direct, indirect, and cumulative effects to these species and their habitat.

"DNRC is managing the habitats of threatened and endangered species on this project by implementing the Montana DNRC Forested Trust Lands Habitat Conservation Plan (HCP) and the associated Incidental Take Permit (Permit) that was issued by the United States Fish & Wildlife Service (USFWS) in February of 2012 under Section 10 of the Endangered Species Act.

The HCP identifies specific conservation strategies for managing the habitats of grizzly bear, Canada lynx, and three fish species: bull trout, westslope cutthroat trout, and Columbia redband trout. This project complies with the HCP. The HCP can be found at www.dnrc.mt.gov/HCP." For more information please refer to Attachment II, Resource Analyses and Attachment IV, Mitigations.

10. HISTORICAL AND ARCHAEOLOGICAL SITES:

Identify and determine direct, indirect, and cumulative effects to historical, archaeological or paleontological resources.

The DNRC Archeologist has been consulted with and supplied the following statement: The DNRC has no record of cultural resources within the project's area of potential effect. However, a professional inventory of cultural resources has not been conducted. If previously unknown, cultural or paleontological materials are identified during project related activities, all work will cease until a professional assessment of such resources can be made.

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 direct, indirect, and cumulative effects to aesthetics.

The project area is visible from the ACM haul road and the Thompson River County Road. Silvicultural prescriptions have been designed to promote historic timber types and emulate natural fire regimes. Any adverse visual impacts are expected to be temporary, as the residual stand and early seral regeneration is expected to fill in canopy openings produced by the project. The adjacent private timber lands have been harvested extensively and the residual stand will likely blend well with the surrounding area. Therefore, direct, indirect, and cumulative effects to aesthetics are expected to be short term and minimal.

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 direct, indirect, and 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.

- Environmental Assessment for the West Prairie Timber Sale, MT DNRC, 2010
- Environmental Assessment for the Big Prairie Timber Sale, MT DNRC, 2004
- Environmental Assessment for the Big Prairie Creek Timber Sale, MT DNRC, 1992

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.

Potential risks to human health and safety are in line with forest industry standards.
Safety on the project area would be monitored throughout the project by Forest Officers and work suspended if unsafe conditions were observed. Warning signs would be placed on open roads and near the project site to warn the public of potential safety concerns.
Human health would not be impacted by the proposed timber sales or associated activity.
Therefore no unusual risks to human health and safety are likely to occur with implantation of the action alternative.

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 Sanders County.

16. QUANTITY AND DISTRIBUTION OF EMPLOYMENT:
Estimate the number of jobs the project would create, move or eliminate. Identify direct, indirect, and cumulative effects to the employment market.

According to Montana Bureau of Business and Economic Research about 10 jobs are supported for one year for every 1 MMBF that is harvested. For this project, that equates to about 20 jobs for one year.

17. LOCAL AND STATE TAX BASE AND TAX REVENUES:
Estimate tax revenue the project would create or eliminate. Identify direct, indirect, and 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 on state or local tax bases 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 direct, indirect, and 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 the designated haul roads and the Thompson River County Road (See attachment 1: Area Maps, Haul Route Map).

Timber harvesting and log hauling is a normal contributor to the traffic and activities of the local area. This traffic increase would be temporary and limited to times when damage to road surfaces would not likely occur. Warning signs would be placed to warn the public of hauling traffic.

Therefore, no effects to the demand for government services would likely occur as a result of this project.

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.

- None applicable.

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 direct, indirect, and cumulative effects to recreational and wilderness activities.

There are no designated wilderness or recreational areas accessed through the project site, although portions of the project area are likely hunted and fished frequently. The residual stand should benefit recreationists by increasing site distances and reducing dead and dying trees. Access through the project site would remain unchanged by the proposed action. Therefore, no effects on recreational and wilderness activities are likely to occur with the implementation of the action alternative.

21. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING:
Estimate population changes and additional housing the project would require. Identify direct, indirect, and 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 to social structures and mores or disruption of native or traditional lifestyles or communities 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 direct, indirect, and cumulative economic and social effects likely to occur as a result of the proposed action.

Estimates of return are 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 7,000 tons (1.3 MMBF) of timber. At an estimated stumpage of $20/ton, and FI rate of $25.13 / MBF, the proposed action would generate an estimated $140,000.00 for the Common Schools (CS) Trust Grant and approximately $33,000.00 in Forest Improvement Fees.
The No Action Alternative does not generate any return to the CS Trust Grant or the FI account at this time.

EA Checklist Prepared By:	**Name:**	Kyle Johnson	**Date:**	February, 2013
	Title:	Management Forester, Plains Unit MT DNRC		

V. FINDING

25. ALTERNATIVE SELECTED:

To meet stated goals and objectives associated with the proposed project, I select the Action Alternative for implementation.

26. SIGNIFICANCE OF POTENTIAL IMPACTS:

Extensive analysis has not shown nor identified significant impacts as likely to occur as a result of implementation of the Action Alternative.

27. NEED FOR FURTHER ENVIRONMENTAL ANALYSIS:

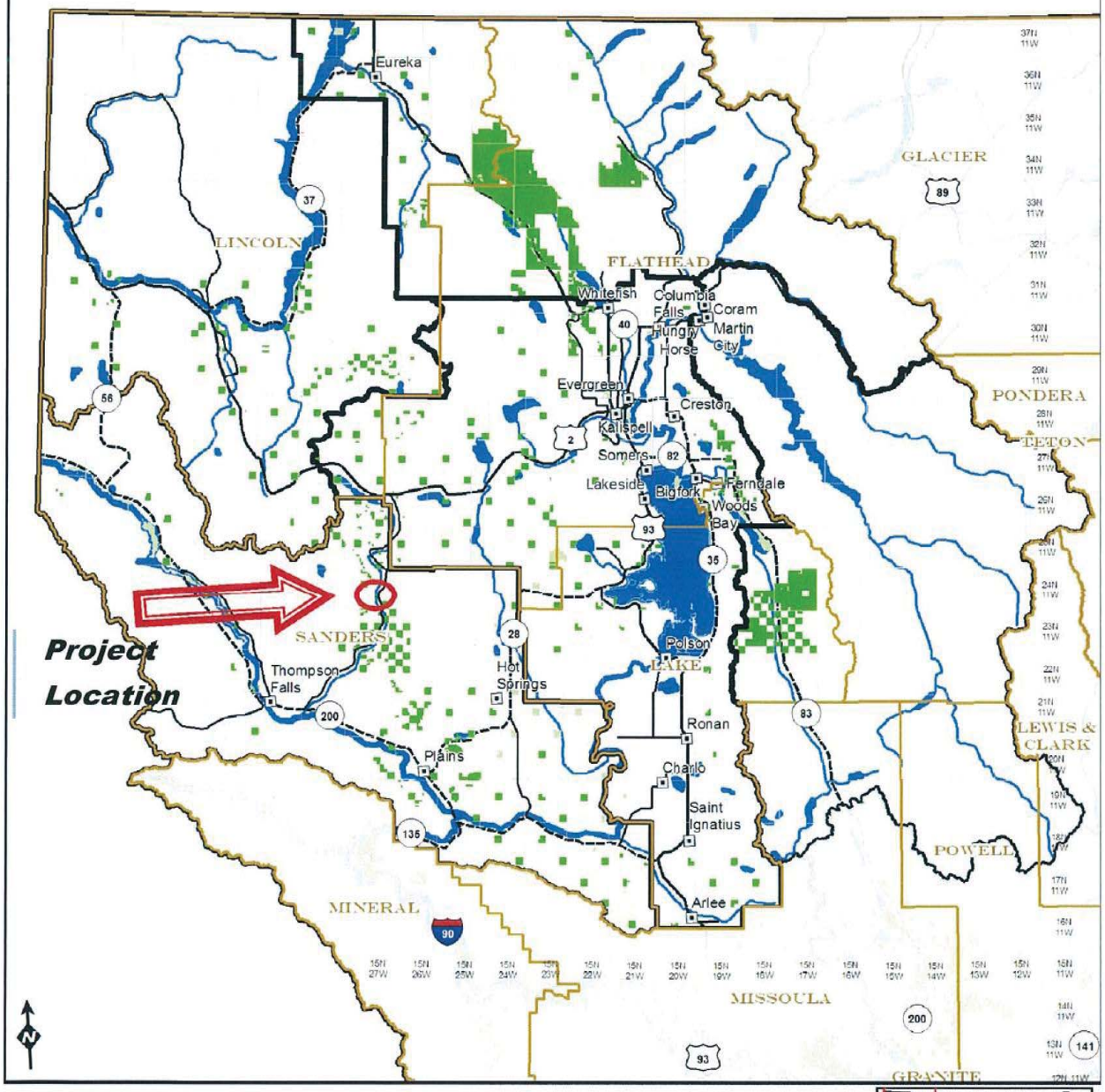
☐	EIS	☐	More Detailed EA	☒	No Further Analysis

EA Checklist Approved By:	**Name:** Larry Ballantyne **Title: Plains Unit Manager**
Signature: /s/ *Larry Ballantyne*	**Date**: March 14, 2013

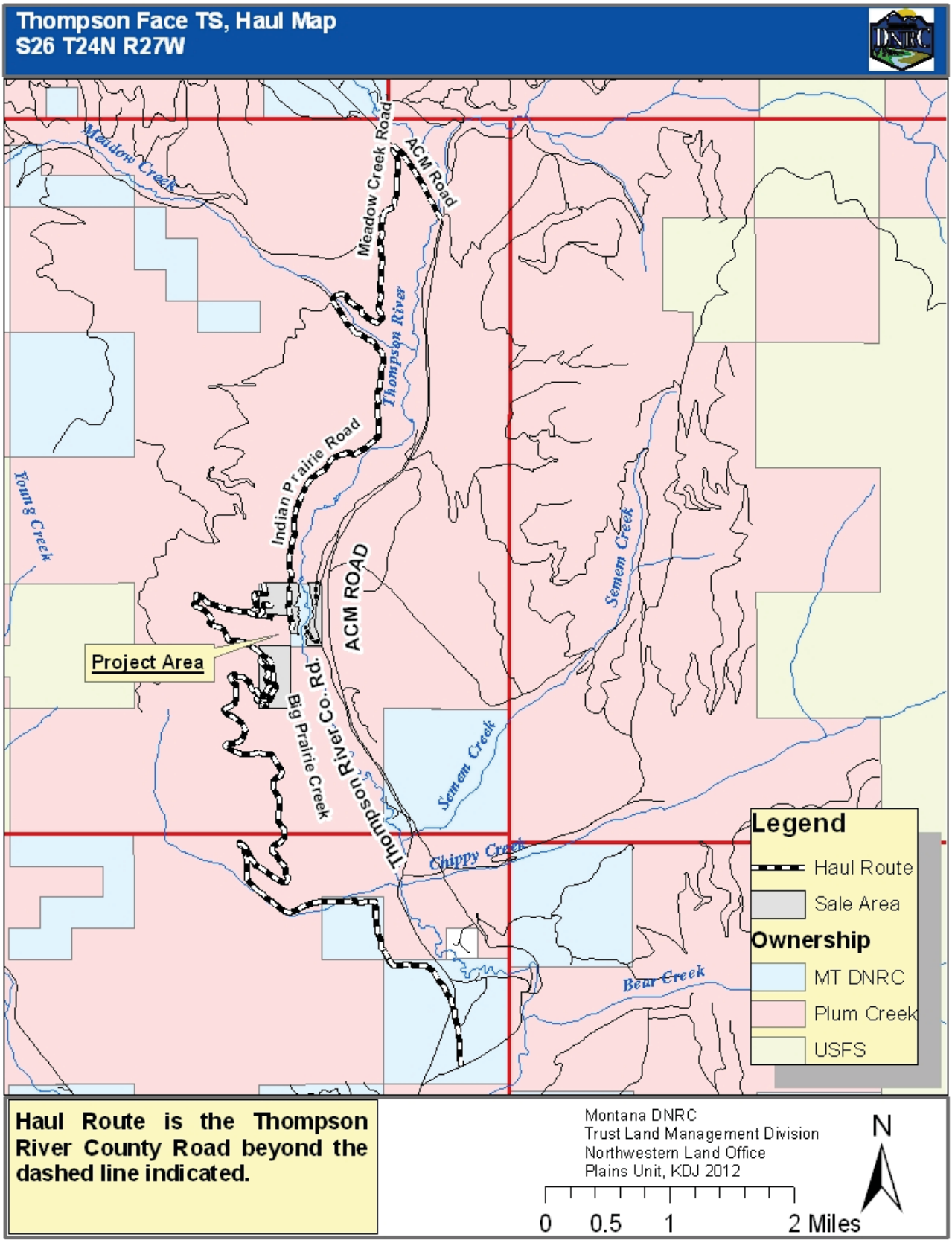
ATTACHMENT I

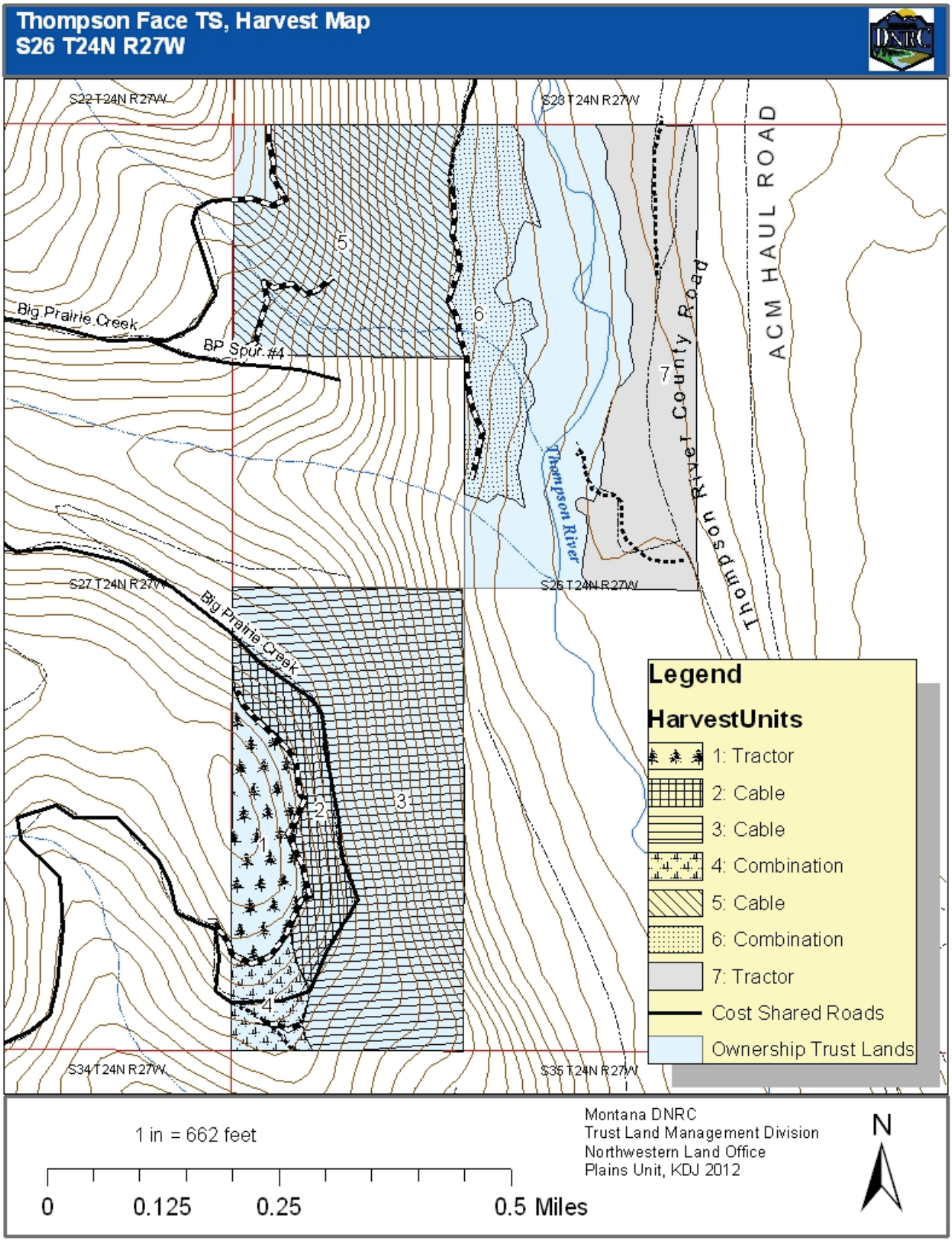
Thompson Face Timber Sale **Attachment A Vicinity Map**

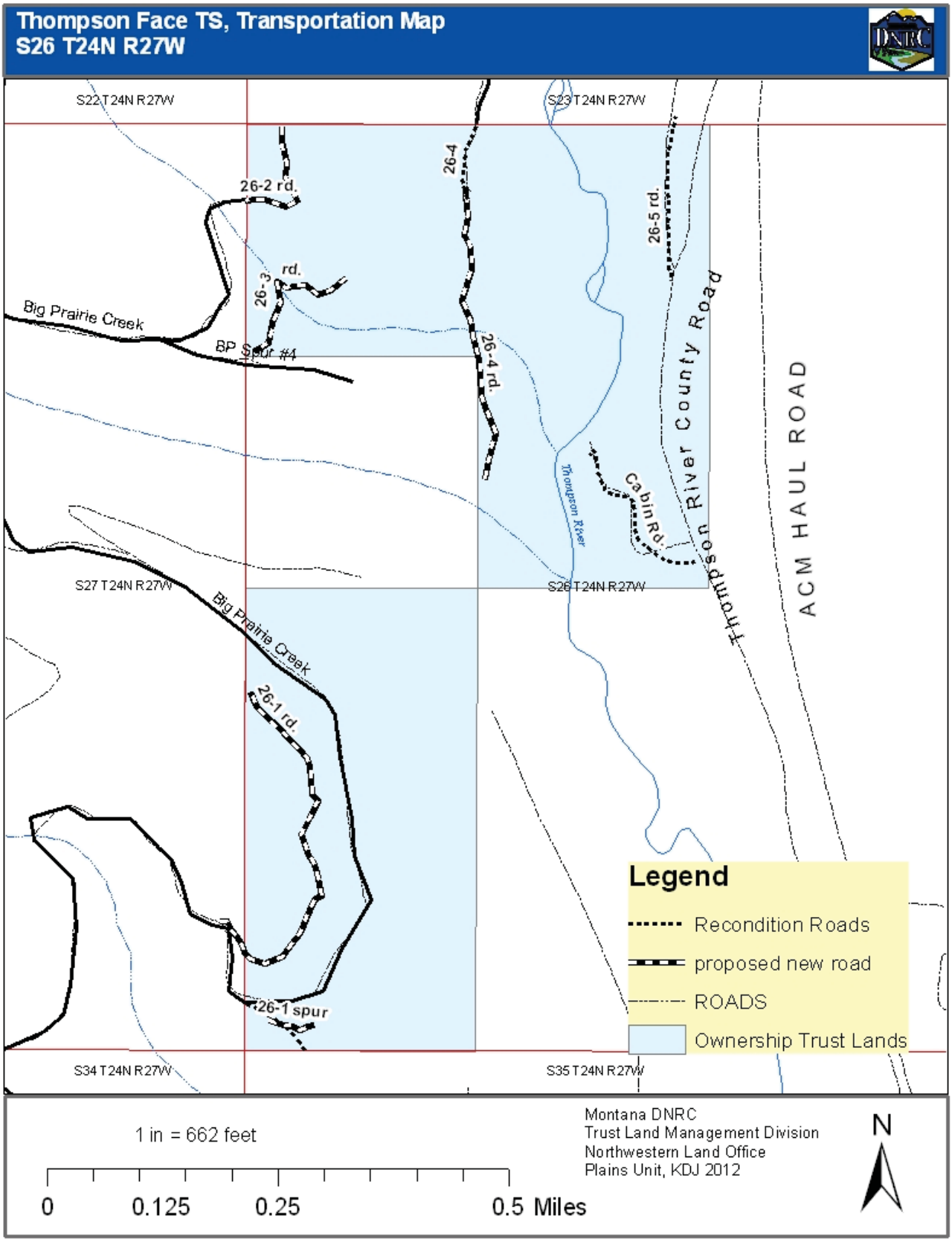
S26, T24N, R27W

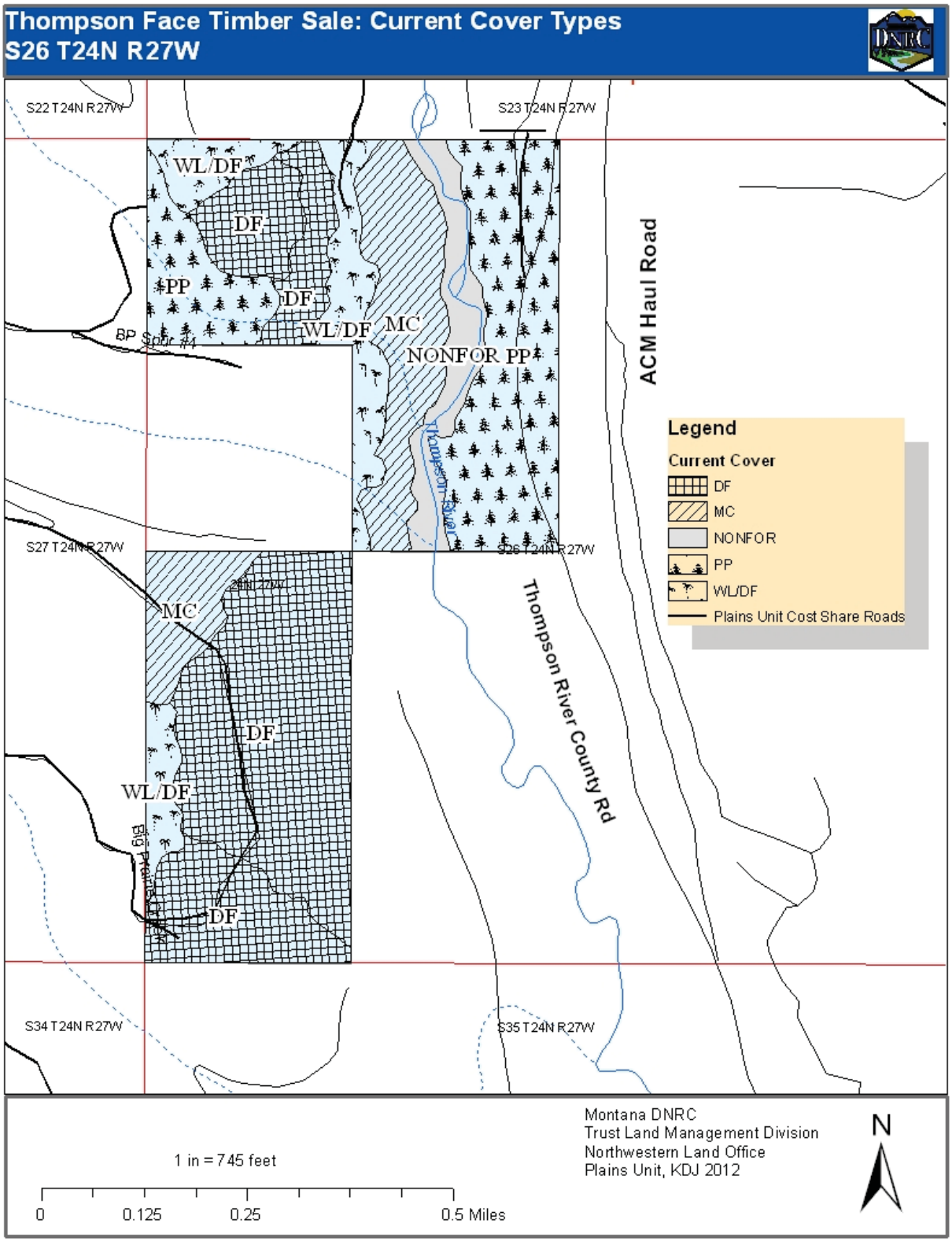


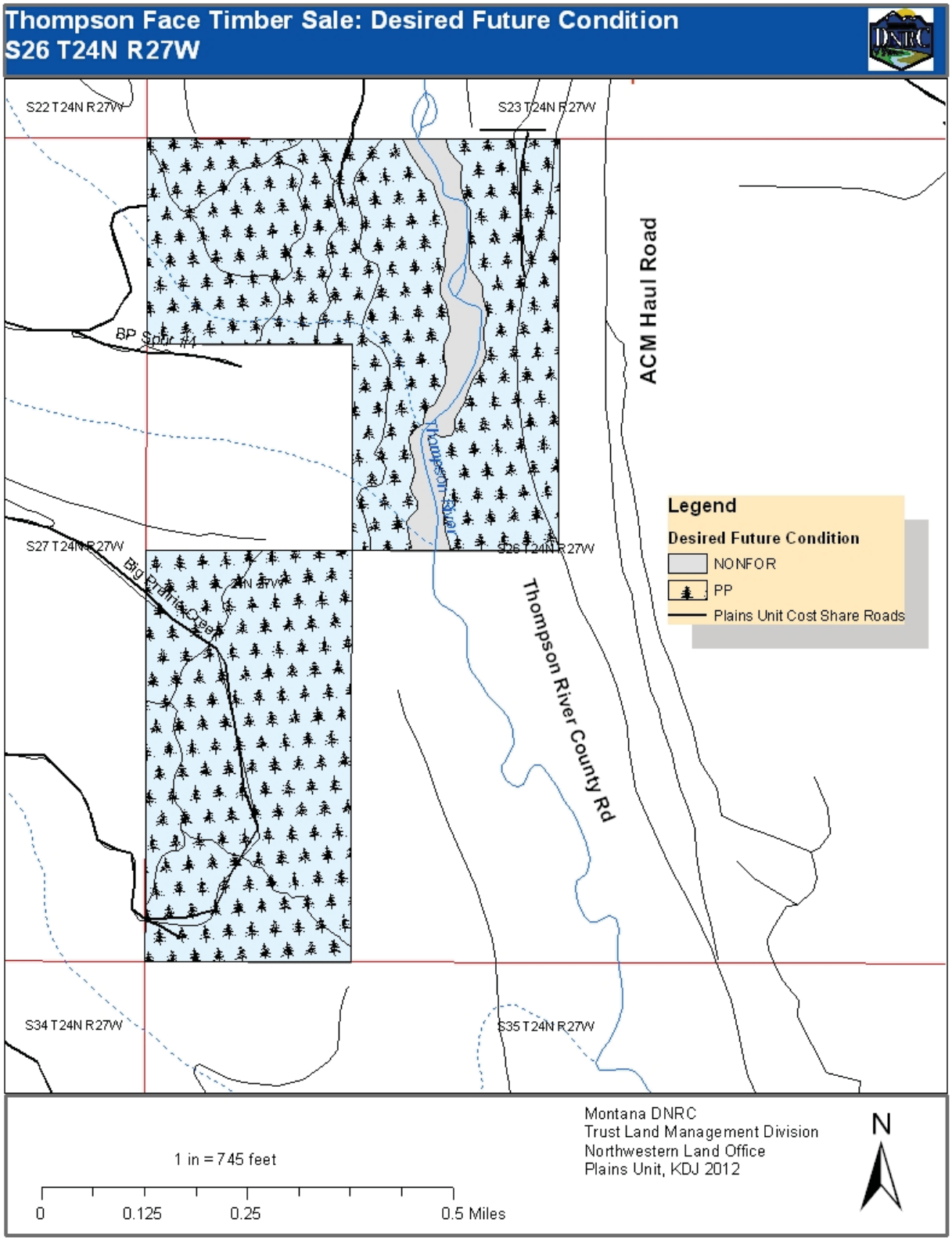
4 June 2012
Montana DNRC
OIT/GIS dr


Thompson Face TS, Haul Map
S26 T24N R27W
Meadow Creek
Meadow Creek Road
ACM Road
Thompson River
Indian Prairie Road
Young Creek
ACM ROAD
Semem Creek
Project Area
Big Prairie Creek
Thompson River Co. Rd.
Semem Creek
Chippy Creek
Bear Creek
Legend
Haul Route
Sale Area
Ownership
MT DNRC
Plum Creek
USFS
Haul Route is the Thompson River County Road beyond the dashed line indicated.
Montana DNRC
Trust Land Management Division
Northwestern Land Office
Plains Unit, KDJ 2012
0 0.5 1 2 Miles
N


Thompson Face TS, Harvest Map
S26 T24N R27W
S22 T24N R27W
S23 T24N R27W
S27 T24N R27W
S26 T24N R27W
S34 T24N R27W
S35 T24N R27W
ACM HAUL ROAD
Thompson River County Road
Thompson River
Big Prairie Creek
BP Spur #4
Big Prairie Creek
1
2
3
4
5
6
7
Legend
HarvestUnits
1: Tractor
2: Cable
3: Cable
4: Combination
5: Cable
6: Combination
7: Tractor
Cost Shared Roads
Ownership Trust Lands
1 in = 662 feet
0
0.125
0.25
0.5 Miles
Montana DNRC
Trust Land Management Division
Northwestern Land Office
Plains Unit, KDJ 2012
N


Thompson Face TS, Transportation Map
S26 T24N R27W
S22 T24N R27W
S23 T24N R27W
S27 T24N R27W
S26 T24N R27W
S34 T24N R27W
S35 T24N R27W
26-2 rd.
26-3 rd.
26-4
26-4 rd.
26-5 rd.
26-1 rd.
26-1 spur
Big Prairie Creek
BP Spur #4
Thompson River
Cabin Rd.
Thompson River County Road
ACM HAUL ROAD
Legend
Recondition Roads
proposed new road
ROADS
Ownership Trust Lands
1 in = 662 feet
0
0.125
0.25
0.5 Miles
Montana DNRC
Trust Land Management Division
Northwestern Land Office
Plains Unit, KDJ 2012
N


Thompson Face Timber Sale: Current Cover Types
S26 T24N R27W
S22 T24N R27W
S23 T24N R27W
S27 T24N R27W
S26 T24N R27W
S34 T24N R27W
S35 T24N R27W
WL/DF
DF
PP
DF
WL/DF
MC
NONFOR
PP
MC
DF
WL/DF
DF
BP Spur #1
Big Prairie Rd
Thompson River
ACM Haul Road
Thompson River County Rd
Legend
Current Cover
DF
MC
NONFOR
PP
WL/DF
Plains Unit Cost Share Roads
1 in = 745 feet
0
0.125
0.25
0.5 Miles
Montana DNRC
Trust Land Management Division
Northwestern Land Office
Plains Unit, KDJ 2012
N


Thompson Face Timber Sale: Desired Future Condition
S26 T24N R27W
S22 T24N R27W
S23 T24N R27W
S27 T24N R27W
S26 T24N R27W
S34 T24N R27W
S35 T24N R27W
ACM Haul Road
Thompson River County Rd
BP Spur #1
Big Prairie Creek
Thompson River
Legend
Desired Future Condition
NONFOR
PP
Plains Unit Cost Share Roads
Montana DNRC
Trust Land Management Division
Northwestern Land Office
Plains Unit, KDJ 2012
1 in = 745 feet
0
0.125
0.25
0.5 Miles
N

Attachment II

Vegetation Analysis
For the
Thompson Face Timber Sale

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 initial project development, public comment was solicited via scoping letters and newspaper advertisements. The following issue statements were developed from concerns raised by DNRC specialists and public comments received during scoping and will be addressed in the following analysis:

1. Concern for maximizing the return to the Common Schools Trust fund by intensively managing for healthy and biologically diverse forests.
2. Concern about minimizing losses in timber volume from mortality due to insect and disease outbreaks, thereby improving forest health and reducing wildfire susceptibility.
3. Concern regarding the continued presence and / or re-establishment of desired future conditions (DFC) and historically appropriate timber types on Trust Lands.

Analysis Area
The analysis area for direct and indirect effects is referred to as the project area, and consists of the 201 acres of state ownership within Section 26**,** T24N, R27W. This parcel is located approximately 24 air miles northeast of Plains, Montana, in Sanders County. The beneficiary for this parcel is the Common Schools (C.S.) Trust Grant. Cumulative impacts are considered at the scale of the Plains Unit**.**

Analysis Method
The Plains Unit typically prepares two to four timber sale projects per year. Each proposed project is evaluated for its potential effects on lands managed by the DNRC and the surrounding landscape.
Methods used to prepare the analysis include:

- Review of stand level inventory (SLI) data
- field visits by project leaders
- review of scientific literature
- review of aerial photography
- consultation and field visits with other professionals.

Existing Condition

Stand History and Past Management

Section 26, T24N R27W.

According to section records for this parcel, past management activities in the project area include limited timber harvesting. The first recorded timber harvest occurred in 1980, when approximately 50 MBF of dead timber was removed. The following year, in 1981 approximately 55 MBF of green timber was removed. Both of these small harvesting operations appear to have occurred in the portion of the project area that is east of the Thompson River. The portion of the project area west of the Thompson River shows signs of past logging in the form of large old stumps; however no records exist for this activity. Judging by the decay of the stumps and the age of current stand this harvest likely occurred 60 – 70 years ago. This logging appears to have

been limited to a few acres near the river could be tractor skid; there are no indications of past logging on the steep slopes which make up the majority of the stand.
The stand bisected by the Thompson River county road also appears to have had extensive firewood cutting, as there are very limited snags in the area.

Current Cover Types, Age Classes, and Stand Structure

Current conditions are described by DNRC's 2012 SLI for the Plains Unit, and verified by field visits by DNRC Foresters.

The project area is comprised of 12 Stand Level Inventory (SLI) stands and is characterized by the following forest current cover types according to the SLI database: (See Attachment I: Area Maps, Current Cover Types).

Current Cover Type	Percent of project area
Douglas-fir	40%
Ponderosa pine	26%
Mixed Conifer	16%
Western larch / Douglas-fir	12%
Non-forested	7%

As described above, a large portion of the project area is classified as Douglas-fir and western larch/Douglas-fir current cover type. These stands consist of an overstory of dominant and co-dominant Douglas-fir with scattered Western larch and ponderosa pine. In these stands, there is wide spread Douglas-fir mortality as much of the current overstory is succumbing to Douglas-fir beetle (*Dendroctonus pseudotsugae*) and western spruce budworm (*Choristoneura occidentalis*). The Western larch and ponderosa pine is relatively healthy, besides the occasional diseased individual. The overstory tree ages range from 100 – 150 years with scattered relics greater than 200 years. Overstory tree diameters range from 12 – 24" averaging 15" DBH. Overstory tree heights range from 75' – 110' averaging 90'. The understory and established regeneration is limited almost entirely to Douglas-fir and grand fir in pockets, indicative of the nearly complete canopy closure.

The potions of the project area classified as a ponderosa pine current cover type consist of an overstory of dominant and co-dominant western larch and Douglas –fir with ponderosa pine scattered throughout. Overstory tree ages range from 100 – 150 years with scattered individuals greater than 200 years. Overstory tree diameters range from 10 – 31" DBH and average 13". Tree heights range from 65 – 110 feet and average 90 feet. The midstory is comprised of Lodgepole pine, Douglas-fir and grand fir. Midstory tree heights range from 50 – 75 feet, diameters range from 6 – 10" DBH. The understory regeneration is comprised mainly of lodgepole pine, grand fir and Douglas-fir.

The potions of the project area classified as a mixed conifer current cover type consist of an overstory of dominant and co-dominant Engelmann spruce, grand fir, western larch and Douglas –fir with few scattered ponderosa pine. Overstory tree ages range from 100 – 150 years with scattered individuals greater than 200 years. Overstory tree diameters range from 12 – 34" DBH and average 15". Tree heights range from 75 – 120 feet and average 90 feet. The midstory is comprised mainly of shade tolerant species, including Engelmann spruce, Lodgepole pine, Douglas-fir and grand fir. Midstory tree heights range from 50 –65 feet, diameters range from 6 – 10" DBH. The understory regeneration is comprised mainly of grand fir, Engelmann spruce and Douglas-fir.

The portion of the project area classified as Non-forested consists of the Thompson River bed and associated channel.

For more information on individual stands, refer to: Attachment III, Harvest Unit Prescriptions.

Desired Future Conditions (DFC)

The Desired Future Condition (DFC) for all stands in the project area except the Non-forested river bed is Ponderosa Pine (See Attachment I: Area Maps, Desired Future Conditions).

Past and current events have changed the forest conditions on the state owned parcels involved in the project area from 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.

Table V-1:
Table V-1 compares the current cover type distribution and DFC for the project area.
Source: DNRC Stand Level Inventory (SLI) dated 09/24/2012.

Cover Type	Current Acres	DFC Acres	Current minus (-) DFC**
Douglas-fir	81	0	81
Ponderosa pine	51	188	-137
Mixed Conifer	33	0	33
Western larch/Douglas-fir	23	0	23
Non-forested	13	13	0
Grand Total	201	201	
**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.
Source: DNRC Stand Level Inventory (SLI) dated 09/24/2012.

Cover Type	Current Acres	DFC Acres	Current minus (-) DFC**
Douglas-fir	3,645.2	1,567.7	2,077.5
Hardwoods	27.2	143.2	-116
Lodgepole pine	1,601.9	1,676.3	-74.4
Mixed conifer	1,827.1	720.2	1,106.9
Other*	7,530.5	6,196.2	1,334.3
Ponderosa pine	24,627.0	30,382.4	-5,755.4
Subalpine fir	275.4	167.0	108.4
Western larch/Douglas-fir	15,205.9	13,099.5	2106.4
Western white pine	225.7	1,013.0	-787.3
Grand Total	54,965.5	54,965.5	
*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, western larch/Douglas-fir, and mixed conifer are currently over-represented in the project area, while the ponderosa pine DFC is under-represented. 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 white pine are under-represented.

Forest Fuels and Fire Behavior

According to Losensky's "Historical Vegetation of Montana" (1997), the area was historically characterized by frequent, low-intensity wildfires prior to the early 1900's. Since that time fire has been virtually eliminated from the project area, although some small areas within the project area do exhibit fire scars on the trees.

As a result of fire exclusion and a lack of recent management, ladder fuels (fuels that conduct ground fire to the canopy) have increased due to growth of shade tolerant species in the understory. Natural tree mortality due to root disease and endemic insect populations have produced an abundance of dead material in the stand, both standing and downed. Due to the abundance of dead material, and tree stress from root diseases, endemic beetle populations have advanced towards epidemic levels resulting in even greater tree mortality. Thus, the current condition of the stand is at high risk for a catastrophic fire event.

Forest Insects and Disease

The primary insects affecting the project area are: Douglas-fir beetle (*Dendroctonus pseudotsugae)* in the Douglas-fir, and Western Spruce Budworm (*Choristoneura occidentalis)* in the Douglas-fir, spruce, and grand fir. In addition to the insects in the stand, the project area has large areas of root disease. Stands such as this with dense stands of aging Douglas-fir are at high risk for bark beetle infestation. Compounding that, trees weakened by root disease are commonly killed by bark beetles adding to the mortality in the stand. Stands with multi-storied stands of Douglas-fir and true firs such as grand fir, are at greatest risk of infestation by Western Spruce bud worm.

These insect populations will likely continue to increase and advance through the stand, unless management to mimic historic fire regimes and selection of non-preferred species such as ponderosa pine and western larch is implemented.

Noxious weeds

Noxious weeds are present in the project area, mainly along the roads. The primary noxious weed in the project area is spotted knapweed (*Centaurea maculos*), although others are likely to exist, especially along the Thompson River county road.

Direct and Indirect Effects

No Action Alternative

Issue 1: Concern for maximizing the return to the Common Schools Trust fund by intensively managing for healthy and biologically diverse forests.

No forest management activities would occur under this alternative and no returns for the CS Trust Grant or the Forest Improvement (FI) account would be generated. Forest health and biodiversity can be expected to decline as successional climax conditions are realized in the project area.

Issue 2: Concern about minimizing losses in timber volume from mortality due to insect and disease outbreaks, thereby improving forest health and reducing wildfire susceptibility.

Tree mortality due to insects and diseases present in the project area would continue to persist and increase. Current bark beetle populations will continue to advance towards epidemic levels due to over stocking and favorable conditions for beetles. The susceptibility of the stand to wildfire would continue to increase as the canopy becomes more closed in and growth of shade tolerant regeneration creates ladder fuels. Trees

killed by the various insects and diseases present in the stand would add to the wildfire risk, providing readily available fuels in the canopy. As the dead trees fall the fuel loading in the stand would increase causing more risk that a low intensity ground fire could spread into the canopy and become a catastrophic stand replacing fire event.

Issue 3: Concern regarding the continued presence and / or re-establishment of desired future conditions (DFC) and historically appropriate timber types on Trust Lands.

Timber types would continue to advance towards climax conditions with shade tolerant Douglas-fir, and grand fir 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.(*Pfister et al 1977)* In places, these species have already begun to become dominant and are replacing the historic timber types and preferred DFC species of ponderosa pine, in the overstory. Growth and vigor of trees present in the analysis area would continue to decline as competition increases with canopy closure.

Action Alternative

Issue 1: Concern for maximizing the return to the Common Schools Trust fund by intensively managing for healthy and biologically diverse forests.

The proposed action alternative would harvest timber on approximately 165 acres. Harvesting would focus on removal of dead and dying timber as well as diseased, suppressed, poorly formed and shade tolerant species. Harvest prescriptions would be designed to emulate historic fire regimes and encourage natural regeneration of historic timber types and desired future condition species. The proposed project area would be evaluated to determine the need for supplemental planting within 5 years of harvest.

Issue 2: Concern about minimizing losses in timber volume from mortality due to insect and disease outbreaks, thereby improving forest health and reducing wildfire susceptibility.

The current activity of insects and disease would be reduced by removal of infected and infested timber and converting the project area to a stand that is not desirable to insects. Retention of healthy individuals would continue to provide healthy and disease resistant natural regeneration on the site. Growth and vigor of the residual stand would be expected to increase as residual tree spacing would allow full light to crowns and more available water. Additionally the healthier, more open residual stand would be more resistant to future beetle infestation and disease outbreaks (*Hagle et al).*
Wildfire susceptibility would be expected to decrease through harvest activities and removal of dead and dying timber. Available fuel 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.

Issue 3: Concern regarding the continued presence and / or re-establishment of desired future conditions (DFC) and historically appropriate timber types on Trust Lands.

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.

Cumulative Effects

No Action Alternative

Issue 1: Concern for maximizing the return to the Common Schools Trust fund by intensively managing for healthy and biologically diverse forests.

No forest management activities would occur under this alternative, no returns for the CS trust grants or the Forest Improvement (FI) account would be generated. Forest health and biodiversity across the Plains Unit can be expected to decline slightly.

Issue 2: Concern about minimizing losses in timber volume from mortality due to insect and disease outbreaks, thereby improving forest health and reducing wildfire susceptibility.

Stand structure and species composition on state land across the Plains Unit will shift slightly towards a shade tolerant, climax condition. Fuel loadings and wildfire risk are expected to gradually increase due to tree mortality from insects and disease outbreaks.

Issue 3: Concern regarding the continued presence and / or re-establishment of desired future conditions (DFC) and historically appropriate timber types on Trust Lands.

Across the Plains Unit there would be a shift away from DFC's and towards climax conditions. A gradual loss of early successional timber types can be expected.

Action Alternative

Issue 1: Concern for maximizing the return to the Common Schools Trust fund by intensively managing for healthy and biologically diverse forests.

The proposed action alternative would harvest timber on approximately 165 acres. The proposed action would produce an estimated $140,000.00 for the Common Schools (CS) Trust Grants at an estimated stumpage of $20.00 per ton. Forest Improvement fees collected in association with the proposed action would total approximately $25,000.00. Harvesting would focus on removal of dead and dying timber as well as diseased, suppressed, poorly formed and shade tolerant species. Forest composition and biodiversity would be expected to improve slightly across the Plains Unit.

Issue 2: Concern about minimizing losses in timber volume from mortality due to insect and disease outbreaks, thereby improving forest health and reducing wildfire susceptibility.

Across the Plains Unit, forest health would be improved and the instance of insects and disease mortality would be decreased. Endemic bark beetle and defoliator populations will persist but advancement towards epidemic levels is expected to slow with active management. A gradual decrease in wildfire risk is expected.

Issue 3: Concern regarding the continued presence and / or re-establishment of desired future conditions (DFC) and historically appropriate timber types on Trust Lands.

Across the Plains Unit there would be a slight shift towards DFC's as the proposed treatment and implementation of current and future timber sales on the Plains Unit would alter cover types toward DFC.

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WATERSHED AND HYDROLOGY ANALYSIS
FOR THE
THOMPSON FACE TIMBER SALE

INTRODUCTION

Project Area and Project Activities

The gross project area includes 201 acres of Trust Lands near Plains, Montana. Affected watersheds include unnamed tributaries to the Thompson River. These parcels are within the Thompson River watershed. The Thompson River flows through a portion of the proposed project area. In addition, one class 1 stream contributes surface flow to the Thompson River. The remainder of the streams and draws become subsurface prior to reaching the Thompson River. The project area is adjacent to land managed by Plum Creek Timber Company. Proposed project activities would include ground based and cable yarding methods to harvest timber on approximately 165 acres within the project area.

Resource Description

Resources potentially at risk in the project area include:

- increased water yield
- increased sediment delivery.

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

Issues and Measurement Criteria

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

Sediment Delivery

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

Measurement Criteria: Sediment from roads, harvesting activities and vegetative removal will be analyzed qualitatively through data collected during past statewide and DNRC internal BMP field reviews.

Water Yield

Water yield can be affected by timber harvesting and associated activities by affecting the timing, distribution and amount of water yield in a harvested watershed. Water yields increase

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

Measurement criteria: The water yield increase for the project area streams was determined using field review and aerial photo interpretation. Visual inspection of the runoff patterns and stream channel stability within the Thompson Face project area were used to assess the impacts of past management to water yield. Aerial photo interpretation was used to determine the extent of past management in these watersheds.

Analysis Area

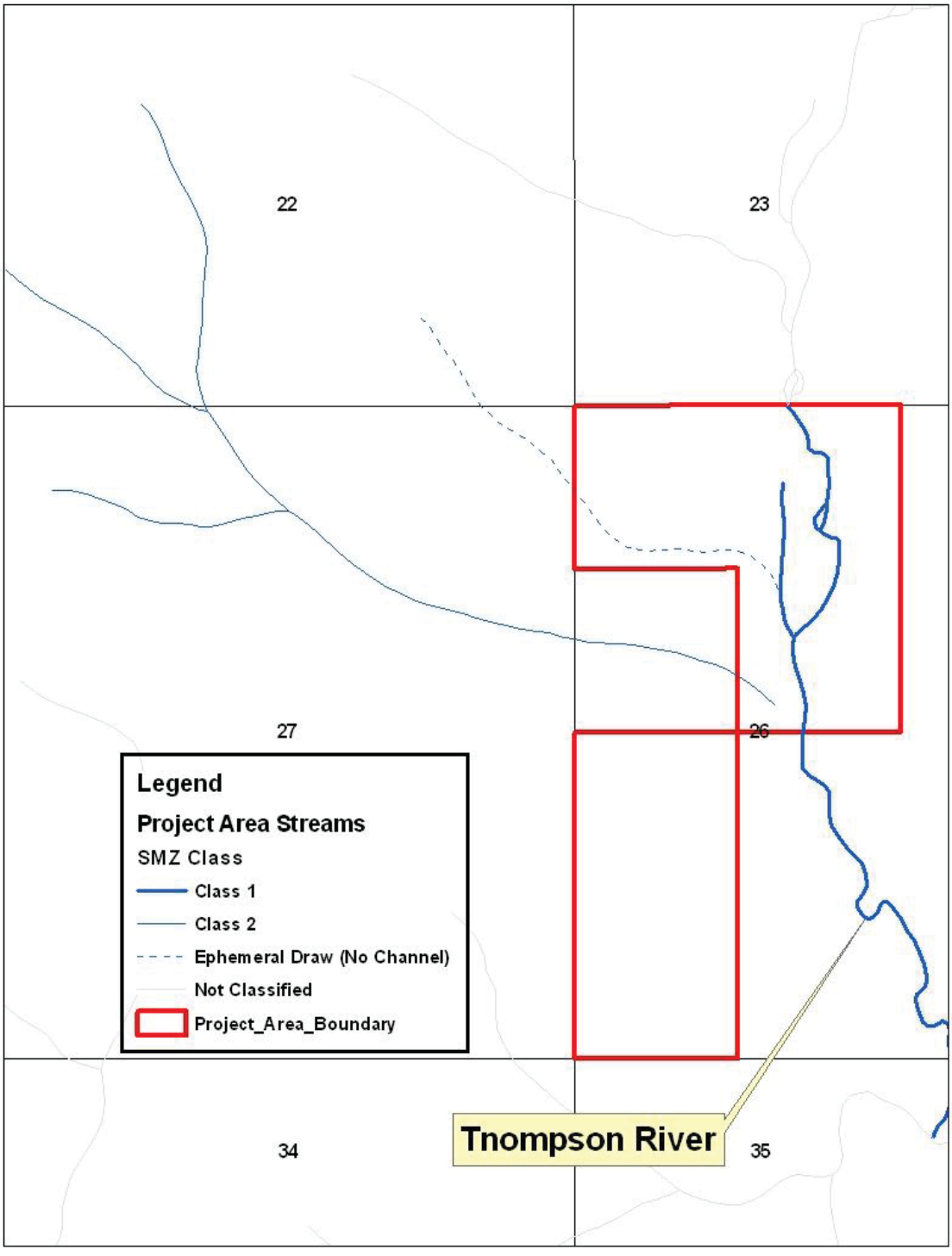
Sediment Delivery

Analysis area for direct, indirect and cumulative effects to sediment delivery will be analyzed on all existing roads in and leading to the proposed project area. Sediment delivery will be analyzed qualitatively where stream crossings exist within the proposed project area using visual inspection and lineal measurement to determine the road surface area delivering to a stream. Additional sites on proposed haul routes located outside the project area will be assessed qualitatively for their potential to affect downstream water.

Water Yield

Direct, indirect and cumulative effects to water yield will be analyzed in the stream systems within the project area. A map of the project area and the streams found within the project area is found in ***Figure H-1***. All existing activities on all ownership and proposed activities related to the Thompson Face project will be analyzed using methods described above. These drainages were chosen as an appropriate scale of analysis, and will effectively display the estimated impacts of proposed activities.

Figure H-1 – Thompson Face Project Area Streams



EXISTING CONDITIONS

Regulatory Framework

Montana Surface Water Quality Standards: According to ARM 17.30.607 (1) (a), the Clark Fork River drainage and its tributaries, including the Thompson River and its tributaries, is classified as B-1. Among other criteria for B-1 waters, no increases are allowed above naturally occurring levels of sediment, and minimal increases in turbidity. "Naturally occurring," as defined by ARM 17.30.602 (19), includes conditions or materials present during runoff from developed land where all reasonable land, soil and water conservation practices (commonly called BMPs) have been applied. Reasonable practices include methods, measures or practices that protect present and reasonably anticipated beneficial uses. These practices include, but are not limited to, structural and non-structural controls and operation and maintenance procedures. Appropriate practices may be applied before, during, or after completion of activities that may impact the resource.

There is one surface water right within the proposed project area and 4 others within 1 mile downstream from the proposed project area. Each of these water rights is for livestock watering.

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

Water Quality Limited Waterbodies:
The Thompson River is listed as fully supporting all beneficial uses in the *2012 Montana's Water Quality Integrated Report (305b)* publication produced by the Montana Department of Environmental Quality (DEQ, 2010). This list is compiled by the Montana Department of Environmental Quality (DEQ) as required by Section 303(d) of the Federal Clean Water Act and the Environmental Protection Agency (EPA) Water Quality Planning and Management Regulations (40 CFR, Part 130).

Montana Streamside Management Zone (SMZ) Law:
For a map of the streams and their SMZ classification, please refer to ***Figure H-1***. By the definition in ARM 36.11.312(3), the stream flowing through the northwest corner of the proposed project area and the Thompson River will be treated as class 1 streams since they flow more than 6 months per year, the small stream contributes flow to the Thompson River and the Thompson River flows perennially, contains fish and contributes flow to the Clark Fork River. To the west of these streams, there is a class 2 stream (ARM 36.11.312(4)) that has a defined channel, flows more than 6 months per year, but does not contribute surface flow to another stream. All other drainage features found within the proposed project area did not meet the definition of a stream in ARM 36.11.312(20), and are classified as ephemeral draws and swales with no defined channel.

Sediment Delivery
Sediment delivery on this parcel was reviewed by a DNRC hydrologist in 2012. Three stream channels were identified in this section. In the northwest portion of the project area is a perennial class 1 stream with an approximately 3-foot bankfull width. The stream was classified as a B4/5 channel using a classification system developed by *Rosgen* (*1996*). Channel types rated as "B" are typically in the 2- to 4-percent gradient range, and have a moderate degree of meander (sinuosity). Channel-bed materials in B4/5 types are mainly gravel and coarse sand. No areas of unstable or actively down-cut channels were identified during field reconnaissance. Large woody debris was found in adequate supply to support channel form and function. Woody material in a stream provides traps for sediment storage and gradient breaks to reduce erosive energy and work as flow deflectors to reduce bank erosion. No evidence of past SMZ harvesting was found.

There is an unnamed stream to the south of the stream described in the previous section that flows perennially, but all flow and evidence of a channel disappear approximately 300 feet before the channel would reach the Thompson River. This is a class 2 stream, and has a 5-foot bankfull channel width. The channel has a boulder/cobble bottom. No areas of channel instability or active down-cut channels were found during field review, and no in-channel sources of sediment were found.

Finally, the Thompson River is a class 1 stream flowing through the northern portion of the project area. The bankfull width of this channel is approximately 100-150 feet where it runs through the project area. There is a well established flood plain with overflow channels that are accessed annually during high runoff. The Thompson River is classified as a C3 channel using a classification system developed by *Rosgen* (*1996*). Channel types rated as "C" are typically in the 1- to 2-percent gradient range, and have a high degree of meander (sinuosity). Channel-bed materials in B3 types are mainly cobble with some gravel and coarse sand. The Thompson River is stable, and its banks and flood plain are well vegetated with grass/forbs and brush species. No areas of unstable or actively down-cut channels were found during field review, and no in-channel sources of sediment were found.

An existing stream crossing along the proposed haul route to the north of the project area, located in section 11, is undersized and creating in-channel erosion. The crossing is on Meadow Creek, and located on a reach that is dry except during spring runoff. The structure consists of two 36" round culverts placed side by side. Flow constriction has caused a gravel bar to form upstream from the crossing, and a large scour hole to form below the outlet.

No sediment delivery from the existing road system was identified on any of the proposed haul routes within or leading to the project area. The existing road system in the proposed project area is low to moderate standard native-surfaced road, and most reaches meet applicable best management practices for surface drainage and erosion control. Most road grades are generally under 8%. The road system was constructed to access timber harvesting by the Plum Creek Timber Company during past entries. Most of these roads are moderate standard, are built on gentle to moderate grades, and are not causing active erosion or sediment delivery to streams.

Water Yield

No water yield impacts were identified from past activities in and around this portion of the Thompson River drainage. Past management activities include timber management and cattle grazing. These activities have led to reductions in forest canopy cover, and construction of roads.

Following field reconnaissance of these parcels, it was determined that a detailed water yield analysis would not be necessary for this project. Most stream channels, where they exist, become subsurface and do not contribute to other streams or bodies of water. In addition, the watersheds that contain the project area parcels are less than 1,000 acres. The ECA method, outlined in Haupt (1976), is designed for watersheds in the 5,000 to 50,000 acre range. All stream channels identified within the proposed project area were stable and showing no signs of impacts from water yield increases. None of the broad ephemeral draws within the proposed project area have any evidence of overland flow (channel scour, re-alignment of litter, definable banks). As a result, annual water yield and peak flow increases resulting from past activities have not been sufficient to extend scoured channels or lead to surface water delivery to downstream waters. After evaluating the watershed cumulative effects risks along with the current conditions in the Thompson Face parcels, by ARM 36.11.423, a detailed watershed analysis is not needed in this parcel.

DIRECT AND INDIRECT EFFECTS

No Action Alternative

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

Action Alternative

The proposed action alternative would harvest timber from approximately 165 acres. The following are the anticipated direct and indirect impacts:

Sediment Delivery

The action alternative would maintain and improve erosion control and surface drainage on all roads proposed for haul. In addition, replacement of the double culvert crossing along the proposed haul route with a properly sized structure would reduce the erosive power of the stream near the crossing site and would reduce in-channel sediment at this site. In addition, the action alternative proposes to construct approximately 1.1 miles of new road. None of the proposed road construction would cross a stream. Short-term risk of low levels of erosion and deposition would be increased for approximately 2 to 3 years after completion due to exposure of bare soil during construction, surface drainage improvement and hauling activities. This risk would return to near current levels as road surfaces and cut and fill slopes re-vegetate. Overall, there is a low risk of short-term low-level increase in erosion and sediment delivery for about 2-3 years at the new and existing stream crossings. However, water quality standards are expected to be met and there is a low risk of impacts to downstream beneficial uses.

Most of the proposed timber harvesting activities would pose a low risk of sediment delivery to streams since they are located away from streams and do not propose harvesting within the SMZ, riparian management zone (RMZ) or within the channel migration zone (CMZ). The SMZ law, Administrative Rules for Forest Management, DNRC Habitat Conservation Plan and applicable BMPs would be applied to all harvesting activities, which would minimize the risk of sediment delivery to draws and streams. The Montana BMP audit process has been used to evaluate the application and effectiveness of forest-management BMPs since 1990; this process has also been used to evaluate the application and effectiveness of the SMZ Law since 1996. During that time, evaluation of ground-based-skidding practices near riparian areas has been rated 92-percent effective, and these same practices have been found effective over 99 percent of the time from 1998 to present (*DNRC 1990 through 2012*). Since 1996, effectiveness of the SMZ width has been rated over 99 percent (*DNRC 1990 through 2012*). As a result, with the application of BMPs and the SMZ Law, proposed activities are expected to have a low to moderate risk of low impacts to sediment delivery.

Water Yield

No measurable impacts to water yield are anticipated in this project area from the proposed harvesting for the following reasons: 1) The well-drained to excessively well-drained nature of the soils would absorb additional available moisture and not produce increased surface runoff, and would in turn produce little or no detectable change in water yield from upland sites, 2) Flows in the class 1 and class 2 streams are stable, the channels have not shown increased lateral or vertical erosion that could be attributed to increased flows, 3) The other streams and ephemeral draws within this parcel are stable and vegetated with a dense mat of grass and forbs vegetation, making them capable of handling potential water yield increases without destabilizing.

CUMULATIVE EFFECTS

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

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

Sediment Delivery
Risk of sediment delivery and sediment loading to the Thompson River and waters downstream from the proposed project area would be slightly increased from current levels in the short term and below current levels in the long term. Maintenance and improvement of existing erosion control and surface drainage on the existing road system would yield similar erosion rates to current levels. Replacement of the double culvert crossing on Meadow Creek would decrease the sediment loading to Meadow Creek and the Thompson River by reducing an existing in-channel sediment source. Overall, there is a low to moderate risk of short-term low-level increases in sediment loading for about 2-3 years. However, water quality standards are expected to be met and there is a low risk of impacts to beneficial uses.

Water Yield
The proposal is to harvest the stands within these parcels with a seed tree prescription. Cumulative effects to water yield in this parcel are not anticipated for the following reasons: 1) The well-drained to excessively well-drained nature of the soils would absorb additional available and not produce increased surface runoff, and would in turn produce little or no detectable change in water yield from upland sites, 2) Flows in project area streams and draws are stable, channels have not shown increased lateral or vertical erosion that could be attributed to increased flows, so any increases in water yield present a low risk of increased in-channel erosion or other channel adjustments, and 3) The other streams and ephemeral draws within this parcel are stable and vegetated with a dense mat of grass and forbs vegetation, making them capable of handling potential water yield increases without destabilizing.

Fisheries Analysis
FOR THE
THOMPSON FACE TIMBER SALE

INTRODUCTION
This analysis is designed to disclose the existing condition of the fisheries resources and display the anticipated effects from activities proposed with the Thompson Face timber sale.

ANALYSIS METHODS
Methodology to assess the status and potential impacts of the proposal to fish populations will include presence/absence determinations in project area parcels and evaluating risk factors to habitat degradation. The risk factors to habitat degradation were evaluated with a sediment source inventory during preparation of the Thompson Face Timber Sale. The inventory included cataloging channel stability, in-channel and out-of-channel sediment sources.

ANALYSIS AREA
The analysis area for fisheries in the Thompson Face project area will be the reaches of the Thompson River within this parcel. A portion of Meadow Creek will also be included due to a poorly functioning stream crossing on a proposed haul road where it crosses Meadow Creek.

EXISTING CONDITIONS

Existing conditions assessed for the Thompson Face timber sale show that the Thompson River contains numerous species of fish. Within reaches of the Thompson River that flow through the proposed project area, species include: brook trout, brown trout, largescale sucker, longnose dace, longnose sucker, rainbow trout, slimy sculpin and westslope cutthroat trout according to the Montana Fisheries Information System (MFISH). This portion of the Thompson River is also considered bull trout nodal habitat by MFISH. Nodal habitat is a migration corridor or overwintering area. Meadow creek contains brook trout, rainbow trout and westslope cutthroat trout according to MFISH. The reach of stream that would be crossed with a proposed haul route is dry except during high runoff events. This reach may be used as a migration corridor by westslope cutthroat trout, but the current structure is a fish passage barrier due to high velocities in the crossing structures. The existing structure consists of two 36” round culverts that are a flow constriction, and both flow nearly full during spring runoff.

Sediment delivery is analyzed in the watershed and hydrology analysis for this project. One substantial source of sediment was identified during field reconnaissance. This site is located on a proposed haul route for the Thompson Face timber sale, but is located outside of the state parcel. This site is the double culvert described above and in the watershed and hydrology analysis. Due to the constriction, there is a large depositional bar upstream from the crossing and a scour hole approximately 3-4 feet deep at the outlet created by high velocities through the culverts.

DIRECT AND INDIRECT EFFECTS

No Action Alternative
This alternative would have no direct or indirect effects on fish populations or fish habitat in the Thompson River watershed. Direct and indirect effects would be limited to those under current and natural conditions.

Action Alternative

The proposed action alternative is expected to have a low to moderate short-term risk and a low long-term risk of direct or indirect effects to fish or fish habitat. Increases in fine sediment delivery could adversely affect channel forms. A short-term increase in risk of fine sediment delivery may occur as a result of bare soil exposure on skid trails from adjacent upland harvest and log hauling on roads near fish-bearing and potential fish-bearing streams. A short-term increase in fine sediment delivery in Meadow Creek is expected due to the proposed replacement of a stream crossing structure in a lower reach of Meadow Creek that is typically dry except during spring runoff. The Watershed Analysis has determined that there is expected to be an estimated long-term decrease in in-channel sediment delivery to Meadow Creek as a result of the proposed stream crossing replacement. The Watershed Analysis has also determined that there is not expected to be a measurable or detectable change in water yield to streams in the project area as a result of the proposed actions. An analysis of the proposed actions indicates that no timber harvest is planned within 100 feet of the Thompson River, its flood plain or side channels. The zone of recruitable large woody debris to the Thompson River was calculated to be approximately 68 feet based on measurements of site potential tree heights. In addition, a channel migration zone (CMZ) and a riparian management zone (RMZ) were laid out, and the RMZ was determined to be 80 feet. As a result, no measurable or detectable adverse impacts to large woody debris are expected in to the Thompson River. In the short term (approximately 2-3 years), there is a low to moderate risk of potential impacts to sediment delivery due to exposure of bare soil through log skidding and hauling operations. In the long term, considering potential effects to sediment, water yield and large woody debris recruitment, a low risk of very low impacts to fish-bearing or potential fish-bearing channels is expected.

The zone of vegetation that is considered to have the greatest affect on stream shading in headwater streams in the project area is considered the area containing mature riparian vegetation; in this case approximately 68 feet. Since the proposed actions do not involve the harvest of any riparian vegetation, the proposed action is not expected to have an effect on stream shading or recruitment of large woody debris. As a result, a low risk of very low impacts to stream temperature is expected.

The proposed Action Alternative would improve fish connectivity by replacing an existing stream crossing that is a fish passage barrier on Meadow Creek with a structure designed to allow fish passage to all species and all life stages during periods that the stream reach has flow.

CUMULATIVE EFFECTS

No Action Alternative

The cumulative effects of this alternative would be similar to those described in the existing conditions. Fish habitat and populations would not be altered by this alternative.

Action Alternative

Since there are no anticipated impacts to species presence or distribution, a low risk of low impacts to channel substrate and stream temperature, and improvements to connectivity, this alternative presents a low risk of low cumulative impacts to native fisheries.

SOILS ANALYSIS
FOR THE
THOMPSON FACE TIMBER SALE

INTRODUCTION

Landform Description
The landform and parent materials in the project area are generally quartzite and argillite bedrock soils with small areas of glacial till or glacial drift influence. Wave sorting of gravels by glacial lake Missoula may be found in protected areas. The majority of the bedrock consists of slightly metamorphosed sedimentary rocks formed from sand, silt, clay, and carbonate materials deposited in an ancient shallow sea during the Precambrian period.

Soil Physical Properties
Analysis of soil physical properties addresses the issue that timber harvesting and associated activities may affect soil conditions in the proposed project area through harvesting activities, and through repeated entries to previously harvested areas. Harvest operations can displace fertile layers of topsoil, which can lead to a decrease in vegetation growth. Harvest activities can also lead to compaction of the upper layers of soil. Compaction decreases pore space in soil, reduces its ability to absorb and retain water, and can increase runoff and overland flow. These conditions can also lead to a decrease in vegetation growth.

Nutrient Cycling
Nutrient cycling, microbial habitat, moisture retention and protection from mineral erosion are provided by coarse and fine woody debris in forested environments (Harmon et al, 1986). Forest management can affect the volumes of fine and coarse woody debris through timber harvesting and result in changes to potentially available nutrients for long-term forest production.

Slope Stability
Slope stability can be affected by timber management activities by removing stabilizing vegetation, concentrating runoff, or by increasing the soil moisture. The primary risk areas for slope stability problems include, but are not limited to, landtypes that are prone to soil mass movement, and soils on steep slopes (generally over 60 percent).

ANALYSIS METHODS

Soil Physical Properties
Impacts to soil physical properties will be analyzed by evaluating the current levels of soil disturbance in the proposed project area based on field review and aerial photo review of existing and proposed harvest units. Percent of area affected is determined through pace transects, measurement, aerial photo interpretation, or GIS to determine skid trail spacing and skid trail width. From this, skid trail density and percent of area impacted are determined. Estimated effects of proposed activities will be assessed based on findings of DNRC soil Monitoring.

Nutrient Cycling
Nutrient cycling will be analyzed by disclosing existing levels of coarse woody debris from transects conducted during field reconnaissance. Potential impacts to nutrient cycling will be assessed by evaluating risks to nutrient pools and long-term site productivity from timber sale contract requirements and mitigation measures.

Slope Stability

Slope stability risk factors will be analyzed by reviewing the Web Soil Survey (NRCS, 1996) and the Montana DSL Plains Unit Soil Survey (Collins, 1985) to identify map units listed as high risk for mass movement. Field reconnaissance will also be used to identify any slopes greater than 60 percent as an elevated risk for mass movement.

ANALYSIS AREA

The analysis area for evaluating soil physical properties, nutrient cycling and slope stability will include DNRC owned land within the Thompson Face parcels.

EXISTING CONDITIONS

Soil Physical Properties

Soil physical properties were assessed in the proposed project area by a DNRC watershed specialist in 2012. Based on field reconnaissance and review of past management records, the parcels in the Thompson Face project area have had no management. As a result, there are no existing impacts to soil physical properties beyond those occurring from natural and pre-existing conditions.

Nutrient Cycling

Nutrient cycling was assessed in the proposed project area by completing 5 transects to estimate the current levels of coarse woody debris. These transects were focused on proposed harvest units. The average coarse woody debris is 19.3 tons/acre, with a range of 0.7 to 58.9 tons/acre and a median of 8.7 tons/acre. These results are within the recommended range discussed in *Managing Coarse Woody Debris in Forests of the Rocky Mountains* (Graham et al, 1994) on similar habitat types. Douglas-fir habitat types in Montana are recommended to have a range of 5 to 24 tons/acre to maintain forest productivity and nutrient cycling.

Slope Stability

Slope stability was evaluated in the proposed project area by reviewing soil types and field reconnaissance. Soil types in the project area are primarily moderately steep to steep (40-60+%) residual soils found on hilly terrain. The Montana DSL Plains Unit Soil Survey (Collins, 1985) identified no specific areas of soils at high risk for slope stability problems in the project area. Substantial portions of the project area have slopes at or steeper than 60%, so these areas are an elevated concern for slope stability. However, residual weathered bedrock soils typically are not a high risk to slope stability, and no slope failures were identified during reconnaissance in the proposed project area. A list of soil types found in the Thompson Face project area and their associated management implications is found in ***Table S-2***.

DIRECT AND INDIRECT EFFECTS

No Action Alternative

The No Action Alternative would have no direct or indirect effects on soil physical properties, nutrient cycling or slope stability. No harvesting activities would take place under this alternative, which would leave the soil in the project area unchanged from the description in the Existing Conditions portion of this analysis. Nutrient cycling from coarse woody debris would stay near current levels as dictated by natural and pre-existing conditions.

Action Alternative

Soil Physical Properties

The effects of the proposed action alternative to soil physical properties were based on DNRC soil monitoring on soils and sites similar to those found in the project area. Based on past monitoring, direct impacts to soil physical properties would be expected on up to 16 of the total 164 acres proposed for harvesting in the Thompson Face project area. Soil monitoring conducted on DNRC lands shows that sites harvested on DNRC lands statewide on similar soils with ground-based machinery had a range of impacts from 3.0 to 21.0 percent of the acres treated, with an average disturbance rate of 10.6% (DNRC, 2009). The low range of impacts includes operations on frozen or snow-covered soils, and the high range includes operations on steep slopes during non-winter conditions. As a result, the extent of impacts expected would likely be similar to those reported by Collins (DNRC, 2009), or approximately 3.0 to 21.0 percent of ground-based harvested acres. The proposal includes 46 acres of ground-based mechanical harvesting.

Direct impacts to the soil physical properties would also be generated by ground-based site preparation. Site-preparation disturbance would be intentionally done, and these impacts are considered light and promote reforestation of the site. The expected impacts to the soil resource as a result of the Action Alternative are summarized in ***Table S-1***. These activities, including road construction and ground based and skyline yarding would leave approximately 9.8 percent of the proposed harvest units in an impacted condition. This level is below the range analyzed for in the *EXPECTED FUTURE CONDITIONS* section of the *SFLMP*, and well within the 20-percent impacted area established as a level of concern in the *SFLMP (DNRC 1996)*. In addition, BMPs and a combination of mitigation measures would be implemented to limit the area and degree of soil impacts as noted in ARM 36.11.422 and the SFLMP (DNRC, 1996).

Table S-1 – Summary of Direct Effects of Alternatives on Soils

Description of Parameter	No Action	Action Alternative
Acres of Harvest	0	164
Acres of ground based yarding	0	46
Acres of ground based impacts[1]	0	**5**
Acres of skyline yarding	0	118
Acres of skyline impacts[2]	0	**7**
Miles of new roads	0	1.2
Acres of new roads[3]	0	**4**
Total estimated acres of impacts	0	**16**
Percent of harvest area with impacts	0%	9.8%

[1] 10.6% of tractor units based on average impacts found on similar soils and sites by DNRC soil monitoring
[2] 6.2% of skyline units affected by corridors according to DNRC 2009
[3] Assuming an average width of 25 feet, roads are approximately 3 acres per mile

Nutrient Cycling

Direct and indirect effects to nutrient cycling would include maintaining coarse and fine woody debris at or near current levels with the action alternative. Through the timber sale contract, approximately 10-15 tons of coarse woody material would be left on the ground following harvesting activities, as well as fine material for nutrient retention.

Slope Stability

There would be a moderate risk of direct and indirect effects to slope stability. Steep slopes in much of the proposed project area mean there is an increased risk for slope stability problems. This risk would be minimized by using cable yarding systems on slopes steeper than approximately 40%. In addition, any road construction on slopes steeper than 60% would not use cut-and-fill construction, but would use “full bench” construction where the entire running surface

of the road is cut into native slope and all material would be hauled off-site to a suitable location. With these measures, there is a moderate risk of low impacts to slope stability with the proposed project.

CUMULATIVE EFFECTS

No Action

This alternative would have no cumulative impacts to soil physical properties or nutrient cycling in the project area. The impacts of this alternative would be similar to those described in the Existing Conditions portion of this analysis. No soil would be disturbed. Nutrient cycling from coarse woody debris would stay near current levels as dictated by natural and pre-existing conditions.

Action Alternative

Cumulative effects to soil physical properties would be identical to those described in the direct and indirect effects portions of this analysis. Cumulative effects are expected to be the same since no past management activity has occurred on these parcels.

Table S-2 – Soil Map Unit Descriptions for the Thompson Face Project Area

Map Unit	Name	Soil & Vegetation Descriptions	Management Considerations			
			K factor**/erosion potential*	Timber	Roads	Comments
10U-A,D	Alluvial Lands 0-10% slopes	Soils of this map unit are found in river bottoms and floodplains. Vegetation is moist forest of Engelmann spruce over an understory of shrubs and forbs.	K=0.20 to 0.43 Erosion potential is considered low to moderate	Potential Prod: Moderate/high Equipment: Tractor Regen: Plant competition and frost	Roads will rut easily and may require turnpike construction to achieve proper drainage.	Locate skid trails and landings away from riparian areas.
15U-7D	Colluvial/Alluvial Footslopes 20-40% slopes	Soils of this map unit have been formed from colluvium and alluvium derived from argillite and quartzite. Vegetation is dry forest of Douglas-fir over an understory of shrubs and forbs.	K=0.20 to 0.43 Erosion potential is considered low to moderate	Potential Prod: Moderate/high Equipment: Tractor Regen: Can be limited by frost and grass competition	Roads perform well with standard location, construction and maintenance practices. High stone and boulder content.	Road cuts and fills need to be re-vegetated promptly
30U-8C	Mountain Sideslopes, Cool/moist 20-40% slopes	Soils of this map unit have been formed from volcanic ash over residuum and colluvium. Vegetation is dry forest of Douglas-fir over an understory of shrubs and forbs.	K=0.10 to 0.28 Erosion potential is considered low to moderate	Potential Prod: Moderate/high Equipment: Tractor Regen: Can be limited by grass competition	Roads perform well with standard location, construction and maintenance practices. Slope steepness may increase cost.	Road cuts and fills may be difficult to re-vegetate
30U-9C	Mountain Sideslopes, Cool/moist 40-60% slopes	Soils of this map unit have been formed from volcanic ash over residium and colluvium. Vegetation is dry forest of Douglas-fir over an understory of shrubs and forbs.	K=0.10 to 0.28 Erosion potential is considered low to moderate	Potential Prod: Moderate/high Equipment: Cable/tractor Regen: Can be limited by grass competition	Roads perform well with standard location, construction and maintenance practices. Slope steepness may increase cost.	Some steep slopes may limit tractor operation.

60-C	Stream Breaklands 50-75% slopes	Soils of this map unit are formed from weathered bedrock. Vegetation is dry forest of Ponderosa Pine and Douglas-fir over and understory of shrubs and forbs.	K=0.20 to 0.49 Erosion potential is considered low to moderate	Potential Prod: Low Equipment: Cable Regen: Can be limited by grass competition	Full bench construction and bedrock blasting may be required	Shallow to bedrock.

* 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)

References:

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WILDLIFE ANALYSIS
For the
Thompson Face Timber Sale

INTRODUCTION

The wildlife analysis is designed to disclose the existing condition of wildlife resources and the anticipated direct, indirect, and cumulative effects that may result from implementing the No-Action and Action alternatives. The following issue statements were developed from concerns raised by DNRC specialists and public comments received during scoping and will be addressed in the following analysis:

- **Mature forest cover and connectivity.** The proposed activities could decrease mature forested cover, which could reduce habitat connectivity and suitability for wildlife species associated with mature forest.
- **Snags and coarse woody debris.** The proposed activities could reduce the availability of snags and coarse woody debris and increase human access for firewood harvesting, which could adversely affect the quality of wildlife habitat.
- **Canada lynx.** The proposed activities could reduce landscape connectivity and the availability of suitable Canada lynx habitat (i.e., summer foraging, winter foraging, other suitable), reducing the capacity of the area to support Canada lynx.
- **Fishers.** The proposed activities could reduce the availability and connectivity of suitable fisher habitat and increase human access, which could reduce fisher habitat suitability and increase trapping mortality.
- **Gray wolves.** The proposed activities could disturb gray wolves and reduce winter range habitat quality for big game, which could displace gray wolves from denning and rendezvous sites and reduce prey availability.
- **Big game winter range.** The proposed activities could reduce cover, which could reduce the quality of big game winter range habitat.

ANALYSIS AREAS

Direct and Indirect Effects
The direct and indirect effects of the proposed activities on all species/issues were analyzed within the project area (FIGURE W-1 –ANALYSIS AREAS), which consists of 201 acres of DNRC-managed lands in Section 26 T24N, R27W.

Cumulative Effects
The cumulative effects of the proposed activities on all species/issues were analyzed at a broad surrounding landscape scale that varies according to the issue or wildlife species being discussed. Cumulative effects analysis areas are named according to the size of the area and are summarized in TABLE W-1 –ANALYSIS AREAS and FIGURE W-1 –ANALYSIS AREAS. Cumulative effects analysis areas (CEAAs) include the project area as well as lands managed by other agencies and private landowners. Detailed descriptions of each analysis area are located in the **Existing Condition** section for each issue or species evaluated (e.g., Canada lynx etc.).

TABLE W-1. ANALYSIS AREAS. Descriptions of the project area and cumulative effects analysis areas.

ANALYSIS AREA NAME	DESCRIPTION	TOTAL ACRES	ISSUE(S)/SPECIES ANALYZED
Project Area	DNRC managed lands in Section 26 T24N, R27W.	201	direct & indirect effects for all issues/species

Medium CEAA	Portions of the Middle Thompson River Subwatershed	9,430	mature forest cover & connectivity, snags & coarse-woody debris
Large CEAA	The Middle Thompson River Subwatershed	24,690	Canada lynx, fishers, gray wolves, big game winter range

ANALYSIS METHODS

Analysis methods are based on DNRC State Forest Land Management Rules, which are designed to promote biodiversity. The primary basis for this analysis included information obtained by: field visits, review of scientific literature, Montana Natural Heritage Program (MNHP) data queries, DNRC Stand Level Inventory (SLI) data analysis, aerial photograph analysis, and consultation with wildlife professionals. The coarse-filter wildlife analysis section includes analyses of the direct, indirect and cumulative effects of the proposed alternatives on old-growth, connectivity of mature forest habitats, and snags and coarse woody debris. However, old-growth does not occur in the project area so the issue will not be discussed further. In the fine-filter analysis, individual species of concern are evaluated. These species include wildlife species federally listed under the Endangered Species Act, species listed as sensitive by DNRC, and species managed as big game by DFWP.

Cumulative effects analyses account for known past and current activities, as well as planned future agency actions. Recent timber sale projects (≤20 years) that could contribute to cumulative effects are summarized in TABLE W-2 RECENT PROJECTS.

TABLE W-2. RECENT PROJECTS. Recent projects that could contribute to cumulative effects and the number of harvested acres that occur in each analysis area.

Sale Name	Agency	Sale Date/Status	Project Area	Medium CEAA	Large CEAA
Cooked Mountain	DNRC	2007/Complete	-	0	280
West Prairie Salvage	DNRC	2010/Complete	-	24	103

Changes to forest structure resulting from all DNRC projects have been accounted for in SLI data used for this analysis. Timber sales that occurred on private lands are accounted for in analyses of aerial photographs.

RELEVANT AGREEMENTS, LAWS, PLANS, RULES, AND REGULATIONS

Various policy and procedural documents provide the foundation for management criteria pertaining to wildlife and their habitat on state lands. The documents most pertinent to this project include: *DNRC Forest Management Rules*, *DNRC Forested Trust Lands Final Environmental Impact Statement and Habitat Conservation Plan (USFWS and DNRC 2010)*, the *Endangered Species Act*, the *Migratory Bird Treaty Act*, and the *Bald and Golden Eagle Protection Act*.

COARSE-FILTER WILDLIFE ANALYSIS

Analysis of the anticipated effects of the proposed activities on old-growth forest, mature forested cover and connectivity, and snags and coarse woody debris are discussed in detailed analyses below.

MATURE FOREST COVER AND CONNECTIVITY

Issue: The proposed activities could decrease mature forested cover, which could reduce habitat connectivity and habitat suitability for wildlife species associated with mature forest.

Introduction

Mature forests characterized by large diameter trees and dense canopy cover provide many wildlife species with food, shelter, breeding sites, and travel corridors. Historically, the spatial configuration of mature forested habitats in the western United States was shaped by natural disturbance events, primarily wildfire, blowdown, and pest outbreaks. Natural disturbance events resulted in a mosaic-like spatial configuration of forest patches varying in age, species composition, and development. Spatial configuration, including patch size and connectivity of forested habitats, is important for many wildlife species. Patch size may affect the distribution of wildlife species that are attracted to, or avoid forest edges. Additionally, connectivity of mature forested habitats may facilitate movements of wildlife species that avoid openings in canopy cover. For example, discontinuous mature forested habits would negatively affect movements of fisher, which avoid large openings in canopy cover. Timber harvest, like wildfire and blowdown, is a disturbance event that often creates open patches of young, early-successional habitats. Forest management considerations for wildlife species dependent on mature forested habitat include providing well-connected patches of habitat with ≥40% canopy cover.

Analysis Areas

The analysis area for direct and indirect effects is the 201-acre project area (FIGURE W-1 –ANALYSIS AREAS). The analysis area for cumulative effects is the 9,430-acre medium CEAA described in TABLE W-1 – ANALYSIS AREAS (FIGURE W-1 –ANALYSIS AREAS). The medium CEAA is defined by geographic features including ridgelines and streams and represents an area large enough to support a diversity of species that use mature forest habitat and/or require connected forest habitat.

Analysis Methods

Analysis methods for mature forest cover and landscape connectivity include field evaluations and Geographical Information System (GIS) analysis of aerial-photographs, DNRC stand level inventory data (SLI), and USFS canopy cover data (VMap 9.1.1). Mature forested habitat is defined here and in the remainder of the document as forest stands with ≥40% canopy cover comprised primarily of trees that are on average >9 inches dbh. Forested stands containing trees of at least this size and density were considered adequate for providing minimal conditions necessary to facilitate movements of many wildlife species that benefit from well-connected mature forest conditions across the landscape. Factors considered in the analysis include: 1) the degree of timber harvesting, 2) availability and patch size of mature forested habitat (≥40% canopy cover, trees >9 inches dbh average), 3) open and restricted road density, and 4) the availability of potential travel corridors.

Existing Conditions

Mature Forested Habitats and Connectivity

The project area currently contains approximately 184 acres of mature stands composed primarily of Douglas-fir, larch, and mixed conifer stands (97.6% of project area) that occurs in two parcels (TABLE W-3 –MATURE FOREST). The mature forested habitat is a part of one large connected patch; therefore connectivity is high across the parcels (FIGURE W-1 –ANALYSIS AREAS). The remaining 17 acres consist primarily of riparian habitat associated with the Thompson River. The majority of the stands are moderately stocked (40-70% canopy cover) and likely provide suitable habitat for species requiring connected and/or mature forested habitat. The project area does not occur in any particular area of documented importance for habitat connectivity; however, riparian habitat in the project area associated with the Thompson River and additional smaller streams likely facilitates wildlife movements between the project area and adjacent stands of mature forested habitat. The network of open and restricted roads in the project area has reduced some landscape connectivity. Open road density in the project area is moderate (2.8 miles/square mile) and total road density is high (4.7 miles/square mile).

The medium CEAA contains 1,626 acres (17.3% analysis area) of mature stands with ≥40% canopy cover (>9 inches dbh average) (TABLE W-3 –MATURE FOREST). The remaining acres in the medium CEAA consist primarily of young regenerating stands due to the extensive history of timber harvest on private land. Connectivity of mature forested habitat is very low with small patches mature forested habitat scattered across the analysis area (FIGURE W-1 –ANALYSIS AREAS). Across the analysis area, riparian areas associated with

the Thompson River, Big Prairie Creek, Semem Creek, and additional smaller streams may provide wildlife travel corridors. The network of open roads has reduced some landscape connectivity. Open and seasonally restricted road density in the medium CEAA is moderate (2.4 miles/square mile) and total road density is high (5.6 miles/square mile).

TABLE W-3 -MATURE FOREST. Average patch size and acreage of mature forested habitat (≥40% canopy cover, >9 inches dbh) pre- and post-harvest in the project area and medium CEAA for the Thompson Face Timber Sale. Percent of the total corresponding analysis area is in parentheses.

ANALYSIS AREA	AVERAGE PATCH SIZE		TOTAL ACRES OF MATURE FOREST	
	Existing	Post-harvest	Existing	Post-harvest
Project Area -- 201 Acres (% of area)	184	11	184 (97.6%)	19 (9.5%)
Medium CEAA –9,430Acres (% of area)	36	31	1,626 (17.3%)	1,461 (15.5%)

Environmental Effects

Direct and Indirect Effects of the No-Action Alternative on Mature Forested Habitats and Connectivity
None of the proposed forest management activities would occur. Forests would continue to age and dense stands of shade-tolerant trees would continue to develop. Patch size and the availability of mature forested habitat would likely increase over time, increasing connectivity. Thus, since: 1) no appreciable change in the abundance, patch size, or suitability of mature forested habitat would occur, 2) no changes in open or restricted road density would occur, and 3) no changes in the availability of travel corridors would occur, no direct or indirect effects to mature forested habitat abundance, suitability, or connectivity would be anticipated as a result of the No-Action Alternative.

Direct and Indirect Effects of the Action Alternative on Mature Forested Habitats and Connectivity
The proposed activities would occur in 162 (87.8%) of the 184 acres of mature stands available in the project area. The treatments proposed for these stands would reduce canopy cover to approximately 5-15% and these areas would not provide mature forested habitat post-harvest. Average patch size of mature forested habitat would be reduced from 184 to 11 acres. Approximately 6 acres of riparian habitat associated with stream RMZs in the project area would be harvested, but vegetation retention measures would apply. Along class 1 streams no trees would be harvested within 50 feet of the stream, and ≥40% canopy cover would be retained within at least 100 feet of the stream within the established RMZ, including retention of all saplings and shrubs. Within 50 feet of class 2 and 3 streams in the project area at least 50% of the existing mature trees would be retained, and all shrubs and saplings would be maintained (*USFWS and DNRC 2010*). See WATER RESOURCES section in this document for additional information. Approximately 1.1 miles of closed roads are proposed for construction, which may reduce connectivity. Connectivity of upland mature canopy forest within the proposed project area would be reduced, but travel corridors would remain along streams. Thus, since: 1) the abundance of mature forested habitat would decrease by 162 acres (87.8% of existing mature forest); 2) average patch size of mature forested habitat would decrease by 173 acres; 3) approximately 1.1 miles of restricted roads are proposed for construction; 4) approximately 6 acres of riparian habitats that may provide wildlife travel corridors would be harvested, but retention measures would apply, and 5) overall connectivity of mature forested habitat would decrease; moderate direct or indirect effects to mature forested habitat abundance, suitability, or connectivity would be anticipated as a result of the Action Alternative.

Cumulative Effects of the No-Action Alternative on Mature Forested Habitats and Connectivity
None of the proposed forest management activities would occur. Forests in the project area would continue to age, and dense stands of shade-tolerant trees would continue to develop. Connectivity would not be affected under this alternative. Other proposed or ongoing activities within the medium CEAA could affect the abundance, suitability, and connectivity of mature forested habitats. Thus, since: 1) no appreciable change in the abundance, patch size, or suitability of mature forested habitat would occur associated with this alternative, 2) no changes in open or restricted road density would occur, and 3) no changes in the availability of travel

corridors would occur, no cumulative effects to mature forested habitat abundance, suitability or connectivity would be anticipated as a result of the No-Action Alternative.

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

The proposed activities would affect 162 acres of the 1,626 acres (9.9%) of mature forested habitat available in the medium CEAA. The proposed activities would open the timber stands in all of these acres to <40% canopy cover, reducing the availability of this habitat type. Average patch size of mature forested habitat would be reduced from 36 to 31 acres. Reductions in the availability of suitable mature forested habitat would be additive to harvest activities that are proposed or ongoing in the medium CEAA, although DNRC is unaware of any projects at this time. Harvest of approximately 6 acres is proposed within the riparian habitat in the project area, which may reduce the quality of habitat suitable for providing connectivity. However vegetation retention requirements would apply (see WATER RESOURCES section in this document for additional information). Additionally, 1.1 miles of restricted roads are proposed, potentially reducing connectivity. Overall, connectivity of upland mature forest within the medium CEAA would be reduced, especially between the Thompson River and McCully Ridge located to the west of the project area. Thus, since: 1) the abundance of mature forested habitat in the medium CEAA would decrease by 9.9%; 2) average patch size of mature forested habitat would decrease by 5 acres; 3) 1.1 miles of restricted roads are proposed for construction; and 4) approximately 6 acres of harvest would occur in riparian habitats that may provide wildlife travel corridors, but vegetation retention measures would apply; minor adverse cumulative effects to mature forested habitat abundance, suitability, or connectivity would be anticipated as a result of the Action Alternative.

SNAGS AND COARSE WOODY DEBRIS

Issue: The proposed activities could reduce the availability of snags and coarse woody debris and increase human access for firewood harvesting, which could adversely affect the quality of wildlife habitat.

Introduction

Snags and coarse woody debris are important components of forest ecosystems that provide the following functions: 1) increase structural diversity, 2) alter the canopy microenvironment, 3) promote biological diversity, 4) provide important habitat substrates for wildlife, and 5) act as storehouses for nutrient and organic matter recycling agents (*Parks and Shaw 1996*). Coarse woody debris, snags, and defective trees (i.e., partially dead, spike top, broken top) are used by a wide variety of wildlife species for foraging, nesting, roosting, and cover. Primary cavity users (i.e., woodpeckers) excavate nesting and roosting cavities in snags. These cavities are used as nesting, roosting, and resting sites by a variety of secondary cavity users, such as small mammals and birds, which are unable to excavate their own cavities. Habitat value of snags for wildlife varies according to tree species, diameter, and snag density. Thick-barked species (e.g., western larch and ponderosa pine) tend to provide high quality snag habitat. Snag diameter is important because many species that nest in smaller diameter snags will also use large snags; however, the opposite is not true. Coarse woody debris habitat value varies according to size, length, decay, and distribution. Single, scattered downed trees may provide access under the snow for small mammals and weasels, while log piles may provide secure areas for snowshoe hares. Timber harvest may affect the abundance and spatial distribution of snags and coarse woody debris by direct removal for commercial value or for human safety purposes, or indirectly by increasing human access for firewood harvesting.

Analysis Areas

The analysis area for direct and indirect effects is the 201-acre project area (FIGURE W-1 –ANALYSIS AREAS). The analysis area for cumulative effects is the 9,430-acre medium CEAA described in TABLE W-1 – ANALYSIS AREAS and depicted in FIGURE W-1 –ANALYSIS AREAS. The medium CEAA is defined by geographic features and represents an area large enough to support a diversity of species that use coarse woody debris and snags.

Analysis Methods

The abundance of snags and coarse-woody debris was quantitatively estimated in the project area using 5 systematically-placed fixed plots (each 100 feet x 66 feet). Coarse-woody debris tons/acre was estimated for material ≥3 in diameter where it intersected the 100-ft transect line according to methods described by Brown (*1974*). Snags per acre were estimated by recording all snags ≥8 in dbh and ≥6 ft tall located within in each

plot. Factors considered in the analysis include: 1) the level of harvesting, 2) availability of snags and coarse woody debris, and 3) risk of firewood harvesting.

Existing Conditions

Snags and Coarse Woody Debris
During field assessments, 22 snags/acre ≥ 8 inches dbh were observed (range: 0-73 snags/acre) and 4 snag ≥21 inches dbh occurred within study plots. Wildlife use of snags was observed throughout the project area. The majority of snags observed were Douglas-fir as well as a few western larch and ponderosa pine. Coarse woody debris levels ranged from 1 to 59 tons/acre across the project area, but averaged 19 tons/acre. Firewood harvesting has likely reduced the availability of coarse woody debris and snags along open roads in the eastern portion of the project area along the Thompson River. However, the majority of the project area is at a low risk of firewood harvesting due to the lack of open roads and steepness of the terrain (2.8 miles/square mile open road density, 4.7 miles/square mile total road density).

In the medium CEAA, snag and coarse woody debris levels on surrounding parcels vary widely depending on motorized access, harvest history, and natural disturbance history. Snag and coarse woody debris levels are likely somewhat limited due to the level of timber harvest that has occurred on private lands. Snags and coarse woody debris are frequently collected for firewood in the medium CEAA, especially near open roads that occur along the Thompson River and the eastern portion of the analysis area. Overall, road density in the medium CEAA is moderate (2.4 miles/square mile open and seasonally restricted road density, 5.6 miles/square mile total road density) and provides moderate accessibility for firewood cutting.

Environmental Effects

Direct and Indirect Effects of the No-Action Alternative on Snags and Coarse Woody Debris
None of the proposed forest management activities would occur. Existing snags would continue to provide wildlife habitat, and new snags would be recruited as trees die. Thus, since: 1) no timber harvesting would alter present or future snag or coarse woody debris abundance, and 2) no changes to human access for firewood harvesting would occur, no direct or indirect effects to snags and coarse woody debris availability or associated wildlife habitat quality would be anticipated as a result of the No-Action Alternative.

Direct and Indirect Effects of the Action Alternative on Snags and Coarse Woody Debris
Some existing snags and snag recruits would be removed from 165 acres (81.9% of project area) due to timber felling operations. Additional recruitment trees and snags may also be lost following timber harvest due to wind throw. Given operability and human safety constraints, existing non-merchantable snags would be left standing where possible. Across the project area, at least 2 large snags and 2 large recruitment trees (>21 inches dbh) per acre would be retained within DNRC harvest units (*ARM 36.11.411*). If such large trees and snags are absent, the largest available snags and/or recruitment trees would be retained. Additionally, 15-20 tons/acre of coarse woody debris would be retained (*ARM 26.11.414*). Firewood cutting risk in the project area would not change following the proposed harvest because no additional open roads are proposed for construction. Thus, since: 1) the proposed actions would remove some snags and minimally influence the amount of coarse woody debris on 165 acres, 2) accessibility for firewood harvesting would not change, and 3) snags and coarse woody debris would be retained to meet DNRC Forest Management Rules (*ARM 36.11.411, ARM 26.11.414*), minor adverse direct and indirect effects to snags and coarse woody debris availability associated with wildlife habitat quality would be anticipated as a result of the Action Alternative.

Cumulative Effects of the No-Action Alternative on Snags and Coarse Woody Debris
None of the proposed forest management activities would occur. No changes in the availability of snags and coarse woody debris would be expected. Existing snags would continue to provide habitat attributes, and new snags would be recruited as trees die. Ongoing and proposed forest management activities may affect the availability of snags and coarse woody debris in the medium CEAA; however, no changes would be expected within the project area under the No-Action alternative. Thus, since: 1) no timber harvesting on DNRC lands would alter present or future snag or coarse woody debris abundance, and 2) no changes to human access for firewood harvesting would occur, no cumulative effects to snags and coarse woody debris availability associated with wildlife habitat quality would be anticipated as a result of the No-Action Alternative.

Cumulative Effects of the Action Alternative on Snags and Coarse Woody Debris
Some existing snags and snag recruits would be removed from the 165 acres (1.7% of medium CEAA) proposed for harvest within the medium CEAA, but retention measures would apply (*ARM 36.11.411, ARM 26.11.414*). Reductions in the availability of coarse woody debris and snags would be additive to any forest management activities occurring in the CEAA (see **ANALYSIS METHODS** section of the Introduction for a detailed description of recent projects), although DNRC is unaware of an ongoing or proposed activities at this time. Firewood cutting risk in the medium CEAA would not change due to DNRC activities under the Action Alternative because no additional open roads are proposed for construction. Thus, since: 1) proposed actions would be additive to any ongoing and proposed activities that would remove snags, snag recruits, and coarse woody debris; 2) accessibility for firewood harvesting would not change; and 3) snags and coarse woody debris would be retained in amounts required to meet DNRC Forest Management Rules (*ARM 36.11.411, ARM 26.11.414*); minor cumulative effects to snags and coarse woody debris availability associated with wildlife habitat quality would be anticipated as a result of the Action Alternative.

FINE-FILTER WILDLIFE ANALYSIS

The fine-filter wildlife analysis discloses the existing conditions of wildlife resources and the anticipated direct, indirect, and cumulative effects that may result from the No-Action and Action alternatives. Wildlife species considered include: 1) species listed as threatened or endangered under the Endangered Species Act of 1973, 2) species listed as sensitive by DNRC, and 3) species managed as big game by DFWP. TABLE W-4 –FINE-FILTER provides an analysis of the anticipated effects for each species.

TABLE W-4 –FINE-FILTER. Anticipated effects of the Thompson Face Timber Sale on wildlife species. For several species, more detailed analysis is provided below where indicated.

SPECIES/HABITAT	EFFECTS ASSESSMENT
THREATENED & ENDANGERED SPECIES	
Canada lynx (*Felis lynx*) Habitat: Subalpine fir habitat types, dense sapling, old forest, deep snow zones	***Detailed Analysis Provided Below*** – The project area contains 107 acres of suitable lynx habitat.
Grizzly bear (*Ursus arctos*) Habitat: Recovery areas, security from human activity	The project area is located 4 miles outside of grizzly bear recovery zone and non-recovery occupied habitat associated with the Cabinet-Yaak Ecosystem (*USFWS 1993*, *Wittinger* 2002) and no recent sightings of grizzly bears have occurred in the area (*Kasworm et al. 2011*). Thus, no direct, indirect, or cumulative effects to grizzly bears would be expected to occur as a result of either alternative.
SENSITIVE SPECIES	
Bald eagles (*Haliaeetus leucocephalus*) Habitat: Late-successional forest less than 1 mile from open water	A bald eagle nest is located south of the project area on the Thompson River. However, the project area is located outside of the home range of the bald eagle pair, thus negligible direct, indirect, or cumulative effects to bald eagles would be anticipated.
Black-backed woodpeckers (*Picoides arcticus*) Habitat: Mature to old burned or beetle-infested forest	No recently (<5 years) burned areas occur within 0.25 miles of 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 salamanders (*Plethodon idahoensis*) Habitat: Waterfall spray zones, talus near cascading streams	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 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 loons (*Gavia immer*) Habitat: Cold mountain lakes, nest in emergent vegetation	No suitable lake habitat occurs within 500 feet of the project area. Thus, no direct, indirect, or cumulative effects to common loons would be expected to occur as a result of either alternative.
Fishers (*Martes pennanti*) Habitat: Dense mature to old forest less than 6,000 feet in elevation and riparian	***Detailed Analysis Provided Below*** – Approximately 45 acres of suitable fisher habitat occur within the project area.
Flammulated owls (*Otus flammeolus*) Habitat: Late-successional ponderosa pine and Douglas-fir forest	Approximately 81 acres of flammulated owl habitat types occur in the project area. However, these acres of potential habitat occur in discontinuous patches <40 acres in size and therefore are not likely to provide suitable conditions for flammulated owl use. Thus, given the small patch size of preferred flammulated owl habitat types, negligible direct, indirect, or cumulative effect to flammulated owls are anticipated.
Gray wolves (*Canis lupus*) Habitat: Ample big game populations, security from human activities	***Detailed Analysis Provided Below*** – The 2011 home range of the Chippy Pack coincides with the project area (*MFWP wolf pack data, 2011*).
Harlequin ducks (*Histrionicus histrionicus*) Habitat: White-water streams, boulder and cobble substrates	The Thompson River bisects the project area. However, harlequin ducks have not been observed using this area (MNHP data, October 1 2012), thus, no direct, indirect and cumulative effects to harlequin ducks would be anticipated.
Northern bog lemmings (*Synaptomys borealis*) Habitat: Sphagnum meadows, bogs, fens with thick moss mats	Potentially suitable wetlands occur within the project area; however harvesting would not occur within 50 feet of these areas. Thus, no direct, indirect, or cumulative effects to northern bog lemmings would be expected to occur as a result of either alternative.
Peregrine falcons (*Falco peregrinus*) Habitat: Cliff features near open foraging areas and/or wetlands	Suitable cliffs/rock outcrops for nest sites were not observed in the project area or within 0.5 miles of the project area. Additionally, peregrine eyries have not been documented in the vicinity of the project area (MNHP data, October 1 2012). Thus, no direct, indirect, or cumulative effects to peregrine falcons would be anticipated as a result of either alternative.
Pileated woodpeckers (*Dryocopus pileatus*) Habitat: Late-successional ponderosa pine and larch-fir forest	Approximately 40 acres of pileated woodpecker habitat occur in the project area. However, these acres of potential habitat occur in discontinuous patches < 25 acres in size and therefore are not likely to provide suitable conditions for pileated woodpecker use (*ARM 36.11.439(1)(a)*). Thus, given the small patch size of pileated woodpecker habitat, negligible direct, indirect, or cumulative effects to pileated woodpeckers are anticipated.
Townsend's big-eared bats (*Plecotus townsendii*) Habitat: Caves, caverns, old mines	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 would be expected to occur as a result of either alternative.
BIG GAME	
Elk (*Cervus canadensis*)	***Detailed Analysis Provided Below*** – The project area contains

Mule Deer (*Odocoileus hemionus*)	potential elk and white-tailed deer winter range habitat as identified by DFWP (*2008*).
White-tailed Deer (*Odocoileus virginianus*)	

THREATENED AND ENDANGERED SPECIES

CANADA LYNX

Issue: The proposed activities could reduce landscape connectivity and the availability of suitable Canada lynx habitat (i.e., summer foraging, winter foraging, other suitable), reducing the capacity of the area to support Canada lynx.

Introduction

Canada lynx are medium-size cats that prey primarily on snowshoe hares and occupy a mosaic of young and mature forests that provide habitats suitable for hunting and denning (*Ruediger et al. 2000*). Lynx foraging habitat in western Montana consist of young coniferous stands and mature forested stands with high levels of horizontal cover, which provide snowshoe hare habitat (*Squires et al. 2010*). Additionally, lynx typically avoid large openings in overhead canopy cover in the winter; hence, densely forested cover that is well connected is important for travel and security (*Squires et al. 2010*). Canada lynx are federally listed as a threatened species. Forest management considerations for lynx include providing a mosaic of young and mature lynx foraging habitat and well-connected large patches of mature forested cover occurring in vegetation types preferred by lynx.

Analysis Areas

The analysis area for direct and indirect effects is the 201-acre project area (FIGURE W-1 –ANALYSIS AREAS). The analysis area for cumulative effects is the, 24,690-acre large CEAA described in TABLE W-1 – ANALYSIS AREAS and depicted in FIGURE W-1 –ANALYSIS AREAS. The large CEAA approximates the size of a lynx home range, is centered on the project area, and is defined according to geographic features (i.e., ridgelines), which are likely to influence movements of Canada lynx in the vicinity of the project area. Thus, this defined area provides a reasonable analysis area for Canada lynx that could be influenced by project-related activities.

Analysis Methods

Analysis methods include field evaluations, aerial photograph interpretation, and GIS analysis of SLI data and suitable lynx habitats. Lynx habitat was subdivided into the following lynx habitat classes: 1) winter foraging, 2) summer foraging, 3) other suitable, and 4) temporary non-habitat. Lynx habitat was classified according to DNRC's lynx habitat mapping protocols (*USFWS and DNRC 2010*) based upon a variety of vegetation characteristics important to lynx and snowshoe hares (i.e., forest habitat type, canopy cover, stand age class, stems/acre, etc.). Other suitable lynx habitat is defined as habitat that has the potential to provide connectivity and lower quality foraging habitat, but does not contain the necessary attributes to be classified as winter or summer foraging habitat classes. The temporary non-habitat category consists of forested stands that are comprised of forest types preferred by lynx, but are not likely to be used by lynx until suitable horizontal cover develops. On non-DNRC lands, data identifying lynx suitable habitat are not readily available. Therefore, for the purpose of this analysis, the stands considered most likely to provide suitable habitat for lynx were mature forest stands (≥40% canopy cover, >9 inches dbh average) below 6,000 feet elevation. Factors considered in the analysis include: 1) the level of harvesting, 2) the availability of suitable lynx habitat classes, and 3) landscape connectivity.

Existing Conditions

Canada Lynx

The project area contains 107 acres of suitable lynx habitat (TABLE W-5 –LYNX HABITAT). The remaining 94 acres consists of stands that are dry Douglas-fir forest types that are not considered to provide lynx habitat. Riparian habitat associated with streams in the project area likely provides some habitat connectivity for lynx (see *MATURE FORESTED COVER AND CONNECTIVITY* in the coarse filter analysis section for further information). Lynx habitat in the project area occurs in continuous patches and travel across each of the parcels

is currently possible. However, connectivity is moderate due to the patchy distribution of forest types preferred by lynx.

The large CEAA contains a total of 3,057 acres of suitable lynx habitats (1.3% of large CEAA), including 968 acres on DNRC-managed lands (TABLE W-5 –LYNX HABITAT) and 2,071 acres on other ownerships. The remaining 21,633 acres in the analysis area consists primarily of stands that do not contain structure necessary for lynx use as well as stand that are not appropriate cover types (i.e., dry Douglas-fir and ponderosa pine stands). In the vicinity of the project area and in surrounding lands, connectivity of lynx habitats is low due to the lack of suitable habitat (see *MATURE FORESTED COVER AND CONNECTIVITY* in the coarse filter analysis section for further information).

TABLE W-5 –LYNX HABITAT. Estimates of existing lynx habitat and lynx habitat that would remain post-harvest on DNRC lands in the project and CEAA. Values in parentheses refer to the percentages of each lynx habitat category of total potential lynx habitat[a] on DNRC-managed lands.

LYNX HABITAT CATEGORY	ACRES OF LYNX HABITAT (percent of total potential DNRC lynx habitat)			
	Project Area		CEAA	
	Existing	Post-Harvest	Existing	Post-Harvest
Summer Foraging	0 (0%)	0 (0%)	7 (0.6%)	7 (0.6%)
Winter Foraging	99 (92.7%)	14 (13.3%)	706 (53.6%)	621 (47.2%)
Other Suitable	8 (7.3%)	0 (0%)	273 (20.7%)	265 (20.1%)
Temporary non-habitat	0 (0%)	93 (86.7%)	330 (25.1%)	423 (32.1%)
Grand Total - Suitable Lynx Habitat[b]	**107 (100%)**	**14 (13.3%)**	**986 (74.9%)**	**893 (67.9%)**

[a]*Total potential lynx habitat describes all areas that contain appropriate forest habitat types for lynx (i.e., sum of summer foraging, winter foraging, other suitable, and temporary non-suitable lynx habitat classes).*
[b]*Total suitable lynx habitat describes all lynx habitat categories that contain structural attributes necessary for lynx use (i.e., sum of summer foraging, winter foraging, other suitable lynx habitat classes).*

Environmental Effects

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

None of the proposed forest management activities would occur. Lynx habitat availability and habitat connectivity would not change. Thus, since: 1) no changes to lynx habitat availability would occur, and 2) no changes to landscape connectivity would occur, no adverse direct or indirect effects to Canada lynx associated with landscape connectivity and availability of suitable habitat would be anticipated as a result of the No-Action Alternative.

Direct and Indirect Effects of the Action Alternative on Canada Lynx

The proposed activities would affect 93 acres (86.7%) of the 107 acres of suitable lynx habitat available in the project area (TABLE W-5 –LYNX HABITAT). After harvest, these acres of suitable lynx habitat would be reclassified as temporary non-suitable habitat due to lack of canopy cover in the understory and overstory. The canopy cover of regenerating conifers is low throughout these stands; however to ensure that forest structural attributes preferred by snowshoe hares remain following harvest, dense patches of advanced regeneration would be retained where they occur, especially within existing lynx winter forage habitat. Additionally, 15-20 tons/acre of coarse woody debris would be retained (*ARM 36.11.414)* and retention of downed logs ≥15 inch diameter would be emphasized. Lynx habitat connectivity would be reduced due to the transition of 93 acres of suitable lynx habitat to temporary non-suitable habitat. However, some connectivity would be retained through

vegetation retention requirements associated with riparian habitat (see the WATER RESOURCES section in this document for additional information). If present in the vicinity of the project area, lynx could be temporarily displaced by forest management activities for up to 3 years due to disturbance caused by motorized activities. Thus, since: 1) lynx suitable habitat availability would be reduced by 86.7%; 2) patches of advanced regeneration would be retained where feasible, especially in winter forage habitat; and 3) landscape connectivity would be reduced, but vegetation retention measures would apply within riparian lynx travel corridors; moderate adverse direct and indirect effects to Canada lynx associated with landscape connectivity and availability of suitable habitat would be anticipated as a result of the Action Alternative.

Cumulative Effects of the No-Action Alternative on Canada Lynx

None of the proposed forest management activities would occur. Ongoing and proposed forest management activities may change the availability of suitable lynx habitats and landscape connectivity in the CEAA; however, no additional cumulative effects that would influence the availability of suitable lynx habitats and landscape connectivity are expected under the No-Action alternative. Thus, since: 1) no changes to lynx habitat type availability would occur, and 2) no changes to landscape connectivity would occur on DNRC lands, no cumulative effects to Canada lynx associated with landscape connectivity and availability of suitable habitat would be anticipated as a result of the No-Action Alternative.

Cumulative Effects of the Action Alternative on Canada Lynx

The proposed activities would affect 93 acres (3.0%) of the 3,057 acres of suitable lynx habitats available in the large CEAA including 85 acres of DNRC winter foraging habitat and 8 acres of DNRC lynx other suitable habitat (TABLE W-5 –LYNX HABITAT). After harvest, these acres of suitable lynx habitat would be reclassified as temporary non-suitable habitat due to lack of canopy cover in the understory and overstory. However, dense patches of advanced regeneration would be retained where possible, especially within lynx winter foraging habitat. Additionally, 15-20 tons/acre of coarse woody debris would be retained (*ARM 36.11.414)* and retention of downed logs ≥15 inch diameter would be emphasized. Lynx habitat connectivity would be reduced due to the transition of 93 acres of suitable lynx habitat to temporary non-suitable habitat. However, suitable lynx habitat is limited in the large CEAA and the project area is not likely to be used by lynx due to lack of habitat in the surrounding area. Riparian harvest would occur, but measures that would retain riparian vegetation would be applied, which would maintain threshold levels of cover suitable to facilitate travel. Changes to lynx suitable habitat availability and habitat connectivity would be additive to any proposed or ongoing projects, although DNRC is currently unaware of any such projects. Lynx could be temporarily displaced by forest management activities associated with the Thompson Face Timber Sale for up to 3 years. Thus, since: 1) lynx suitable habitat availability would be reduced by 93 acres (3.0% of potentially suitable lynx habitat in the large CEAA); 2) patches of advanced regeneration and shade-tolerant understory trees would be retained where feasible, especially in winter forage habitat; and 3) given the lack of suitable habitat in the area and vegetation retention measures within riparian areas, connectivity of lynx habitat would not change; minor adverse cumulative effects to Canada lynx associated with landscape connectivity and suitable habitat type availability would be anticipated as a result of the Action Alternative.

SENSITIVE SPECIES

FISHERS

Issue: The proposed activities could reduce the availability and connectivity of suitable fisher habitat and increase human access, which could reduce habitat suitability and increase trapping mortality.

Introduction

In the Rocky Mountains, fishers prefer late-successional moist coniferous forests (*Jones 1991*) and prey upon snowshoe hares, ungulate carrion, and small mammals (*Roy 1991*). Preferred fisher habitat typically contains large live trees, snags, and logs, which are used for resting and denning sites, and dense canopy cover, which is important for snow intercept (*Jones 1991*). Fishers generally avoid large openings in canopy cover, non-forested habitats, and shrub-seedling stands. Forest-management considerations for fishers involve providing upland and riparian resting and denning habitats, maintaining a network of travel corridors, and reducing trapping risk associated with motorized access.

Analysis Areas

The analysis area for direct and indirect effects is the 201-acre project area (FIGURE W-1 –ANALYSIS AREAS). The analysis area for cumulative effects is the 24,690-acre large CEAA described in TABLE W-I – ANALYSIS AREAS and depicted in FIGURE W-1 –ANALYSIS AREAS. The large CEAA is centered on the project area and is defined according to geographic features (i.e., ridgelines), which are likely to influence movements of fishers in the vicinity of the project area, providing a reasonable analysis area for fishers that could be influenced by project-related activities.

Analysis Methods

Analysis methods include field evaluations, aerial photograph interpretation, and GIS analysis of travel corridors, preferred fisher cover types (*ARM 36.11.403(60)*), and habitat structure. Fisher habitat classifications considered in the analysis include: 1) upland fisher habitat, and 2) riparian fisher habitat, which are defined according to proximity of the area to streams. Riparian fisher habitat is located within 100 feet of Class 1 streams or within 50 feet of Class 2 streams (*ARM 36.11.440(b)*). The remaining fisher habitat is considered upland fisher habitat. Habitat structure considered appropriate for fisher use includes stands of sawtimber size class trees (≥9 inches dbh) with 40-100% crown density. Potential fisher habitat (riparian, upland) on other ownerships was identified by examining mature forested habitat below 6,000 feet elevation and the proximity of mature forested habitat (≥40% cover, >9 inches dbh average) to perennial and intermittent streams. Factors considered in the analysis include: 1) the degree of harvesting, 2) availability and structure of preferred fisher habitats (upland, riparian), 3) landscape connectivity, and 4) human access.

Existing Conditions

Fishers

The project area contains 45 acres of preferred fisher cover types including 7 acres of riparian fisher habitat associated with Class 1 and 2 streams. All of these preferred fisher habitat types contain structure necessary for fisher use (i.e., sawtimber size class ≥9 inches dbh, 40-100% crown density) and are considered suitable fisher habitat (22.3% of project area). Suitable fisher habitat is continuous within each of the parcels in the project area and mature forested habitat is present on 91.4% of the project area; thus connectivity within the project area is high. Riparian habitat associated with Class 1 and 2 streams likely provide suitable travel corridors. The density of open and seasonally restricted roads is 2.8 miles/square mile and total road density is 4.9 miles/square mile, thus there is moderate-to-high level of access that could facilitate trapping.

The large CEAA contains approximately 3,756 acres of fisher habitat (15.2% of analysis area), including 1,354 acres of suitable fisher habitat on DNRC-managed lands and an additional 2,071 acres of mature forested habitat on other ownerships located below 6,000 feet elevation, which are likely to provide suitable fisher habitat. Of these acres of potential fisher habitat, approximately 226 acres are riparian fisher habitat. The remaining 20,934 acres in the large CEAA consist primarily of stands burned in the Chippy Creek Fire of 2007 (18.3% of large CEAA) and well as young regenerating stands located on privately-owned lands. Fisher habitat exists in discontinuous patches throughout the large CEAA with the majority of potential fisher habitat located on the west side of the Thompson River. The density of open and seasonally restricted roads is 2.7 miles/square mile and total road density is 5.2 miles/square mile, thus there is a moderate-to-high level of access that could facilitate trapping.

Environmental Effects

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

None of the proposed forest management activities would occur. No changes to fisher habitat availability or connectivity would occur in the project area and no additional risk associated with trapping would be expected. Thus, since: 1) no change in the amounts or structure of preferred fisher habitats would occur, 2) no change in landscape connectivity would occur, and 3) no changes to human access would occur that would facilitate trapping, no direct or indirect effects to fisher associated with habitat suitability and trapping risk would be anticipated as a result of the No-Action Alternative.

Direct and Indirect Effects of the Action Alternative on Fishers

The proposed activities would affect 31 acres (69%) of the 45 acres of suitable fisher habitat present in the project area. Canopy cover would be reduced to 5-15% in these stands, thus the structure would be expected to become unsuitable for fishers. Approximately 1 acre (14.8%) of riparian fisher habitat is proposed for harvest. However, measures would be applied to retain riparian vegetation in a manner that would maintain threshold levels of cover and structure that would maintain habitat suitability for fishers in these areas. Within riparian

fisher habitat, 85.2% of the stand would be retained in sawtimber size class in moderate to well-stocked density (*ARM 36.11.440(b)*). The availability of some important habitat characteristics (i.e., snags, coarse woody debris) could be reduced by harvest activities; although retention of dead material and live snag recruitment trees would meet DNRC Forest Management Rules (*ARM 36.11.411, ARM 26.11.414*). Approximately 1.1 miles of restricted roads are proposed for construction, thus trapping risk associated with human access would increase slightly. However, no open roads are proposed for construction. Connectivity of mature forested habitats suitable for fisher use would be expected to decrease under the Action Alternative, although travel corridors associated with riparian habitat would remain, albeit with lowered cover and tree density. If present in the vicinity of the project area, fishers could disturbed and be temporarily displaced by forest management activities for up 3 years. Thus, since: 1) habitat availability would be reduced by 31 acres (69%), but some snags and coarse woody debris would be retained (*ARM 36.11.411, ARM 26.11.414);* 2) harvest of 1 acre of riparian fisher habitat would occur, but 85.2% of the stand would be retained in sawtimber size class in moderate to well-stocked density; 3) landscape connectivity would be reduced; and 4) approximately 1.1 miles of restricted roads would be constructed, but open road density would not change; moderate adverse direct and indirect effects to fisher associated with habitat suitability and trapping risk would be anticipated as a result of the Action Alternative.

Cumulative Effects of the No-Action Alternative on Fishers

None of the proposed forest management activities would occur. Ongoing and proposed forest management projects within the large CEAA that would influence fisher habitat availability, habitat structure, and landscape connectivity. Thus, since: 1) no change in the amount or structure of preferred fisher habitats would occur, 2) no change in landscape connectivity would occur, and 3) no changes to human access would occur that would facilitate trapping, no cumulative effects to fisher associated with habitat suitability and trapping risk would be anticipated as a result of the No-Action Alternative.

Cumulative Effects of the Action Alternative on Fishers

The proposed activities would affect 31 acres (0.8%) of the 3,756 acres of potential fisher habitat available in the large CEAA. The proposed activities would change the structure of these habitats, reducing canopy cover to 5-10%, thus the structure of these stands proposed for harvest would be expected to become unsuitable for fishers. Additionally, 1 acre (0.5%) of the 226 acres of potential riparian fisher habitats available in the large CEAA is proposed for harvest. However, measures would be applied to retain riparian vegetation in a manner that would maintain threshold levels of cover and structure that would maintain habitat suitability for fishers in these areas. The availability of some important habitat characteristics (i.e., snags, coarse woody debris) could be reduced by harvest activities; although retention of some dead material and live snag recruitment trees would be required to meet DNRC Forest Management Rules (*ARM 36.11.411, ARM 26.11.414*). Connectivity of fisher habitats would be reduced, but travel corridors associated with riparian habitat would be maintained. Approximately 1.1 miles of restricted roads would be constructed, increasing trapping risk. Any adverse affects to fisher would be additive to any proposed or ongoing sales in the large CEAA, although DNRC is unaware of any such projects at this time. Fishers could be temporarily displaced by forest management activities associated with the proposed Thompson Face Timber Sale for up to 3 years. Thus, since: 1) habitat availability would decrease by 31 acres (0.8%), but snags and coarse woody debris would be retained (*ARM 36.11.411, ARM 26.11.414);* 2) harvest of 1 acre (0.5%) of riparian fisher habitat would occur; 3) landscape connectivity would be reduced; and 4) approximately 1.1 miles of restricted roads would be constructed, but no long-term changes in open road density would occur; minor adverse cumulative effects to fisher associated with habitat suitability and trapping risk would be anticipated as a result of the Action Alternative.

GRAY WOLVES

Issue: The proposed activities could disturb gray wolves and reduce winter range habitat quality for big game, which could displace gray wolves from denning and rendezvous sites and reduce prey availability.

Introduction

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

management considerations for wolves include restricting disturbance near den and rendezvous sites and promoting habitat characteristics necessary for healthy big game populations.

Analysis Areas

The analysis area for direct and indirect effects is the 201-acre project area (FIGURE W-1 –ANALYSIS AREAS). The analysis area for cumulative effects is the 24,690-acre large CEAA described in TABLE W-1 – ANALYSIS AREAS and depicted in FIGURE W-1 –ANALYSIS AREAS. The CEAA is centered on the project area, defined according to geographic features (i.e., ridgelines), and provides a reasonable analysis area for wolves that could be influenced by project-related activities.

Analysis Methods

Analysis methods include field evaluation, aerial photograph interpretation, and GIS analysis of available habitats. Factors considered in the analysis include: 1) the degree of harvesting, 2) the location of any known den or rendezvous sites, and 3) big game winter range habitat characteristics.

Existing Conditions

Gray Wolves

The project area is located the within 2011 home range of the Chippy Pack (*DFWP 2012*). No wolf rendezvous sites or den sites have been documented within 1 mile of the proposed harvest units (*K. Laudon, DFWP, wolf management specialist, pers. comm., 2012*); however, wolf use of the area could occur at any time. The entire project area is elk, moose, and white-tailed deer winter range as described by DFWP (TABLE W-6 BIG GAME, *DFWP 2008*); although little winter browsing activity was observed in the project area. Game trials, tracks, and droppings were observed throughout the project area. The project area likely provides habitat for prey species, should wolves use the area.

The large CEAA contains 14,252 acres of the estimated 2011 home range of the Chippy Creek Pack (73.5% of home range). Portions of the CEAA are identified as elk, moose, and white-tailed deer winter range by DFWP (TABLE W-4 BIG GAME, DFWP 2008). However, due to the intensive harvest history in the area, there is little thermal cover available for wintering big game.

Environmental Effects

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

None of the proposed forest management activities would occur. Wolves would not be disturbed by forest management activities and big game winter range in the project area would remain intact. Thus, since: 1) no disturbance to wolf den or rendezvous sites would occur, and 2) no change in big game winter range habitat characteristics would occur, no direct or indirect effects to wolves associated with displacement or changes in prey availability would be anticipated as a result of the No-Action Alternative.

Direct and Indirect Effects of the Action Alternative on Gray Wolves

The proposed activities would occur in 81.9% of the Chippy Creek Pack home range present in the project area. The proposed activities would affect elk and white-tailed deer winter range as identified by DFWP (TABLE W-6 –BIG GAME). Moose are fairly tolerant of winter conditions due to their large body size and the proposed activities are not expected to adversely affect moose. The proposed activities would reduce canopy cover from ≥40% to 5-15% on 162acres (87.8%) of the 184 acres of mature forested habitat currently providing thermal cover. However, the capacity of the project area to provide suitable winter range is likely low due to the east-aspect of the project area and the low availability of thermal cover in the vicinity of the project area. There are no known wolf rendezvous or den sites in the project area. However, if documented in the vicinity of the project area, mechanized activities would be restricted within 1 mile of wolf dens (*ARM 33.11.430(1)(a)*) and 0.5 miles of wolf rendezvous sites (*ARM 33.11.430(1)(b)*). Wolf use of the area is possible, and if present in the vicinity of the project area, wolves could be displaced by forest management activities for up to 3 years. Thus, since: 1) wolf den or rendezvous sites do not occur within the vicinity of the project area, but restrictions would apply if one or both are encountered during operations (*ARM 33.11.430(1)(a)(b)*); and 2) canopy cover would be removed, but the proposed activities are not expected to appreciably affect prey availability for wolves; minor adverse direct and indirect effects to wolves associated with displacement or changes in prey availability would be anticipated as a result of the Action Alternative.

Cumulative Effects of the No-Action Alternative on Gray Wolves

None of the proposed forest management activities would occur. Wolves would not be disturbed by forest management activities on DNRC lands. Big game winter range availability in the project area would not change, but may change on other ownerships outside the project area due to other potential proposed and ongoing projects. Thus, since: 1) no disturbance to wolf den or rendezvous sites would occur and 2) no change in big game winter range habitat characteristics would occur, no direct or indirect effects to wolves associated with displacement or changes in prey availability would be anticipated as a result of the No-Action Alternative.

Cumulative Effects of the Action Alternative on Gray Wolves

The proposed activities would occur in 1.2% of the Chippy Creek Pack home range present within the large CEAA. The proposed activities would affect elk and white-tailed deer winter range as identified by DFWP (TABLE W-6 –BIG GAME). Moose are fairly tolerant of winter conditions due to their large body size and the proposed activities are not expected to adversely affect moose. The proposed harvest would reduce canopy cover to <40% within 162 (4.1%) of the 3,975 acres of mature habitat available in the large CEAA; however, considering that the project area is not likely to be high-quality winter range, adverse effects are likely to be minimal. There are no known rendezvous or den sites on DNRC lands in the large cumulative effects area. However, if documented in the vicinity of the project areas, mechanized activities would be restricted within 1 mile of wolf dens (*ARM 33.11.430(1)(a)*) and 0.5 miles of wolf rendezvous sites (*ARM 33.11.430(1)(b)*). The alteration of canopy cover and disturbance to wolves would be additive to any proposed and ongoing activities occurring in the large CEAA, although the DNRC is unaware of such projects at this time. If present in the vicinity of the project area, wolves could be displaced by forest management activities associated with the Thompson Face Timber Sale for up to 3 years. Thus, since: 1) wolf den or rendezvous sites do not occur within the vicinity of the project area, but restrictions would apply if one or both are encountered during operations(*ARM 33.11.430(1)(a)(b)*); and 2) some canopy cover would be removed, but the proposed activities are not expected to adversely affect prey availability for wolves; minor adverse cumulative effects to wolves associated with displacement or changes in prey availability would be anticipated as a result of the Action Alternative.

BIG GAME WINTER RANGE

Issue: The proposed activities could reduce cover, which could reduce the quality of big game winter range habitat.

Introduction

Big game, including elk, mule deer, and white-tailed deer require areas with adequate amounts of cover and forage at lower elevations during winter. Effective big game winter range contains ample mid-story and overstory, which can ameliorate severe winter conditions by reducing wind velocity and providing snow intercept, enabling big game to move across the landscape, and by improving access to forage with less energy expenditure. Forest management considerations for big game include providing adequate hiding cover and ample overstory, which ameliorate the effects of harsh weather conditions in winter.

Analysis Areas

The analysis area for direct and indirect effects is the 201-acre project area (FIGURE W-1 –ANALYSIS AREAS). The analysis area for cumulative effects is the 24,690-acre large CEAA described in TABLE W-1 – ANALYSIS AREAS and depicted in FIGURE W-1 –ANALYSIS AREAS. The large CEAA is defined according to geographic features including watershed boundaries (i.e. ridgelines), which, provides a reasonable biological analysis unit for local big game animals that could be influenced by project-related activities.

Analysis Methods

Analysis methods include field evaluations, aerial photograph interpretation, and GIS analysis of available big game winter range (*DFWP 2008*). The availability of mature forested habitat (≥40% canopy cover, >9 inch dbh average) was used to assess the quality of big game winter range in the medium CEAA. Factors considered in the analysis include: 1) the degree of timber harvesting, and 2) the availability and structure of big game winter range.

Existing Conditions

Big Game Winter Range
The project area contains elk and white-tailed deer winter range (*DFWP 2008*) (TABLE W-6 –BIG GAME). Approximately 184 acres (91.4%) of the project area contains mature canopy cover (≥40% canopy cover, 9 inch dbh average) composed primarily of Douglas-fir, western larch, and ponderosa pine stands. This habitat consists of primarily of moderately stocked forest stands with approximately 23 acres of dense canopy cover (70%). Desirable winter range habitat attributes found in the area include low elevation, steep slopes, and appreciable amounts of canopy cover. However, the east aspect of the majority project area makes the area less likely to provide high quality winter range and little evidence of winter browsing was observed during field visits. Big game may use the area if other more suitable winter range habitat is not available.

The large CEAA contains elk and white-tailed deer winter range (*DFWP 2008*) (TABLE W-6 –BIG GAME). Approximately 3,975 acres (16.1% analysis area) of mature forested habitat (≥40% canopy cover, >9 inch dbh average) occur in the large CEAA and provides some thermal protection for big game. The remaining habitat in the large CEAA consists of habitat burned in the Chippy Creek Fire of 2007 (18.1% of the large CEAA) as well as young regenerating stands due to the history of logging. Desirable winter range habitat attributes that occur in the large CEAA include low elevation, steep slopes, and southwest facing aspects. However, mature canopy cover suitable for thermal cover is limited and scattered across the large CEAA in small patches.

TABLE W-6 –BIG GAME. Existing big game winter range as identified by DFWP (*2008*) in the project and large CEAA and acres that would be affected by the proposed activities.

BIG GAME SPECIES	ACRES OF WINTER RANGE			
	Project Area		Large CEAA	
	Existing[a]	Acres Affected[b]	Existing[a]	Acres Affected[b]
Elk	201 100.0%	165 82.0%	22,843 92.5%	165 0.7%
White-tailed deer	201 100.0%	165 82.0%	23,725 96.1%	165 0.7%

[a]*Acreage and percentage estimates reflect the amounts of each analysis area considered winter range by DFWP.*
[b]*Acreage and percentage estimates reflect the amounts of existing winter range that would be affected in each analysis area by the proposed activities.*

Environmental Effects

Direct and Indirect Effects of the No-Action Alternative on Big Game Winter Range
None of the proposed forest management activities would occur. Mature forested habitat in the project area providing thermal cover in the project area would not be affected. Thus, since the structure of existing big game winter range would not change, no direct and indirect effects to big game winter range quality and wintering animals would be anticipated as a result of the No-Action Alternative.
Direct and Indirect Effects of the Action Alternative on Big Game Winter Range
Big game winter range would be affected by the proposed activities (TABLE W-6 –BIG GAME). The proposed activities would reduce canopy cover on 162 acres (87.8%) of the 184 acres of mature forested habitat currently providing thermal cover. The proposed activities would open stands to 5-15% canopy cover, reducing the capacity of these areas to provide snow intercept and reduce wind velocity. However, the east facing aspect and low availability of canopy cover in the vicinity of the project area makes this area unlikely to provide big game with high-quality winter range; thus the proposed activities may have a limited impact on local big game populations. Advanced regenerating conifers (>6 feet height) would be retained throughout the harvest units, providing some residual cover. Winter logging may occur, but would not be required and wintering animals

could be displaced for up to 3 winters by the proposed activities. Thus, since: 1) canopy cover would be removed on 162 acres (87.8% of available mature canopy cover), 2) some canopy cover and regenerating conifers would be retained, 3) displacement of big game would be temporary and across a relatively small area (up to 3 years), and 4) the aspect and low availability of canopy cover cause indicate that the area is low-quality winter range, minor adverse direct and indirect effects to big game winter range quality and wintering animals would be anticipated as a result of the Action Alternative.

Cumulative Effects of the No-Action Alternative on Big Game Winter Range

None of the proposed forest management activities would occur. Big game thermal cover would not be affected, but may change on other ownerships. Thus, since the structure of existing big game winter range would not change, no cumulative effects to big game winter range quality and wintering animals would be anticipated as a result of the No-Action Alternative.

Cumulative Effects of the Action Alternative on Big Game Winter Range

Big game winter range would be affected by the proposed activities (TABLE W-6 –BIG GAME). The proposed harvest would reduce canopy cover to <40% within 162 (4.1%) of the 3,975 acres of mature habitat available in the large CEAA. However, advanced regenerating conifers (>6 feet height) and some canopy cover (5-15%) would be retained, providing some residual cover. Additionally, the aspect and surrounding land-management indicate the area is likely not high-quality winter range. Reductions in thermal cover would be additive to any proposed and ongoing activities in the large CEAA, although DNRC is currently unaware of such projects. Winter logging may occur, but would not be required and wintering animals could be displaced for up to 3 winters by the proposed activities. Thus, since: 1) canopy cover would be removed, reducing the quality of big game winter range on 162 acres (4.1% of available canopy cover) currently providing thermal cover; 2) some canopy cover and regenerating conifers would be retained; 3) displacement of big game would be temporary across a relatively small area; and 4) the proposed activities would occur in an area that has a limited capacity to provide quality winter range due to aspect and surrounding land management; minor adverse cumulative effects to big game winter range quality and wintering animals would be anticipated as a result of the Action Alternative.

LIST OF MITIGATIONS

- If a threatened or endangered species is encountered, consult a DNRC biologist and develop additional mitigations that are consistent with the Forest Management Rules for managing threatened and endangered species (*ARM 36.11.428* through *36.11.435*).
- Prohibit contractors and purchasers conducting contract operations from carrying firearms while on duty as per ARM 36.11.444(2) and *GB-PR2* (*USFWS and DNRC 2010)*.
- Contractors will adhere to food storage and sanitation requirements as per GB-PR3 (*USFWS and DNRC 2010*).
- Within Canada lynx winter foraging habitat, retain up to 10% of the stand area in patches of advanced regeneration of shade-tolerant trees (grand fir, subalpine fir, and spruce) as per LY-HB4 (*USFWS and DNRC 2010).*
- Manage for snags and snag recruits, particularly favoring western larch, Douglas-fir, and ponderosa pine.
- Retain 15-20 tons/acre of coarse-woody debris and emphasize the retention of downed logs ≥15 inches dbh where they occur as per LY-HB2 (*USFWS and DNRC 2010).*
- Use a combination of topography, group retention, and roadside vegetation to reduce sight distances within harvest units where feasible.

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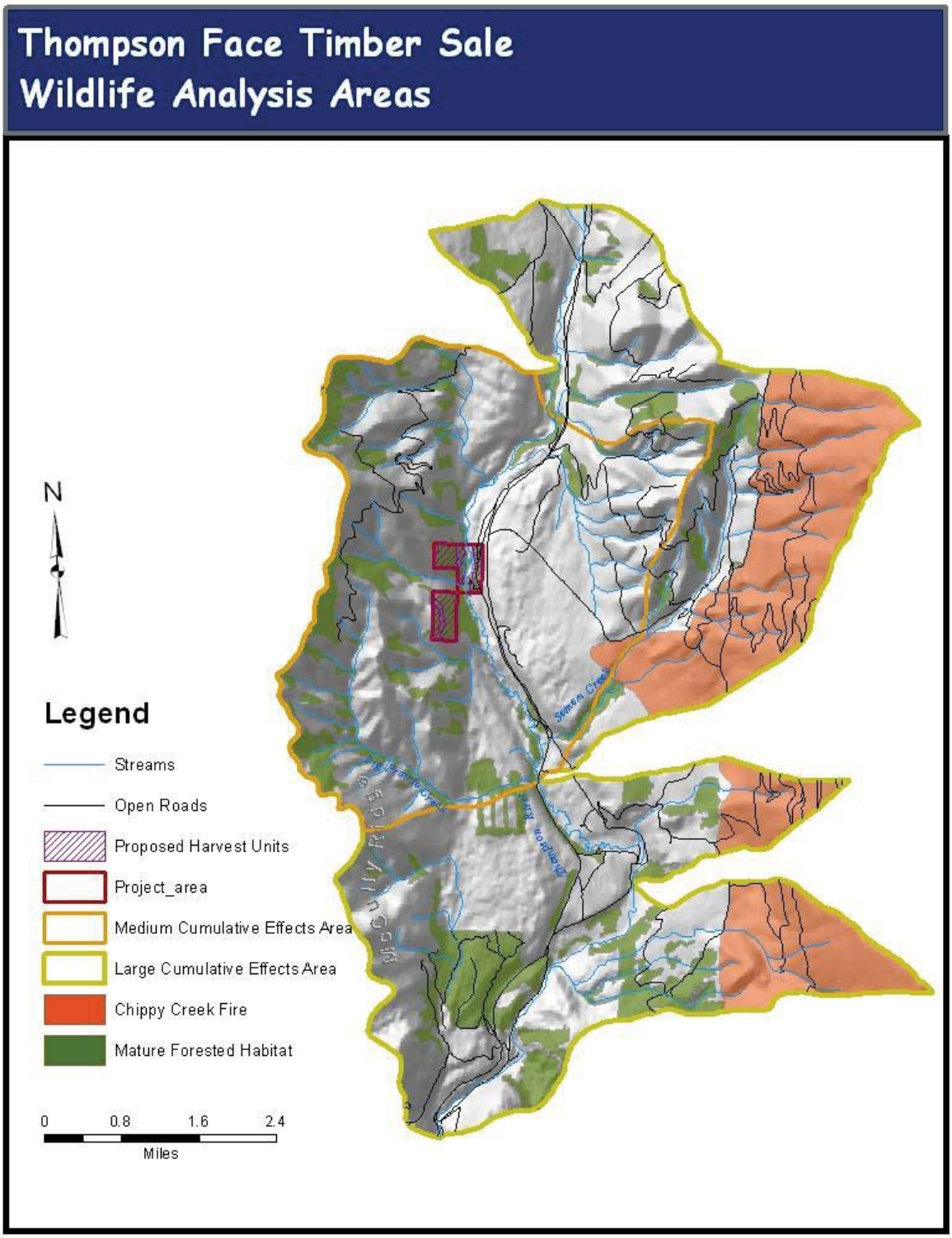
FIGURE W-1 –ANALYSIS AREAS. Wildlife analysis areas for the proposed Thompson Face Timber Sale.



Attachment III

Harvest Prescriptions

Thompson Face Timber Sale
HARVEST UNIT PRESCRIPTIONS

Unit Number: 1	**Acres:** 11	**Location:** W1/2, SW1/4, S26, T24N, R27W
Elevation: 4040’	**Slope:** 5 – 25%	**Aspect(s):** East
Habitat type: Grand fir / twinflower **-** twinflower phase (ABGR/LIBO - LIBO)		
Soils: Winkler, cool, - Sharrott, cool - rock outcrops complex.		
Current Cover Type: western larch / Douglas-fir		
Desired Future Condition: ponderosa pine		

Description of stand(s):

The current stand generally consists of an overstory of Douglas-fir and western larch with scattered large diameter mature ponderosa pine forming a closed canopy. The overstory is 80% Douglas-fir, 8% western larch, 7% ponderosa pine and 5% grand fir. The overstory mean diameter is 13”, heights range from 70 – 100 feet and ages average 100 – 150 years. The scattered large diameter ponderosa pine in the overstory average 26” DBH, 100+ feet tall and 200+ years of age.

The midstory is dominated by grand fir with a mean diameter of 9”, heights average 60 feet tall and ages average 70 – 80 years. The canopy is generally closed and understory regeneration is limited to pockets of dense grand fir saplings.

Throughout the stand much of the Douglas-fir is succumbing to infestations of Douglas-fir beetle (*Dendroctonus pseudotsuga*) and western spruce bud worm (*Choristoneura occidentalis)*. The grand fir is also succumbing to the western spruce bud worm (*Choristoneura occidentalis)*. Root disease is prevalent in places, adding to the susceptibility of insect attack in the Douglas-fir.

Fuel loading in the stand is quite high as overstory trees die and fall, and grand fir regeneration grows in the resulting canopy openings. Down woody debris in the stand ranges from 15 – 35 tons per acre.

Treatment Objectives:

- Minimize losses in merchantable timber volume, and generate income for the Common Schools Trust Grant by removing unhealthy, poorly formed, overcrowded, diseased and dying trees from the stand.
- Reduce overall fire hazard of the stand by removing dead and dying individuals, ladder fuels and adequately spacing healthy residual trees.
- Promote long term forest health, insect and disease resistance and promote continued regeneration of desired future condition species.

Prescribed Treatment:

- Shelterwood with reserves to emulate mixed severity fire; retaining healthy trees on a variable spacing of approximately 40 feet.
- Favor leaving ponderosa pine, western larch and Douglas-fir in that order.
- Remove all merchantable grand fir and lodgepole pine.
- Snags: Cull trees with visible wildlife use and snag recruits of the largest size class available should be retained at a target of at least 4 per acre.
- Lynx habitat: individuals surrounded by groups of advanced regeneration should be retained for lynx habitat.

Harvest method:

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

Regeneration plans:

- Promote natural regeneration through silvicutural prescriptions and scarification during harvest.
- Machine pile and scarify as needed after nutrient recycling period following harvest.
- Monitor success of natural regeneration and plant as necessary.

Hazard reduction:

- Pile and burn slash at landings following harvest.
- Pile and burn slash in unit where accumulations exceed nutrient recycling requirements of 15 – 20 tons per acre.

Anticipated Future Treatments:

- Monitor stand for future salvage opportunities related to insect and disease outbreaks, severe weather events or other unforeseen circumstances.
- Evaluate for regeneration and precommercial thinning opportunities as the stand progresses in age.

Unit Number: 2	**Acres:** 11	**Location:** W1/2, SW1/4, S26, T24N, R27W
Elevation: 3900’	**Slope:** 50 – 70%	**Aspect(s):** North , East
Habitat type: Douglas-fir / twinflower **-** snowberry phase (PSME/LIBO - SYAL)		
Soils: Winkler, cool, - Sharrott, cool - Rock outcrop complex.		
Current Cover Type: Douglas-fir		
Desired Future Condition: ponderosa pine		

Description of stand(s):

The current stand generally consists of an overstory of Douglas-fir with scattered western larch and large diameter mature ponderosa pine forming a closed canopy. The overstory is 84% Douglas-fir, 10% ponderosa pine and 6% grand fir. The overstory mean diameter is 15”, heights range from 70 – 100 feet and ages average 100 – 150 years. The scattered large diameter ponderosa pine in the overstory average 23” DBH, 100 feet tall and 200+ years of age.

The midstory consists of grand fir with a mean diameter of 9”, heights average 50 - 60 feet tall and ages average 70 – 80 years. The canopy is generally closed and understory regeneration is limited to pockets of dense grand fir saplings.

Throughout the stand much of the Douglas-fir is succumbing to infestations of Douglas-fir beetle and western spruce bud worm. The grand fir is also succumbing to the western spruce bud worm. Root disease is prevalent in places, adding to the susceptibility of insect attack in the Douglas-fir.

Fuel loading in the stand is moderate as overstory trees die and fall, and grand fir regeneration grows in the resulting canopy openings. Down woody debris in the stand ranges from 10 – 20 tons per acre.

Treatment Objectives:

- Minimize losses in merchantable timber volume, and generate income for the Common Schools Trust Grant by removing unhealthy, poorly formed, overcrowded, diseased and dying trees from the stand.
- Reduce overall fire hazard of the stand by removing dead and dying individuals, ladder fuels and adequately spacing healthy residual trees.
- Promote long term forest health, insect and disease resistance and promote continued regeneration of desired future condition species.

Prescribed Treatment:

- Seed Tree with reserves to emulate stand replacing fire, retaining healthy trees on a variable spacing of approximately 50 feet.
- Favor leaving ponderosa pine, western larch and Douglas-fir in that order.
- Remove all merchantable grand fir and lodgepole pine.
- Snags: Cull trees with visible wildlife use and snag recruits of the largest size class available should be retained at a target of at least 4 per acre.
- Lynx habitat: individuals surrounded by groups of advanced regeneration should be retained for lynx habitat.

Harvest method:

- Cable logging systems are applicable to this unit.

Regeneration plans:

- Promote natural regeneration through silvicutural prescriptions and scarification during harvest.
- Monitor success of natural regeneration and plant as necessary.

Hazard reduction:

- Pile and burn slash at landings following harvest.

Anticipated Future Treatments:

- Monitor stand for future salvage opportunities related to insect and disease outbreaks, severe weather events or other unforeseen circumstances.
- Evaluate for regeneration and precommercial thinning opportunities as the stand progresses in age.

Unit Number: 3	**Acres:** 53	**Location:** W1/2, SW1/4, S26, T24N, R27W
Elevation: 3,240 – 3,760'	**Slope:** 30 - 90%	**Aspect(s):** North, East, South
Habitat type: Douglas-fir / twinflower **-** snowberry phase (PSME/LIBO - SYAL)		
Soils: Beeskove – Mollman – Rock outcrop Complex.		
Current Cover Type: Douglas-fir		
Desired Future Condition: ponderosa pine		

Description of stand(s):

The current stand generally consists of an overstory of Douglas-fir, western larch and grand fir with scattered lodgepole pine and large diameter mature ponderosa pine forming a closed canopy. The overstory is 78% Douglas-fir, 6% western larch, 7% ponderosa pine 7% grand fir, and 2% lodgepole pine. The overstory mean diameter is 14", heights range from 80 – 110 feet and ages average 100 – 150 years. The scattered large diameter ponderosa pine in the overstory average 22" DBH, 100+ feet tall and 200+ years of age.
The canopy is generally closed and understory regeneration is limited to pockets of dense grand fir saplings. Throughout the stand much of the Douglas-fir is succumbing to infestations of Douglas-fir beetle and western spruce bud worm. The grand fir is also succumbing to the western spruce bud worm. Root disease is prevalent in places, adding to the susceptibility of insect attack in the Douglas-fir.
Fuel loading in the stand is high as overstory trees die and fall, and grand fir regeneration grows in the resulting canopy openings. Down woody debris in the stand ranges from 15 – 45 tons per acre.

Treatment Objectives:

- Minimize losses in merchantable timber volume, and generate income for the Common Schools Trust Grant by removing unhealthy, poorly formed, overcrowded, diseased and dying trees from the stand.
- Reduce overall fire hazard of the stand by removing dead and dying individuals, ladder fuels and adequately spacing healthy residual trees.
- Promote long term forest health, insect and disease resistance and promote continued regeneration of desired future condition species.

Prescribed Treatment:

- Seed Tree with reserves to emulate stand replacing fire, retaining healthy trees on a variable spacing of approximately 50 feet.
- Favor leaving ponderosa pine, western larch and Douglas-fir in that order.
- Remove all merchantable grand fir and lodgepole pine.
- Snags: Cull trees with visible wildlife use and snag recruits of the largest size class available should be retained at a target of at least 4 per acre.
- Lynx habitat: individuals surrounded by groups of advanced regeneration should be retained for lynx habitat.

Harvest method:

- Cable logging systems are applicable to this unit.
- Intermediate supports may be required on this unit.

Regeneration plans:

- Promote natural regeneration through silvicutural prescriptions and scarification during harvest.
- Monitor success of natural regeneration and plant as necessary within 5 years of harvest.

Hazard reduction:

- Pile and burn slash at landings following harvest.

Anticipated Future Treatments:

- Monitor stand for future salvage opportunities related to insect and disease outbreaks, severe weather events or other unforeseen circumstances.
- Evaluate for regeneration and precommercial thinning opportunities as the stand progresses in age.

Unit Number: 4	**Acres:** 5	**Location:** W1/2, SW1/4, S26, T24N, R27W
Elevation: 3,900’	**Slope:** 5 – 25%	**Aspect(s):** South
Habitat type: Douglas-fir / snowberry **-** snowberry phase (PSME/SYAL - SYAL)		
Soils: Winkler gravelly sandy loam, cool.		
Current Cover Type: Douglas-fir		
Desired Future Condition: ponderosa pine		

Description of stand(s):

The current stand generally consists of an overstory of Douglas-fir and large diameter mature ponderosa pine forming a closed canopy. The overstory is 65% Douglas-fir, and 35% ponderosa pine. The Douglas-fir mean diameter is 14", heights range from 70 – 90 feet and ages average 100 – 150 years. The scattered large diameter ponderosa pine in the overstory average 20" DBH, 100+ feet tall and 200+ years of age.
The canopy is generally closed and understory regeneration is limited to pockets of dense grand fir saplings. Throughout the stand much of the Douglas-fir is succumbing to infestations of Douglas-fir beetle and western spruce bud worm. The grand fir is also succumbing to the western spruce bud worm. Root disease is prevalent in places, adding to the susceptibility of insect attack in the Douglas-fir.
Fuel loading in the stand is moderate as overstory trees die and fall, and grand fir regeneration grows in the resulting canopy openings. Down woody debris in the stand ranges from 15 – 25 tons per acre.

Treatment Objectives:

- Minimize losses in merchantable timber volume, and generate income for the Common Schools Trust Grant by removing unhealthy, poorly formed, overcrowded, diseased and dying trees from the stand.
- Reduce overall fire hazard of the stand by removing dead and dying individuals, ladder fuels and adequately spacing healthy residual trees.
- Promote long term forest health, insect and disease resistance and promote continued regeneration of desired future condition species.

Prescribed Treatment:

- Shelterwood with reserves to emulate mixed severity fire, retaining healthy trees on a variable spacing of approximately 40 feet.
- Favor leaving ponderosa pine, western larch and Douglas-fir in that order.
- Remove all merchantable grand fir and lodgepole pine.
- Promote natural regeneration of ponderosa pine and western larch by creating openings in the stand and allowing sunlight to reach the floor.
- Snags: Cull trees with visible wildlife use and snag recruits of the largest size class available should be retained at a target of at least 4 per acre.
- Lynx habitat: individuals surrounded by groups of advanced regeneration should be retained for lynx habitat.

Harvest method:

- Tractor logging with conventional, mechanical or cut to length operations are applicable to this unit.
- Some adverse skidding is required in this unit, less than 2 acres.

Regeneration plans:

- Promote natural regeneration through silvicutural prescriptions and scarification during harvest.
- Machine pile and scarify as needed after nutrient recycling period following harvest.
- Monitor success of natural regeneration and plant as necessary.

Hazard reduction:

- Pile and burn slash at landings following harvest.
- Pile and burn slash in unit where accumulations exceed nutrient recycling requirements of 15 – 20 tons per acre.

Anticipated Future Treatments:

- Monitor stand for future salvage opportunities related to insect and disease outbreaks, severe weather events or other unforeseen circumstances.
- Evaluate for regeneration and precommercial thinning opportunities as the stand progresses in age.

Unit Number: 5	**Acres:** 36	**Location: N**W1/4, NW1/4, S26, T24N, R27W
Elevation: 3,240 **-** 3,920'	**Slope:** 45 – 95%	**Aspect(s):** East, Southeast
Habitat type: Douglas-fir / snowberry **-** snowberry phase (PSME/SYAL - SYAL)		
Soils: Beeskove – Mollman – Rock outcrop Complex.		
Current Cover Type: Douglas-fir		
Desired Future Condition: ponderosa pine		

Description of stand(s):

The current stand generally consists of an overstory of Douglas-fir with scattered western larch and large diameter mature ponderosa pine forming a closed canopy. The overstory is 92% Douglas-fir, 4% western larch, and 4% ponderosa pine. The Douglas-fir mean diameter is 13", heights range from 70 – 90 feet and ages average 100 – 150 years. The scattered western larch and ponderosa pine in the overstory average 17" DBH, 100+ feet tall and 200 years of age.
The canopy is generally closed and understory regeneration is limited to pockets of dense grand fir saplings. Throughout the stand much of the Douglas-fir is succumbing to infestations of Douglas-fir beetle and western spruce bud worm. The grand fir is also succumbing to the western spruce bud worm. Root disease is prevalent in places, adding to the susceptibility of insect attack in the Douglas-fir.
Fuel loading in the stand is high as overstory trees die and fall, and grand fir regeneration grows in the resulting canopy openings. Down woody debris in the stand ranges from 25 – 45 tons per acre.

Treatment Objectives:

- Minimize losses in merchantable timber volume, and generate income for the Common Schools Trust Grant by removing unhealthy, poorly formed, overcrowded, diseased and dying trees from the stand.
- Reduce overall fire hazard of the stand by removing dead and dying individuals, ladder fuels and adequately spacing healthy residual trees.
- Promote long term forest health, insect and disease resistance and promote continued regeneration of desired future condition species.

Prescribed Treatment:

- Seed Tree with reserves to emulate stand replacing fire, retaining healthy trees on a variable spacing of approximately 50 feet.
- Favor leaving ponderosa pine, western larch and Douglas-fir in that order.
- Remove all merchantable grand fir and lodgepole pine.
- Snags: Cull trees with visible wildlife use and snag recruits of the largest size class available should be retained at a target of at least 4 per acre.
- Lynx habitat: individuals surrounded by groups of advanced regeneration should be retained for lynx habitat.

Harvest method:

- Cable logging systems are applicable to this unit.
- Intermediate supports may be required on this unit.
- Some high-banking is required in this unit.

Regeneration plans:

- Promote natural regeneration through silvicutural prescriptions and scarification during harvest.
- Monitor success of natural regeneration and plant as necessary.

Hazard reduction:

- Pile and burn slash at landings following harvest.

Anticipated Future Treatments:

- Monitor stand for future salvage opportunities related to insect and disease outbreaks, severe weather events or other unforeseen circumstances.
- Evaluate for regeneration and precommercial thinning opportunities as the stand progresses in age.

Unit Number: 6	**Acres:** 18	**Location:** E1/2, NW1/4, S26, T24N, R27W
Elevation: 3,080 **-** 3,180'	**Slope:** 25 –75%	**Aspect(s):** East
Habitat type: grand fir / queencup beadlily **-** queencup beadlily phase (ABGR/CLUN - CLUN)		
Soils: Beeskove gravelly loam, moist.		
Current Cover Type: mixed conifer		
Desired Future Condition: ponderosa pine		

Description of stand(s):

The current stand generally consists of an overstory of Douglas-fir, Engelmann spruce, and grand fir with scattered western larch and ponderosa pine forming a closed canopy. The overstory is 69% Douglas-fir, 14% Engelmann spruce, 11% grand fir, 3% western larch, and 3% ponderosa pine. The overstory mean diameter is 12", heights range from 70 – 90 feet and ages average 100 – 150 years. The scattered western larch and ponderosa pine in the overstory average 24" DBH, 100 - 120 feet tall and 200+ years of age. The midstory is dominated by grand fir, and Engelmann spruce with a mean diameter of 9", heights average 50-70 feet tall and ages average 70 – 80 years.

The understory regeneration is limited to pockets of dense grand fir saplings.

Throughout the stand much of the Douglas-fir is succumbing to infestations of Douglas-fir beetle and western spruce bud worm. The grand fir is also succumbing to the western spruce bud worm. Root disease is prevalent in places, adding to the susceptibility of insect attack in the Douglas-fir.

Fuel loading in the stand is high as overstory trees die and fall, and grand fir regeneration grows in the resulting canopy openings. Down woody debris in the stand ranges from 25 – 45 tons per acre.

Treatment Objectives:

- Minimize losses in merchantable timber volume, and generate income for the Common Schools Trust Grant by removing unhealthy, poorly formed, overcrowded, diseased and dying trees from the stand.
- Reduce overall fire hazard of the stand by removing dead and dying individuals, ladder fuels and adequately spacing healthy residual trees.
- Promote long term forest health, insect and disease resistance and promote continued regeneration of desired future condition species.

Prescribed Treatment:

- Shelterwood with reserves to emulate mixed severity fire, retaining healthy trees on a variable spacing of approximately 40 feet.
- Favor leaving ponderosa pine, western larch and Douglas-fir in that order.
- Remove all merchantable grand fir and lodgepole pine.

- Promote natural regeneration of ponderosa pine and western larch by creating openings in the stand and allowing sunlight to reach the floor.
- Snags: Cull trees with visible wildlife use and snag recruits of the largest size class available should be retained at a target of at least 4 per acre.
- Lynx habitat: individuals surrounded by groups of advanced regeneration should be retained for lynx habitat.

Harvest method:

- This unit may require a combination of cable logging and tractor skidding systems.
- Intermediate supports may be required on this unit.
- Mechanical harvesting and tractor skidding on slopes >45% will not be permitted.

Regeneration plans:

- Promote natural regeneration through silvicutural prescriptions and scarification during harvest.
- Monitor success of natural regeneration and plant as necessary.

Hazard reduction:

- Pile and burn slash at landings following harvest.

Anticipated Future Treatments:

- Monitor stand for future salvage opportunities related to insect and disease outbreaks, severe weather events or other unforeseen circumstances.
- Evaluate for regeneration and precommercial thinning opportunities as the stand progresses in age.

Unit Number: 7	**Acres:** 30	**Location:** E1/2, NW1/4, S26, T24N, R27W
Elevation: 3,200'	**Slope:** 0 - 5%	**Aspect(s):** west
Habitat type: Douglas-fir / dwarf huckleberry (PSME/VACA)		
Soils: Rumblecreek gravelly loam, dry.		
Current Cover Type: ponderosa pine		
Desired Future Condition: ponderosa pine		

Description of stand(s):

This harvest unit has had previous harvesting activity, and the resulting stand is a fairly dense multistoried stand. The current overstory is: 84% Douglas-fir with a mean diameter of 11", heights range from 50 – 70 feet, and ages range from 50 – 100 years; 12% ponderosa pine with a mean diameter of 26", an average height of 120 feet and ages ranging from 150 – 250 years; and 4% western larch with a mean diameter of 14", heights averaging 80 feet and ages ranging from 100 – 150 years. The midstory is dominated by Douglas-fir and lodgepole pine. The understory is generally Douglas-fir and lodgepole pine with grand fir in the wetter sites.

Throughout the stand much of the Douglas-fir is succumbing to infestations of Douglas-fir beetle and western spruce bud worm. The grand fir is also succumbing to the western spruce bud worm. The lodgepole pine has signs of infestation by mountain pine beetle. Root disease is prevalent in places, adding to the susceptibility of insect attack in the Douglas-fir.
Fuel loading in the stand is low as much of the dead timber in the unit has been removed for firewood. Down woody debris in the stand ranges from 5 – 15 tons per acre.

Treatment Objectives:

- Minimize losses in merchantable timber volume, and generate income for the Common Schools Trust Grant by removing unhealthy, poorly formed, overcrowded, diseased and dying trees from the stand.
- Reduce overall fire hazard of the stand by removing dead and dying individuals, ladder fuels and adequately spacing healthy residual trees.
- Promote long term forest health, insect and disease resistance and promote continued regeneration of desired future condition species.

Prescribed Treatment:

- Individual Selection to emulate a low intensity fire, retaining healthy trees on a variable spacing of approximately 30 feet.
- Favor leaving ponderosa pine, western larch and Douglas-fir in that order.
- Remove all merchantable grand fir and lodgepole pine.
- Snags: Cull trees with visible wildlife use and snag recruits of the largest size class available should be retained at a target of at least 4 per acre, where available.

Harvest method:

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

Regeneration plans:

- Regeneration is not a priority for this stand at this time.

Hazard reduction:

- Pile and burn slash at landings following harvest.
- Pile and burn slash in unit where accumulations exceed nutrient recycling requirements of 15 – 20 tons per acre.
- Lop and trample slash to a maximum depth of 18” to minimize fire hazard along open roads.

Anticipated Future Treatments:

- Monitor stand for future salvage opportunities related to insect and disease outbreaks, severe weather events or other unforeseen circumstances.
- Evaluate for regeneration and precommercial thinning opportunities as the stand progresses in age.

ATTACHMENT IV

MITIGATIONS

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

Roads:

- A transportation system minimizing road miles and meeting all Best Management Practices (BMP) has been designed by DNRC Foresters.
- The proposed action would include approximately 1.1 miles of new road construction and approximately 0.5 miles of existing road reconditioning. Additionally, approximately 14.6 miles of existing system roads would be maintained and improved as needed to meet Forestry Best Management Practices (BMPs).
- New construction, reconditioned and improved roads would have drainage installed, and would be grass seeded and fertilized at the direction of the Forest Officer. Restricted access roads would be closed to vehicle traffic following harvesting.
- Upon completion of road work, all haul roads would meet BMP standards.

Wildlife

- If a threatened or endangered species is encountered, consult a DNRC biologist and develop additional mitigations that are consistent with the Forest Management Rules for managing threatened and endangered species (*ARM 36.11.428* through *36.11.435*).
- Prohibit contractors and purchasers conducting contract operations from carrying firearms while on duty as per ARM 36.11.444(2) and *GB-PR2* (*USFWS and DNRC 2010)*.
- Contractors will adhere to food storage and sanitation requirements as per GB-PR3 (*USFWS and DNRC 2010*).
- Within Canada lynx winter foraging habitat, retain up to 10% of the stand area in patches of advanced regeneration of shade-tolerant trees (grand fir, subalpine fir, and spruce) as per LY-HB4 (*USFWS and DNRC 2010).*
- Manage for snags and snag recruits, particularly favoring western larch, Douglas-fir, and ponderosa pine.
- Retain 15-20 tons/acre of coarse-woody debris and emphasize the retention of downed logs ≥15 inches dbh where they occur as per LY-HB2 (*USFWS and DNRC 2010).*
- Use a combination of topography, group retention, and roadside vegetation to reduce sight distances within harvest units where feasible.

Soils:

DNRC would minimize long-term soil impacts and adverse cumulative effects by implementing any or all of the following:

- Existing skid trails from past harvest activities would be used if they are properly located and spaced
- Additional skid trails would be used only where existing trails are unacceptable
- Mitigating the potential direct and indirect effects with soil moisture restrictions, season of operation, and method of harvest
- Retention of a portion of coarse woody debris and fine litter for nutrient cycling.

Regeneration:

- Silvicutrural prescriptions designed to promote natural regeneration of desired future conditions and historic timber types have been incorporated into the project design.
- Seedlings of the desired future condition species would be planted where soil conditions allow and there is little or no seed source as determined by Forest Officer.

Noxious Weed Management:

- Newly constructed roads and skid trail approaches would be seeded and fertilized 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. Restricted entry roads would be closed following the sale to avoid migration of weed seed into the area. Post-harvest, the area would be included in the Plains Unit's integrated weed management program.

Attachment V

Consultants and References

Preparers:

Kyle Johnson, MT DNRC, Plains Unit, Plains, Montana –DNRC Forester, Project Leader

Tony Nelson, MT DNRC, Northwestern Land Office, Kalispell, Montana – Area Hydrologist, Soils Specialist

Leah Briedinger, MT DNRC, Northwestern Land Office, Kalispell, Montana – Area Wildlife Biologist

Consultants:

Larry Ballantyne, MT DNRC, Plains Unit, Plains Montana

Dave Olsen, MT DNRC, Plains Unit, Plains, Montana

Patrick Rennie, MT DNRC, Trust Land Management Division, Helena Montana - Archaeologist

Dale Peters, MT DNRC, Plains Unit, Plains, Montana

Everett Young , MT DNRC, Plains Unit, Plains, Montana

Sonya Germann, MT DNRC, Forest Management Bureau, Missoula Montana

Tim Spoelma, MT DNRC, Forest Management Bureau, Missoula Montana

Norm Kuennen, MT DNRC, Northwestern Land Office, Kalispell, Montana

Jim Bower, MT DNRC, Forest Management Bureau, Missoula Montana

Doug Shaner, USFS Forester retired. Plains / Thompson Fall Ranger District.

Marc Vessar, MT DNRC, Northwestern Land Office, Kalispell, Montana – Area Hydrologist, Soils Specialist

Christopher Forristal, MT DNRC, Northwestern Land Office, Kalispell, Montana – Area Wildlife Biologist

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