DRAFT

Environmental Assessment

For The

Henry Fuels Timber Sale

Sections 35 & 36 T20N R25W

Prepared By

Dale Peters, Management Forester
Plains Unit, Northwestern Land Office

Montana Department of Natural Resources and Conservation

June 2010

Table of Contents

Objective Memo **5**

Checklist Environmental Assessment **7**

Attachment I: Area Maps **15**

Attachment II: Resource Analysis **25**

- **Vegetation Analysis** **27**
- **Watershed and Hydrology Analysis** **29**
- **Soils Analysis** **33**
- **Wildlife Habitat Analysis** **36**
- **Archaeological Analysis** **50**

Attachment III: Harvest Prescriptions **53**

Attachment IV: Mitigations **77**

Attachment V: Consultants & References **81**

MEMORANDUM

To: Dale Peters, Management Forester, Plains Unit

From: Larry Ballantyne, Plains Unit Resource Program Manager

Date: January 5, 2009

RE: Henry Divide Timber Opportunity

Primary Objective

The primary objective of the Henry Divide Timber Opportunity is to explore possibilities of income for the Common School (CS) Trust. The land parcels involved in this possible activity are located in Sections 34, 35 and 36, T20N, R25W. Timber volume and revenue would contribute to the Northwestern land Office sale program targets for FY 2011.

Secondary Objectives

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

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

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

Management Directives

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

CHECKLIST ENVIRONMENTAL ASSESSMENT

Project Name:	Henry Fuels Timber Sale
Proposed Implementation Date:	August, 2010
Proponent:	Plains Unit - Northwestern Land Office Department of Natural Resources and Conservation.
Location:	Sections 35 & 36, Township 20 North, Range 25 West
County:	Sanders County

I. TYPE AND PURPOSE OF ACTION

The Department of Natural Resources and Conservation (DNRC) proposes to sell approximately 20,800 tons (2.8 MMBF**)** of sawlogs from Sections 35 and 36, T20N, R25W, 7 air miles west of Plains, Montana. This action would produce estimated revenue of $450,000.00 for the Common Schools (C.S.) Trust Grant and an additional $100,000.00 in Forest Improvement (FI) fees. Under the proposed action, the DNRC harvest activities would maintain and improve forest health, reduce fuel loadings, and increase forest productivity beneficial to future Trust actions. The harvest prescriptions are designed to promote timber types historically found in the area, improve forest health and promote regeneration of the project area (See Attachment I, Area Maps and Project Plan; Attachment III, Harvest Prescriptions). If the Action Alternative is selected, activities would begin August 2010.

In addition to timber harvesting, approximately 1.2 miles of new road would be constructed; 1.3 miles of road would be reconditioned as necessary to meet Best Management Practices (BMP); 10.3 miles of United States Forest Service (USFS), Bureau of Indian Affairs (BIA) & Tribal roads would have advanced maintenance preformed (See Attachment I, Area Maps and Project Plan).

Lands involved in this proposed project are held by the State of Montana in trust for the support of specific beneficiary institutions such as the public buildings trust, public schools, state colleges, universities, and other state institutions (Enabling Act of February 22, 1889:1972 Montana Constitution, Article 1 Section11). The Board of Land Commissioners and the Department of Natural Resources and Conservation are required, by law, to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run for these beneficiary institutions (Section 77-1-202, MCA). 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 involvement has been solicited through newspaper advertisements and through letters sent to adjacent landowners, as well as other known interested parties and organizations. Public response was received and used to assist in identifying issues surrounding the proposed project. Hydrological, soils, wildlife, archaeological, and vegetative concerns were identified by DNRC specialists and field foresters for both the No-Action and the Action Alternatives. Issues and concerns have been resolved or mitigated through project design and/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 Analyses;

Attachment III, Harvest Prescriptions; Attachment IV, Mitigations; 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.

USFS cost-share road agreement

Confederated Salish & Kootenai Tribes (CS&KT)

The DNRC has received for Cultural Clearance and has applied for Temporary Road Use Permits from the Confederated Salish & Kootenai Tribes (CS&KT).

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. Recommended actions to reduce environmental effects would be incorporated into the proposed action.

No Action: Under the No Action Alternative, no activity would be undertaken. No timber would be harvested and no road construction or improvements would occur. The No Action alternative would result in decreased growth rates, continued decline of stand conditions and increased fuel loading within the timber stands. This alternative would not produce revenue for the Common Schools Trust grant.

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 hydrologist has reviewed the project area, transportation system and harvest plan. Recommendations to minimize impacts have been incorporated into the project design. (See Attachment II, Resource Analysis; Soils, Watershed and Hydrology Analysis).

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 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 project is located in Montana State Airshed 2; it is not within a Class 1 Airshed.
Efforts would be made to dispose of slash without burning by chipping or grinding logging slash piles. However; some particulate matter may be introduced into the Airshed from the burning of logging slash. Impacts are expected to be minor and temporary with slash burning to be conducted when conditions favor good to excellent smoke dispersion. All burning would be conducted during times of adequate ventilation within the existing rules and regulations. Thus direct, indirect, and cumulative effects to air quality are expected to be minimal.

7. VEGETATION COVER, QUANTITY AND QUALITY:
What changes would the action cause to vegetative communities? Consider rare plants or cover types that would be affected. Identify direct, indirect, and cumulative effects to vegetation.

Tree removal would cause changes in the vegetative structure of the project area. Silvicultural prescriptions have been developed to keep stands moving towards historical conditions, while maintaining good tree growth and vigor. Harvest prescriptions also aim to remove diseased and insect infested timber. 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, Vegetation Analysis, Attachment III, Harvest Prescriptions; Attachment IV, Mitigations). Approximately 6 acres would be removed from timber production to create road access into the sale area. No old growth stands as defined by Green et al. (1992) are present in the project area; therefore the action alternative would not affect old growth. No sensitive plants listed by the Montana Natural Heritage Program have been identified in the project area. Measures to minimize noxious weeds, insects and disease are included in the project design (See Attachment IV, Mitigations). Change to cover type distribution across the Plains unit and age class distribution would move only slightly towards a historic condition.

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. (Attachment I, Area Maps and Project Plan: Attachment II, Resource Analyses, Wildlife Habitat Analysis, Watershed and Hydrology Analysis: Attachment III, Harvest Prescriptions: Attachment IV, Mitigations).
As detailed in the Wildlife Analysis and the Watershed and Hydrology Analysis, no substantial direct, indirect or cumulative impacts to terrestrial, avian and aquatic species and habitats 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.

Recommendations from DNRC specialists to minimize direct, indirect, and cumulative impacts have been incorporated in the project design. (Attachment I, Area Maps and Project Plan: Attachment II, Resource Analyses, Wildlife Habitat Analysis: Attachment III, Harvest Prescriptions: Attachment IV, Mitigations). As detailed in the Wildlife Analysis, no substantial direct, indirect or cumulative impacts to unique, endangered, fragile or limited environmental resources are expected to result from the implementation of the Action Alternative.

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

The DNRC archaeologist conducted a Class III intensity level cultural and paleontological resources inventory of the entire area of potential effect. Despite a detailed examination, no cultural or fossil resources were identified and no additional archaeological or paleontological investigative work is recommended. The proposed timber sale/fuels reduction project will have *No Effec*t to *Antiquities* as defined under the Montana State Antiquities Act. A formal report of findings has been prepared and is on file with the DNRC and the Montana State Historic Preservation Officer.

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.

Topography is mountainous, therefore the majority of the sale area would be hidden from view minimizing visual impacts. Portions of the project would be visible from State Hwy 28, five miles to the east. Openings or disturbance from harvest operations, with large diameter overstory ponderosa pine, and western larch retained throughout most of the project area, would be visible upon completion of the project. Prescriptions are designed to mimic historic stand conditions and would not have an adverse visual impact on the area (see: Attachment III, Harvest Prescriptions; Attachment IV, Mitigations).

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.

State tract includes active Forest Grazing License, in part producing 90 AUM's annually. This activity would be continued to be monitored with periodic grazing field evaluations.

Forest Improvement (FI) projects, specifically the thinning of regenerated forest stands, have recently occurred and are planned for some adjacent stands.

IV. IMPACTS ON THE HUMAN POPULATION

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

14. HUMAN HEALTH AND SAFETY:
Identify any health and safety risks posed by the project.

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

15. INDUSTRIAL, COMMERCIAL AND AGRICULTURE ACTIVITIES AND PRODUCTION:
Identify how the project would add to or alter these activities.

Timber harvest would provide continuing industrial production in 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.

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

17. LOCAL AND STATE TAX BASE AND TAX REVENUES:
Estimate tax revenue the project would create or eliminate. Identify 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 from this proposed action on tax revenues.

18. DEMAND FOR GOVERNMENT SERVICES:
Estimate increases in traffic and changes to traffic patterns. What changes would be needed to fire protection, police, schools, etc.? Identify 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 route.(See attachment I: Area Maps). This increase is a normal contributor to the activities of the local community and industrial base and cannot be considered a new or increased source. No changes to the level of government services would be needed as a result of this project, therefore it would not contribute to cumulative effects on government services.

19. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS: *List State, County, City, USFS, BLM, Tribal, and other zoning or management plans, and identify how they would affect this project.*

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

> *Our premise is that the best way to produce long term income for the trust is to manage intensively for healthy and biologically diverse forests. Our understanding is that a diverse forest is a stable forest that will produce the most reliable and highest long term revenue stream… In*

the foreseeable future, timber management will continue to be our primary source of revenue and our primary tool for achieving biodiversity objectives.

On March 12, 2003, the DNRC adopted Administrative Rules for Forest Management (Rules)(Administrative Rules of Montana [ARM] 36.11.401 through 450). The Rules provide DNRC personnel with consistent policy, direction, and guidance for the management of forested trust lands. Together, the SFLMP and Rules define the programmatic framework for this project.

---

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

The area is hunted frequently. Roads through the area that would be closed after the project only access the immediate area, closure of them would not affect the ability of people to recreate on these parcels. Recreational areas and wilderness are not accessed through this tract. Illegal off road vehicle use is expected to decrease while legal use is expected to remain the same with 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 direct, indirect, and cumulative impacts related to social structures and mores would be expected under either alternative.

---

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

No direct, indirect, and cumulative 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.

Costs, revenues and estimates of return are estimates intended for relative comparison of alternatives. They are not intended to be used as absolute estimates of return. The estimated stumpage is based on comparable sales analysis for limited access sales. This method compares recent sales to find a market value for stumpage. These sales have similar species, quality, average diameter, product mix, terrain, date of sale, distance from mills, road building and logging systems, terms of sale, or anything that could affect a buyer's willingness to pay for the timber. The effect of the proposed project would produce an estimated return to the Common Schools (C.S.) Trust Grant of $450,000.00 and $100,000.00 in Forest Improvement (FI) fees under the alternative action. The No Action Alternative does not generate any return to the trust at this time.

EA Checklist Prepared By:	**Name:** Dale Peters	**Date:** June, 2010
	Title: Management Forester	

V. FINDING

25. ALTERNATIVE SELECTED:

Type Response here

26. SIGNIFICANCE OF POTENTIAL IMPACTS:

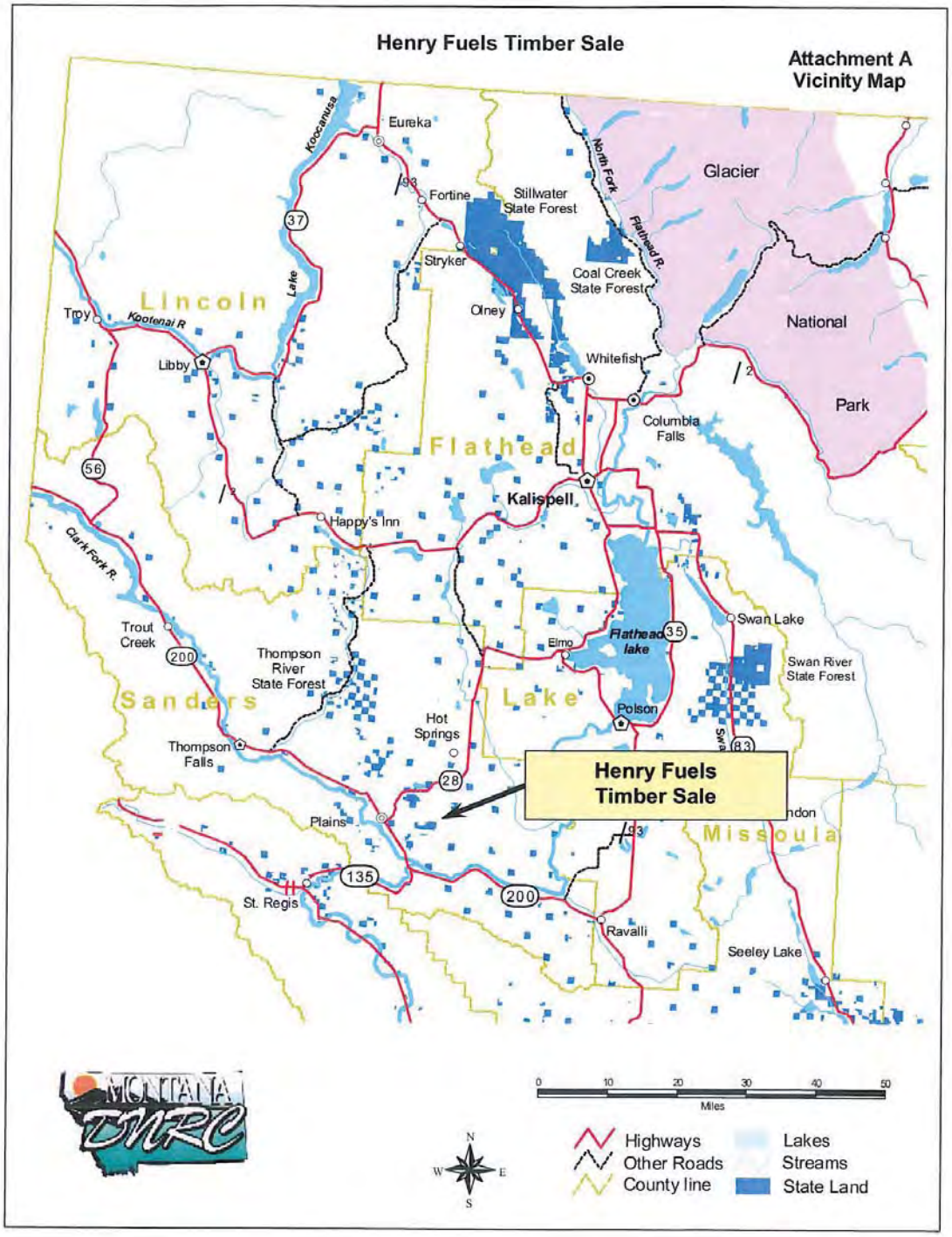
27. NEED FOR FURTHER ENVIRONMENTAL ANALYSIS:

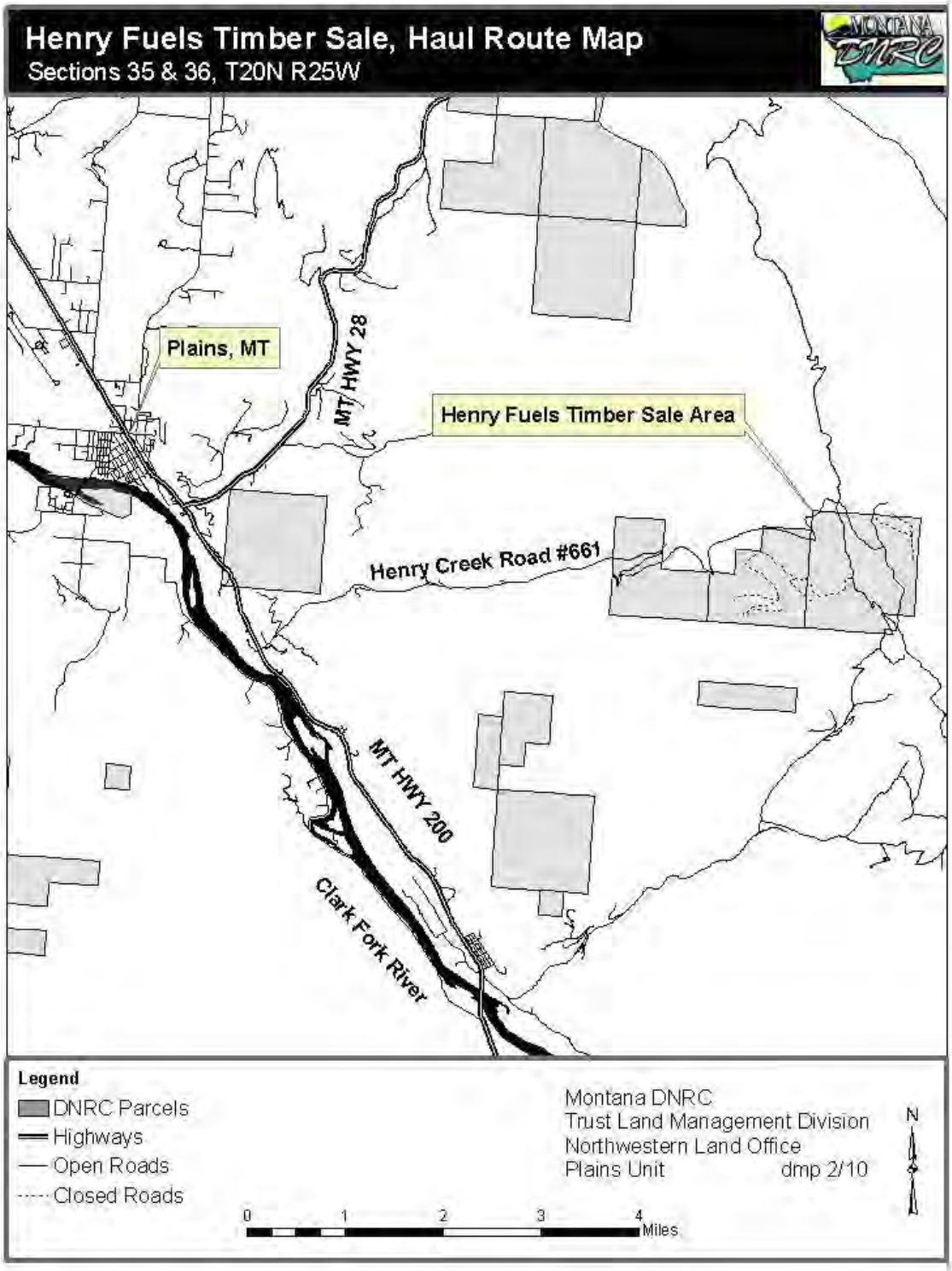
☐ EIS ☐ More Detailed EA ☐ No Further Analysis

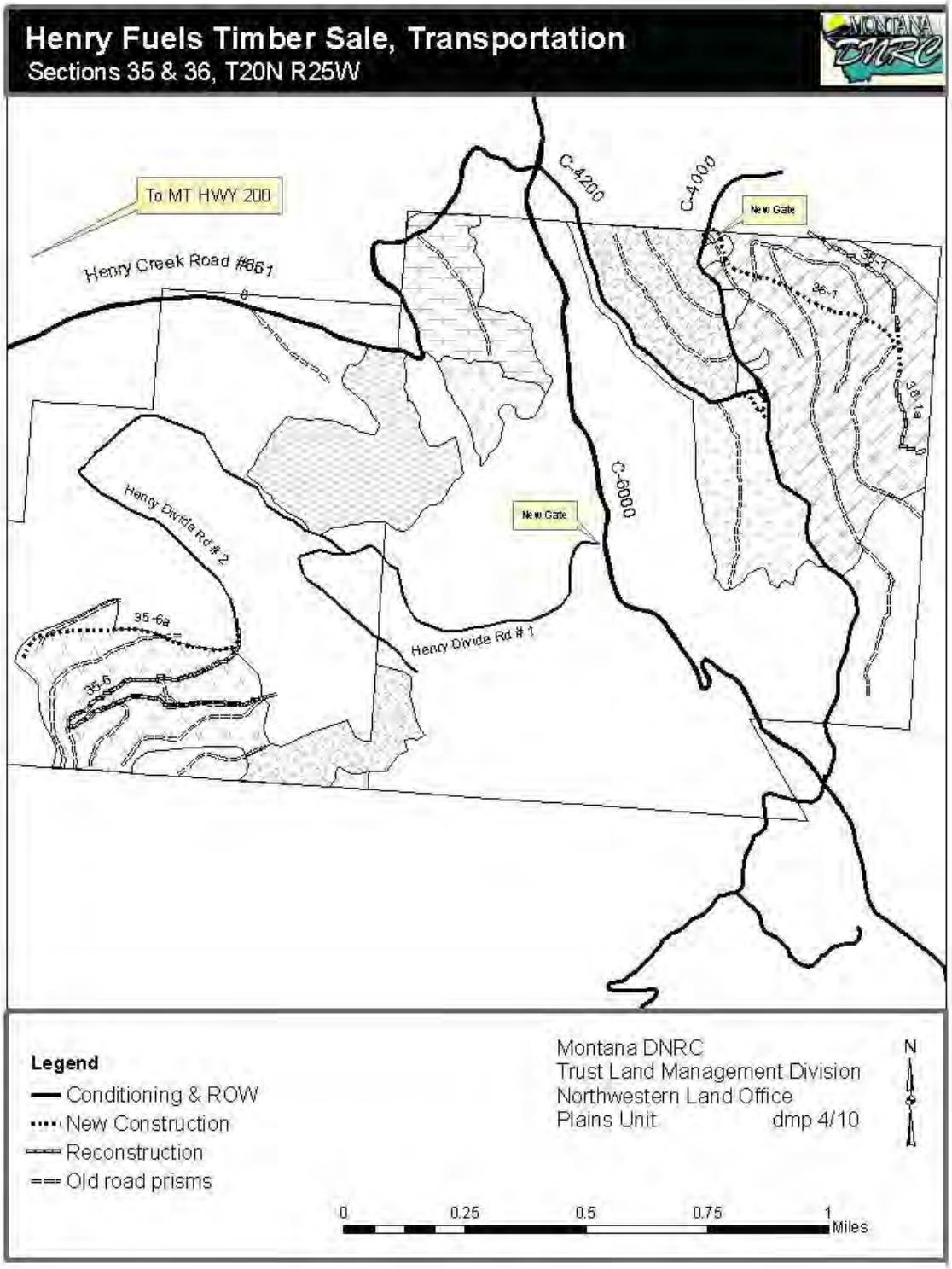
EA Checklist Approved By:	***NAME:***
	Title:
Signature:	**Date**:

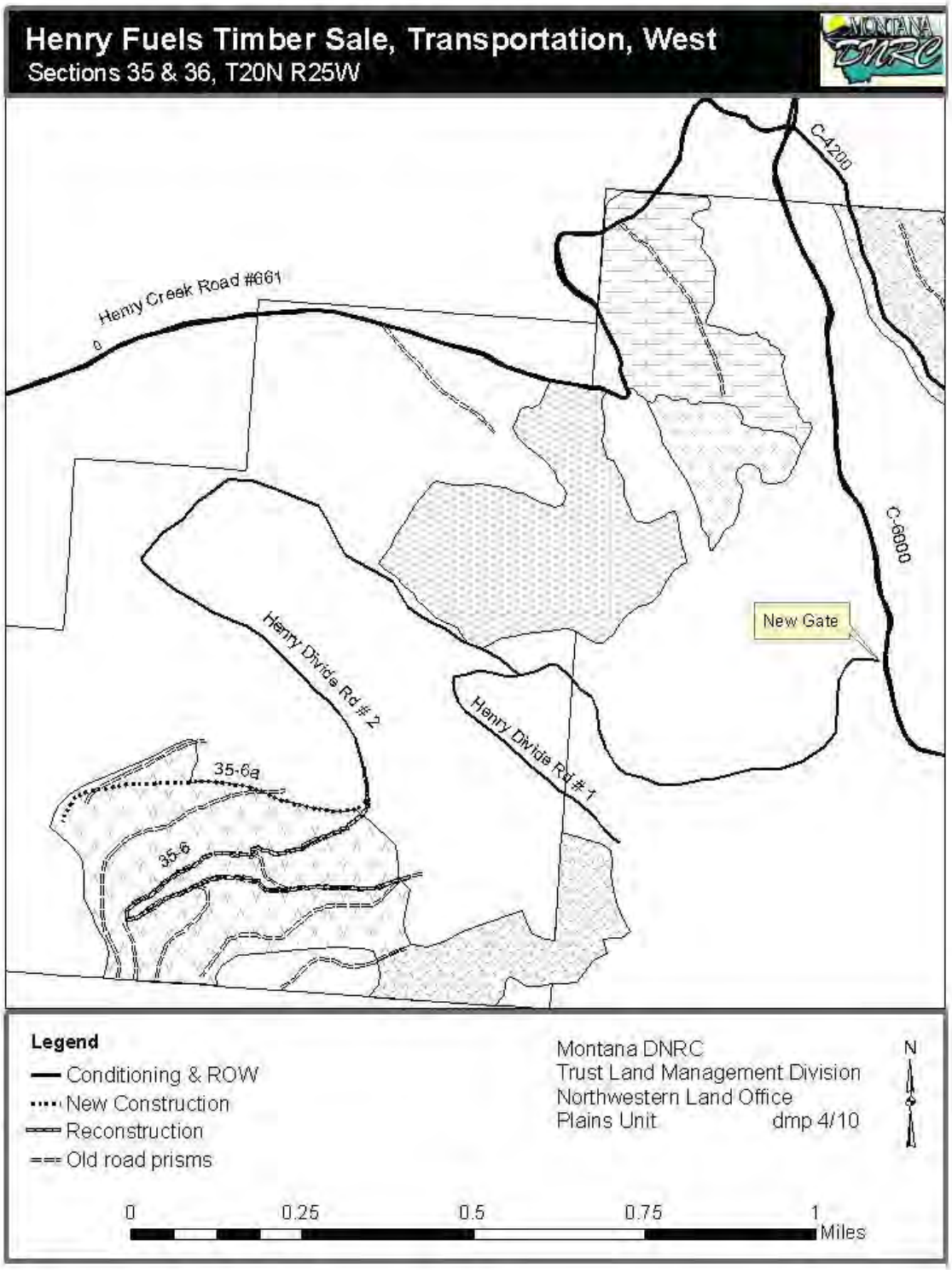
Attachment I
Area Maps and Project Plan

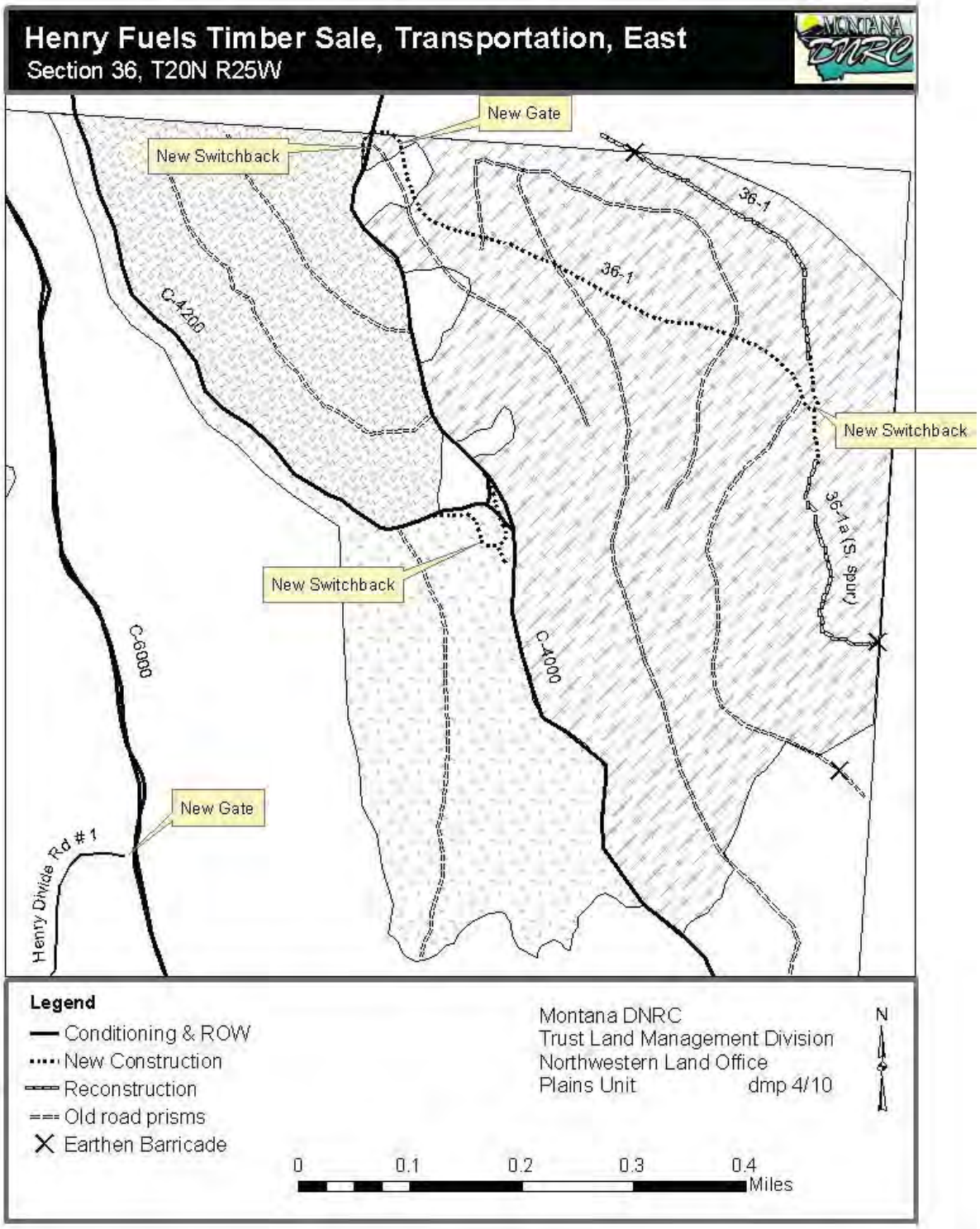
Vicinity Map	**17**
Haul Route Map	**18**
Transportation Map	**19**
Transportation Map, West	**20**
Transportation Map, East	**21**
Harvest Plan Map	**22**
Current Cover Types Map	**23**
Desired Future Conditions Map	**24**

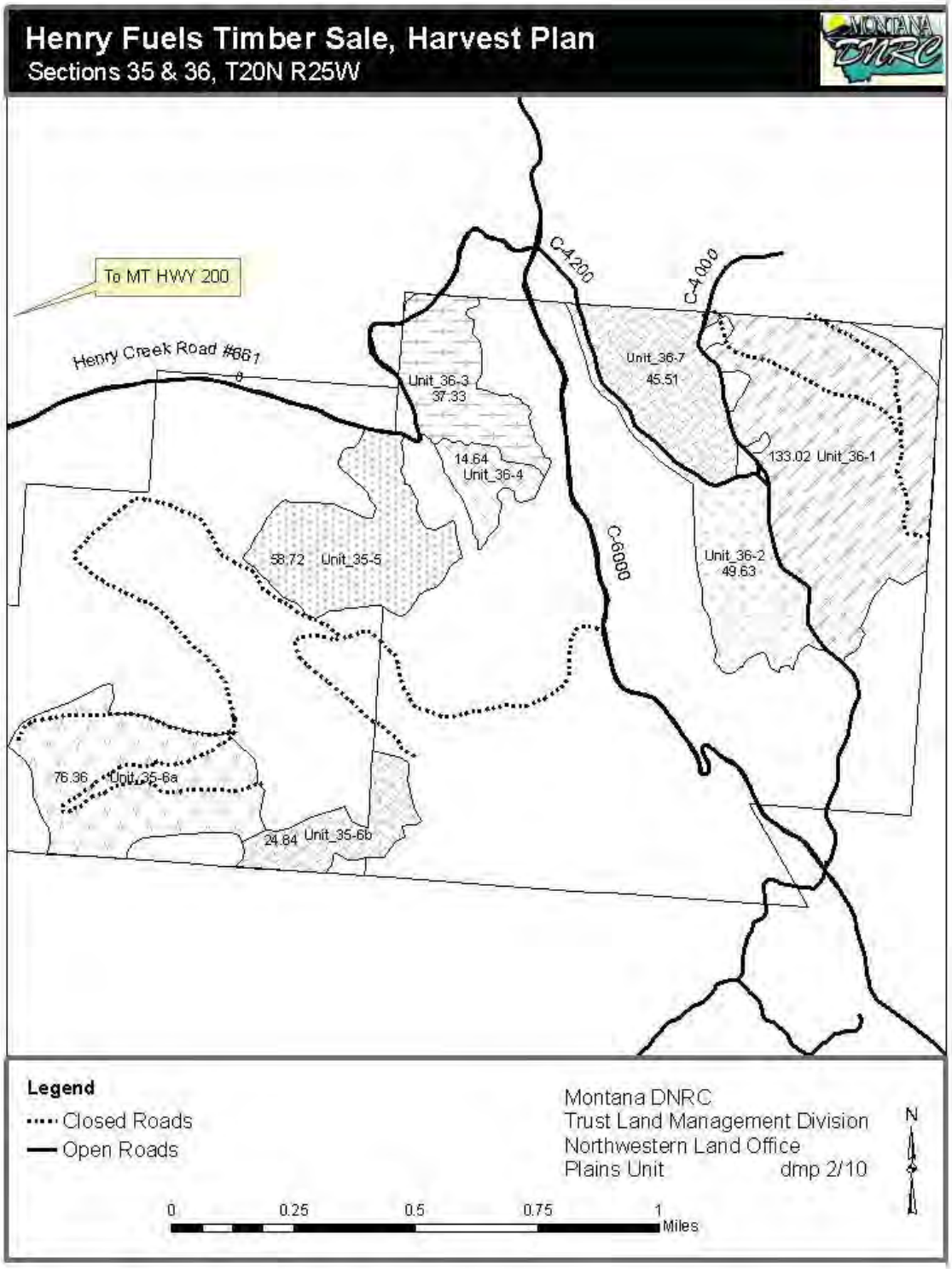

Henry Fuels Timber Sale
Attachment A
Vicinity Map
Eureka
Koocanusa
Fortine
Stillwater State Forest
North Fork
Flathead R.
Glacier
National
Park
Stryker
Coal Creek State Forest
Olney
Lincoln
Lake
Troy
Kootenai R
Libby
Whitefish
Columbia Falls
Flathead
Kalispell
Happy's Inn
Clark Fork R.
Trout Creek
Thompson River State Forest
Swan Lake
Flathead lake
Elmo
Swan River State Forest
Sanders
Lake
Polson
Hot Springs
Thompson Falls
Henry Fuels Timber Sale
Plains
Missoula
St. Regis
Ravalli
Seeley Lake
0 10 20 30 40 50
Miles
Highways
Other Roads
County line
Lakes
Streams
State Land

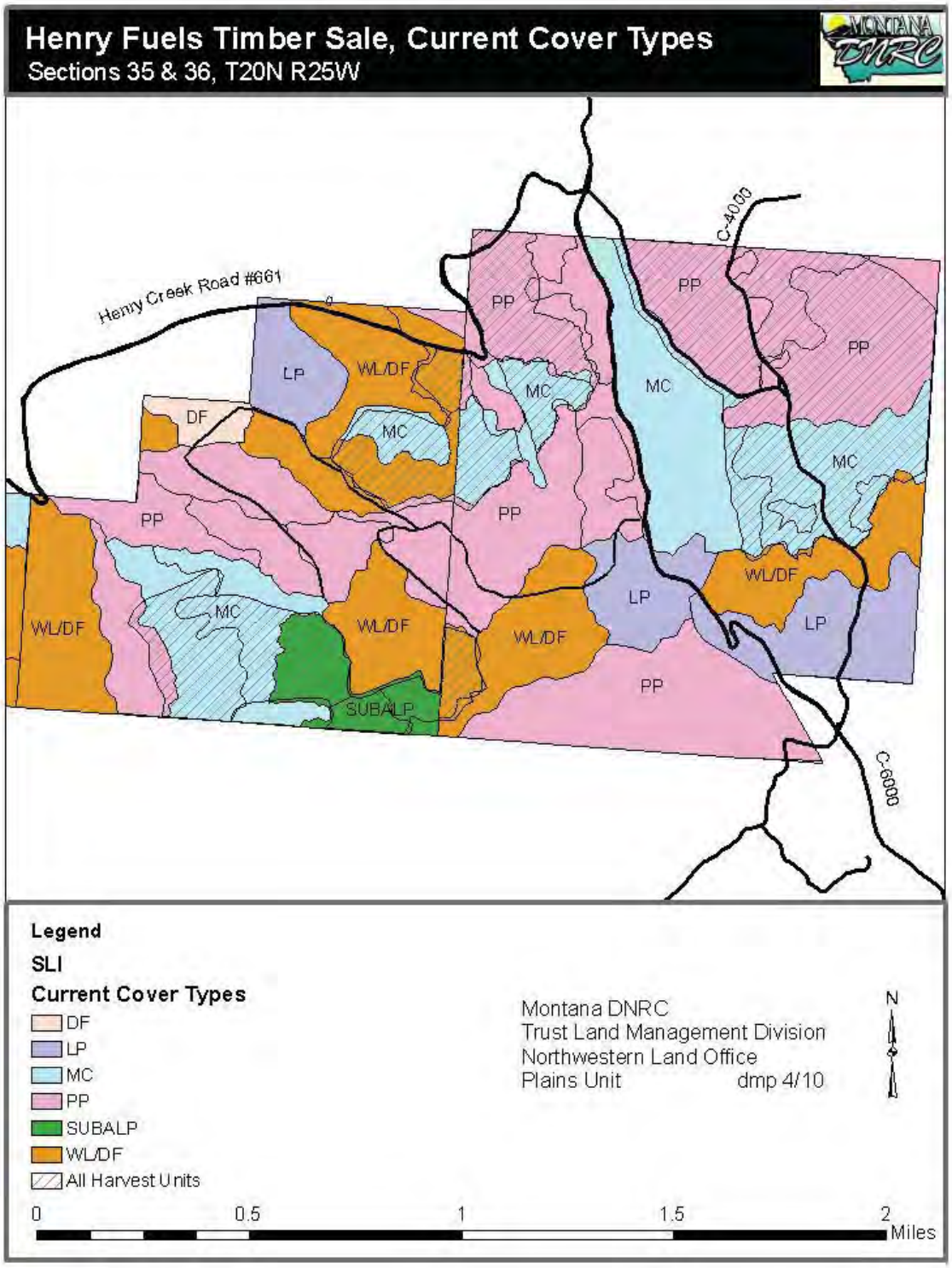

Henry Fuels Timber Sale, Haul Route Map
Sections 35 & 36, T20N R25W
Plains, MT
MT HWY 28
Henry Fuels Timber Sale Area
Henry Creek Road #661
MT HWY 200
Clark Fork River
Legend
DNRC Parcels
Highways
Open Roads
Closed Roads
Montana DNRC
Trust Land Management Division
Northwestern Land Office
Plains Unit
dmp 2/10
N
0
1
2
3
4
Miles

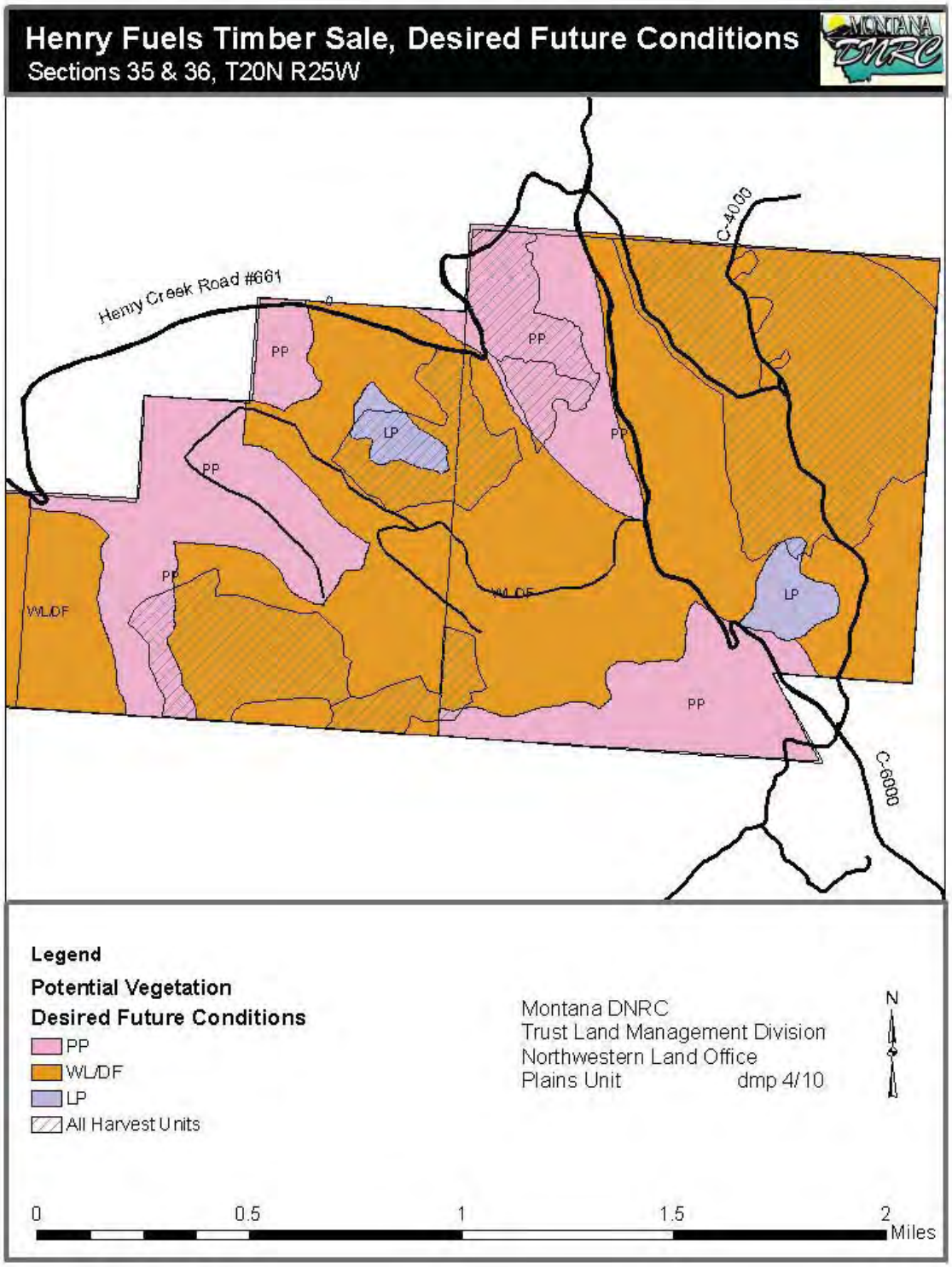

Henry Fuels Timber Sale, Transportation
Sections 35 & 36, T20N R25W
To MT HWY 200
Henry Creek Road #661
C-4200
C-4000
New Gate
36-1
36-1
36-1a
C-6000
New Gate
Henry Divide Rd # 2
35-6a
35-6
Henry Divide Rd # 1
Legend
Conditioning & ROW
New Construction
Reconstruction
Old road prisms
Montana DNRC
Trust Land Management Division
Northwestern Land Office
Plains Unit
dmp 4/10
N
0
0.25
0.5
0.75
1
Miles


Henry Fuels Timber Sale, Transportation, West
Sections 35 & 36, T20N R25W
C-4200
Henry Creek Road #661
C-6000
New Gate
Henry Divide Rd # 2
Henry Divide Rd # 1
35-6a
35-6
Legend
Conditioning & ROW
New Construction
Reconstruction
Old road prisms
Montana DNRC
Trust Land Management Division
Northwestern Land Office
Plains Unit
dmp 4/10
N
0
0.25
0.5
0.75
1
Miles


Henry Fuels Timber Sale, Transportation, East
Section 36, T20N R25W
New Gate
New Switchback
36-1
36-1
C-4200
New Switchback
36-1a (S. spur)
New Switchback
C-6000
C-4000
New Gate
Henry Divide Rd # 1
Legend
Conditioning & ROW
New Construction
Reconstruction
Old road prisms
Earthen Barricade
Montana DNRC
Trust Land Management Division
Northwestern Land Office
Plains Unit
dmp 4/10
N
0
0.1
0.2
0.3
0.4
Miles


Henry Fuels Timber Sale, Harvest Plan
Sections 35 & 36, T20N R25W
To MT HWY 200
Henry Creek Road #661
C-4200
C-4000
C-6000
Unit_36-3
37.33
14.64
Unit_36-4
Unit_36-7
45.51
133.02 Unit_36-1
58.72 Unit_35-5
Unit_36-2
49.63
76.36 Unit_35-6a
24.84 Unit_35-6b
Legend
Closed Roads
Open Roads
Montana DNRC
Trust Land Management Division
Northwestern Land Office
Plains Unit
dmp 2/10
N
0
0.25
0.5
0.75
1
Miles


Henry Fuels Timber Sale, Current Cover Types
Sections 35 & 36, T20N R25W
Henry Creek Road #661
C-4000
C-6000
PP
LP
WL/DF
MC
DF
SUBALP
Legend
SLI
Current Cover Types
DF
LP
MC
PP
SUBALP
WL/DF
All Harvest Units
Montana DNRC
Trust Land Management Division
Northwestern Land Office
Plains Unit
dmp 4/10
N
0
0.5
1
1.5
2
Miles


Henry Fuels Timber Sale, Desired Future Conditions
Sections 35 & 36, T20N R25W
Henry Creek Road #661
C-4000
C-6000
PP
LP
WL/DF
Legend
Potential Vegetation
Desired Future Conditions
PP
WL/DF
LP
All Harvest Units
Montana DNRC
Trust Land Management Division
Northwestern Land Office
Plains Unit
dmp 4/10
N
0
0.5
1
1.5
2
Miles

Attachment II
Resource Analysis

Vegetation Analysis	**27**
Watershed and Hydrology Analysis	**29**
Soils Analysis	**33**
Wildlife Habitat Analysis	**36**
Archaeological Analysis	**50**
Tribal Cultural and Historical Sites Review	**51**

Footnote: All proposed road miles, harvest boundaries and acreages are close approximations as this proposal has not yet been implemented on the ground.

Vegetation Analysis

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

- Concern for maximizing the return to the School Trust Fund by intensively managing for healthy and biologically diverse forests.
- Improve forest health. Minimize losses in timber volume from mortality due to insect and disease conditions present within the sale area.
- Promote the continued presence and/or reestablishment of historically appropriate timber types on Trust Land included in this project.
- Reduce fire hazard and associated risks of loss to State of Montana, United States Forest Service, Flathead Indian Reservation and privately owned lands in the area.
- Concern regarding the impacts to threatened and endangered plant and animal species.

Analysis Area
The analysis area for direct and indirect effects are the state sections 35 & 36 of T20N R25W. These sections are located 7 air miles west of Plains, Montana, on the divide between the Henry Creek drainage to the west and the Camas Prairie to the east. Cumulative impacts are considered at the scale of the Plains Unit and will adequately allow for the disclosure of existing conditions, direct, indirect, and cumulative impacts.

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

Existing Condition
Past and current events have changed the forest conditions on the proposed parcels involved in the project area from what would have been present historically 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 the early 1900's, fire has been virtually eliminated from the project area. Logging activity has occurred in the past on these sections. Section records indicate has had timber sales in the 1940's and as late as 1991. There were numerous small timber permits issued during that time including post and poles permits and a few permits for Christmas tree removal.

Section 36
Between the years of 1945 & 1949, 5.2 million board feet (mmbf) of timber was removed from whole of Section 36. 4.5 mmbf of this volume was most likely large diameter ponderosa pine (*pinus ponderosa)* with the remainder being large diameter Douglas-fir (*pseudotsuga menziesii)* and western larch (*larix occidentalis)*, as evidenced by the large diameter stumps that still exist. This selective logging of the dominant and co-dominant ponderosa pine, western larch and Douglas-fir, and lack of low-intensity wildfires, has allowed the remaining stand to develop into what we see today. A multi storied stand of lesser quality, genetics and form class, dominated by Douglas-fir that is principally infected with Dwarf mistletoes *(Arceuthobium spp)*. In 1991, a 45 acre seed tree unit removed 2.1 mmbf. These 45 acres are now regenerated with a single overstory of ponderosa pine and western larch. The Clear Creek fire of 2000 burned across the southern third of this section. This area has adequately regenerated to the point that some pre-commercial thinning has occurred and several more are currently under contract. In 2002, 352 mbf of grand fir *(abies grandis)* was removed as part of a salvage operation.

Section 35
Between the years of 1954 & 1955, 1.2 million board feet of timber was removed from whole of Section 35. 774 mbf (thousand board feet) of this volume was most likely large diameter ponderosa pine with the remainder being large diameter Douglas-fir and western larch, as evidenced by the large diameter stumps that still exist. This selective logging of the dominant and co-dominant ponderosa pine, western larch and Douglas-fir, and lack of low-intensity wildfires, has allowed the remaining stand to develop into what we see today. A multi storied stand of lesser quality, genetics and form class, dominated by Douglas-fir that is principally infected with Dwarf mistletoe. Between 1988 & 1991, 2.1 mmbf was harvested as part of the Henry Divide Timber Sale; 731 mbf of lodgepole pine *(pinus contorta)*, 595 mbf of Douglas-fir, 412 mbf of western larch, 292 of grand fir and 68 mbf of ponderosa pine. Between 1995 & 1996, 2.5 mmbf was harvested as part of the Henry Peak Timber Sale; 1.7 mmbf of western larch, 460 mbf of ponderosa pine and 343 mbf of lodgepole pine. Between 1999 & 2000, 2.4 mmbf of mixed conifer species was harvested as part of the Boyer Fire Salvage Timber Sale. The Clear Creek fire of 2000 burned across a portion this section. This area has adequately regenerated to the point that some pre-commercial thinning has occurred.

There is a component of noxious weeds on both of these sections, mainly knapweed, present throughout the project area, mostly prevalent along open roads.

Direct and Indirect Effects
No Action Alternative
No timber harvest or associated activities would occur under this alternative. Timber types would continue to advance towards climax conditions with shade tolerant grand fir continuing to thrive in the understory. Within the next 50 - 100 years this species may replace the current overstory. Growth and vigor of trees present in the analysis area would continue to decline as competition increases. Dwarf mistletoes would be allowed to propagate, thereby perpetuating this pathogen in future generations of timber. Noxious weeds would continue to exist along the roads and may move into the forested areas as natural disturbances prepare appropriate seedbeds.

Action Alternative
The proposed action alternative would harvest timber on approximately 437 acres. None of the proposed harvest areas are in old growth timber as defined by Green et al. The proposed harvest would be focused on opening the stand to enhance regeneration of preferred seral species, reducing stocking of shade tolerant climax species, as well as removing species susceptible to dwarf mistletoes. More detailed information for treatment of individual units can be found in Attachment III, Harvest Prescriptions. Gated road closures would prevent the unauthorized removal of snags. Fuel loadings would be reduced by removal of ladder fuels from the understory and intermediate components of the stand, as well as opened crown spacing in the overstory component. Growth and vigor of the remaining trees is expected to increase as residual tree spacing would allow full light to crowns and more available water. Fuel loadings would be reduced by the removal of ladder fuels from the understory and intermediate components of these stands, as well as crown spacing in the intermediate and overstory components. Noxious weeds would be monitored and addressed through the Plains Unit integrated weed management program.

Cumulative Effects
No Action Alternative
Under this alternative, stand structure and species composition on state land across the Plains Unit will move towards a shade tolerant, climax condition. Fuel loadings are expected to increase due to tree mortality from insects and disease outbreaks.

Action Alternative
Across the Plains Unit there would be a slight shift towards Desired Future Conditions as the proposed treatment would alter the Current Vegetation Cover Types. The project area would be altered with regard to size class distribution and stocking levels. Fuel loading, ladder fuels, insect and disease incidence would be reduced. This change would occur on approximately 437 acres of the Plains Unit total 52,795 acres. This results in a change to slightly less than 1% of the total.

Watershed and Hydrology Analysis

INTRODUCTION

Water Quality
The primary parameter of concern for water quality is sediment. Increased sediment delivery and deposition can affect physical and biological water quality, channel stability and geomorphology. Sediment yield can be affected by a number of activities. Timber harvesting and associated road construction can increase sediment yield through exposure of bare soil. These impacts can be mitigated through implementation of Best Management Practices (BMPs), and other erosion control measures.

Water Yield
Timber harvesting and associated activities can affect the timing, distribution, and amount of water yield in a harvested watershed. Similarly, effects of stand replacement wildfire also affect water quantity and yield in a watershed. Water yields increase proportionately to the percentage of canopy removal, because removal of live trees reduces the amount of water transpired, leaving more water available for soil saturation and runoff. Canopy removal also decreases interception of rain and snow and alters snowpack distribution and snowmelt, which lead to further water yield increases. Higher water yields may lead to increases in peak flows and peak-flow duration, which can result in accelerated streambank erosion and sediment deposition.

ANALYSIS METHODS

Existing conditions for water quality and water yield were analyzed using field site visits and visual inspection of the drainage features in the proposed project area.

ANALYSIS AREA

Water Quality
The analysis area for water quality is the proposed project area, and all forest roads that lead into the project area from other ownership. The primary focus of the sediment delivery analysis was on the streams and draws located within the proposed project area.

Water Yield
The analysis area for water yield is the streams and ephemeral draws found within the project area.

EXISTING CONDITIONS

Regulatory Framework

Montana Surface Water Quality Standards: According to ARM 17.30.607 (1), this portion of the Clark Fork River, including Henry Creek, is all 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 (17), includes conditions or materials present during runoff from developed land where all reasonable land, soil and water conservation practices (commonly called BMPs) have been applied. Reasonable practices include methods, measures or practices that protect present and reasonably anticipated beneficial uses. These practices include but are not limited to structural and non-structural controls and operation and maintenance procedures. Appropriate practices may be applied before, during, or after completion of activities that may impact the resource.

Designated beneficial uses downstream from the project area include livestock watering and cold water fisheries in Henry Creek.

Water Quality Limited Waterbodies: Henry Creek is listed in the 2008 List of Waterbodies in Need of Total Maximum Daily Load (TMDL) Development publication produced by the Montana Department of Environmental Quality (DEQ, 2008). 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). Under these laws, DEQ is required to identify water bodies that do not fully meet water quality standards, or where beneficial uses are threatened or impaired. These water bodies are then characterized as "water quality limited" and thus targeted for Total Maximum Daily Load (TMDL) development. The TMDL process is used to determine the total allowable amount of pollutants in a water body of watershed. Each contributing source is allocated a portion of the allowable limit. These allocations are designed to achieve water quality standards.

The Montana Water Quality Act (MCA 75-5-701-705) also directs the DEQ to assess the quality of state waters, insure that sufficient and credible data exists to support a 303(d) listing and to develop TMDL for those waters identified as threatened or impaired. Under the Montana TMDL Law, new or expanded nonpoint source activities affecting a listed water body may commence and continue provided they are conducted in accordance with all reasonable land, soil and water conservation practices. Total Maximum Daily Loads have not been completed for the Henry Creek drainage. DNRC will comply with the Law and interim guidance developed by DEQ through implementation of all reasonable soil and water conservation practices, including Best Management Practices, commitments in the State Forest Land Management Plan, and the Forest Management Rules.

Henry Creek is listed as needing TMDL development from the headwaters to its confluence with the Clark Fork River. This comprises approximately 6.7 miles of stream. Aquatic life, cold water fisheries and primary contact recreation are listed as partial support in the 2008 list. Listed causes of impairment in these reaches are: alteration in stream-side or littoral vegetative covers, total phosphorus, sedimentation/siltation, and total Kjehldahl Nitrogen; with the probable source listed as channelization, forest roads (road construction and use), grazing in riparian, and flow alterations from water diversions.

Montana Streamside Management Zone (SMZ) Law: By the definition in ARM 36.11.312 (5), there are two streams in the proposed project area. One channel is located in the northwest corner of section 36, and the other flows through the south half of section 35 of the proposed project area. According to ARM 36.11.312(4), these are class 2 streams. They each have a defined channel, contribute flow to another body of water, but do not flow more than 6 months of the year. The rules and requirements for class 2 streams are listed in ARM 36.11.302 through ARM 36.11.305. The remaining drainage features in the proposed project area are dry draws or moist seeps with no defined channel.

Water Quality

The existing road system in the proposed project area is moderate to low standard. Most of this system meets applicable best management practices for surface drainage or erosion control. Portions of the existing road system have erosion control and surface drainage that requires minor improvement, but road grades are moderate and the road system is located away from draws and streams except at crossings. No other sources of erosion or deposition were identified through field review. The intermittent stream that flows through section 35 has little scour where it is adjacent to proposed harvesting. The channel is identified mainly by definable banks, and by some areas of rock substrate. This channel is stable and no active erosion was identified through field visits. The stream that flows through section 36 has definable bed and banks, with rocky substrate through most of its length within the project area. The lower reaches of this stream, located upstream from the primary haul route, are in stable condition from and channel erosion perspective, but the bed and banks have been trampled by cattle use. As a result, the channel is overly widened, and stream bank vegetation is mainly grass and for, with little to no shrub cover. These channel alterations have not led to excessive channel migration or in-channel erosion due to rock content and low flows. Channel stability is good, but at risk due to cattle use.

Water Yield
Past activities in and around the proposed project area include timber management and agriculture. These activities have led to reductions in forest canopy cover, and construction of roads.

Following field reconnaissance of the proposed project area, it was determined that a detailed water yield analysis would not be necessary for the proposed project area. 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). The defined stream channels in the project area have stable, intermittent flows with no evidence of instability from water yield increases, and very little scouring effect from annual runoff events. As a result, water yield increases resulting from past activities have not been sufficient to destabilize stream channels, or to scour a channel in any of the broad draws throughout the project area.

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 water quality and water yield. The water quality and water yield would be unaffected by the no action alternative, and the intermittent streams in the proposed project area would continue to be affected by natural and pre-existing conditions.

Action Alternative

Water Quality
The action alternative would improve the erosion control and surface drainage on approximately 9.6 miles of existing road, and bring it up to applicable BMP standards. No stream or draw crossing structures would be installed under the action alternative. Improvement of surface drainage features would generate bare soil, which may lead to increased erosion potential. This risk would reduce as vegetation becomes re-established on these sites through grass seeding. Use of prescribed fire to prepare the site for reforestation may increase the risk of sediment delivery to a draw or stream through removal of the ground vegetation and some of the duff layer. The risk of sediment delivery from these sites and activities to downstream areas is negligible in places that lack stream channels. In places where there is a stream channel, there is a low to moderate risk of sediment delivery. The risk would be kept low due to implementation of all applicable BMPs, and by following all requirements of ARM 36.11.302 through 36.11.306 and ARM 36.11.425. No timber harvesting is proposed within a SMZ or riparian management zone.

Water Yield
The proposed action alternative would harvest timber from approximately 479 acres. No measurable impacts to stream channel stability from water yield increases are anticipated from the proposed harvesting for the following reasons: 1) The well-drained nature of the soils would produce little or no detectable change in water yield, 2) The ephemeral draws within the project area are stable and vegetated with a dense mat of grass and for vegetation, making them capable of handling potential water yield increases without destabilizing, and 3) The stability of channels where they exist would be sufficient to handle potential increases. It is not expected that possible increases in water yield would create surface flow to any other body of water beyond that occurring under the existing conditions.

CUMULATIVE EFFECTS

No Action Alternative
Cumulative effects of the No Action alternative on water quality and water yield would be similar to the situations described in the existing conditions. The water quality 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

Water Quality

Risk of sediment loading to downstream waters from the proposed project area would be reduced from current levels. Improvement of erosion control and surface drainage on the existing road system would reduce erosion rates from current levels and reduce the risk of downstream sediment loading to Henry Creek.

Water Yield

Past activity in and around the proposed project area has mainly consisted of timber management and wildfires. On sites where timber was harvested, there has been substantial vegetative and hydrologic recovery with no apparent impact to stream channels or draws from water yield increases.

Watershed cumulative effects are not anticipated for the following reasons: 1) The well-drained nature of the soils would produce little or no detectable change in water yield, 2) The ephemeral draws within the project area are stable and vegetated with a dense mat of grass and for vegetation, making them capable of handling potential water yield increases without destabilizing from a combination of past and proposed activities, and 3) Approximately 259 acres of the proposed harvesting would occur in ephemeral draws with no surface delivery to another body of water. The remaining 220 acres of harvest would be located in the Henry Creek watershed near intermittent tributaries. These areas have been exposed to wildfire and timber harvesting in the past 20 years, and channels have shown no signs of water yield causing in-stream erosion or increased flows. As a result, there would be a low risk of the current proposal, when combined with past and current vegetative changes, leading to water yield increases destabilizing channels beyond the current conditions.

Soils Analysis

Introduction

Landform Description

The Henry Creek watershed is a valley formed by glaciers and river processes. The dominant soil types found in the project area are deep to moderately deep weathered bedrock derived from argillite, siltite and limestone from the Belt Supergroup. Upper slopes and ridges are weathered bedrock scoured by glaciers.

Soil Physical Properties

This analysis addresses the issue that timber harvesting and associated activities may affect soil conditions in the proposed project area through ground-based activities, and through repeated entries to previously harvested areas. Operation of ground-based machinery can displace fertile layers of topsoil, which can lead to a decrease in vegetation growth. Ground-based machinery 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.

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.

Slope Stability

Slope stability risk factors will be assessed by reviewing the Plains Unit Soil Survey and the Web Soil Survey to identify landtypes 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 and slope stability will include DNRC owned land within the Henry Peak project area. Two unnamed tributaries to Henry Creek encompass most of the project area.

Existing Conditions

Soil Physical Properties

In the proposed project area, DNRC has conducted timber harvesting since the 1940s. Timber sale records dating back to the 1960s indicate most of the proposed project area has been harvested using primarily ground-based yarding methods. Ground-based yarding can create soil impacts through displacement and compaction of productive surface layers of soil, mainly on heavily used trails. Existing skid trails are spaced at least 50 feet apart, and none were identified as erosion or sediment sources. Trails are still apparent, but most are well vegetated and past impacts are beginning to ameliorate from

freeze-thaw cycles and root penetration. Based on pace transects of trail spacing, knife penetration tests for compaction, and ocular estimates of re-vegetation, less than 15% of previously ground-skidded harvest units are in an impacted condition in the proposed project area.

Slope Stability

Soil types in the project area are primarily gentle (0-40%) residual soils found on hilly terrain. The DNRC Plains Unit Soil Survey identified no areas of soils at high risk for mass movements in the project area. No slope failures were identified during reconnaissance in the proposed project area. Because none of the slope stability risk factors are present in the proposed project area, slope stability will not be evaluated on this project in the remainder of this analysis. A list of soil types found in the Henry Peak project area and their associated management implications is found in table 3-vv.

Direct and Indirect Effects

No Action

Alternative A would have no direct or indirect effects on soil physical properties. No ground-based activity 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.

Action Alternative

Soil Physical Properties

Based on DNRC soil monitoring on soils and sites similar to those found in the project area, direct impacts would be expected on up to 24 of the total 371 acres proposed for harvesting. 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 18.0 percent of the acres treated, with an average disturbance rate of 9.4% (DNRC, 2004). The low range of impacts includes operations on frozen or snow-covered soils, and the high range includes operations on dry soils during non-winter conditions. As a result, the extent of impacts expected would likely be similar to those reported by Collins (DNRC, 2004), or approximately 3.0 to 18 percent of ground-based harvested acres. The proposal includes 479 acres of ground-based mechanical harvesting.

Ground-based site preparation would also generate direct impacts to the soil resource. Site-preparation disturbance would be intentionally done, and these impacts are considered light and promote reforestation of the site. *Table III-uu – Summary of Direct Effects of Alternatives on Soils* summarize the expected impacts to the soil resource as a result of the Action Alternative. These activities would leave approximately 9.4 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 3-uu – Summary of Direct Effects of Alternative on Productivity

Description of Parameter	No Action	Action Alternative
Acres of Harvest	0	479
Acres of tractor yarding	0	479
Acres of ground based impacts[1]	0	45
Percent of harvest area with impacts	0%	9.4%

[1] 9.4% of tractor units based on average impacts found on similar soils and sites by DNRC soil monitoring

CUMULATIVE EFFECTS

No Action

Soil Physical Properties

This alternative would have no cumulative impacts to physical properties of soils 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 and no re-entry of past harvest units would occur. All impacts from past management activities would continue to improve or degrade as dictated by natural and pre-existing conditions.

Action Alternative

Soil Physical Properties

Approximately 479 acres with previous timber sale operations would be entered. Cumulative effects to soils may occur from repeated entries into a forest stand where additional ground is impacted by equipment operations. Existing skid trails where compaction has begun to ameliorate through freeze-thaw cycles and revegetation would return to a higher level of impact due to the Action Alternative. Additional trails may also be required if existing trails are in undesirable locations. Cumulative impacts to soil physical properties under the Action Alternative would fall below the range analyzed for in the EXPECTED FUTURE CONDITIONS section of the SFLMP and are well within the 20-percent impacted area established as a level of concern in the SFLMP (DNRC, 1996).

DNRC would minimize long-term soil impacts and adverse cumulative effects by implementing any or all of the following: 1) existing skid trails from past harvest activities would be used if they are properly located and spaced 2) additional skid trails would be used only where existing trails are unacceptable 3) mitigating the potential direct and indirect effects with soil moisture restrictions, season of operation, and method of harvest 4) retention of a portion of coarse woody debris and fine litter for nutrient cycling

TABLE 3-VV – SOIL MAP UNIT DESCRIPTIONS FOR THE HENRY PEAK PROJECT AREA

Map Unit	Description	Soil Drainage	Road Limitations	Topsoil Displacement & Compaction	Seedling Establishment	Erosion (Bare Surface)	Notes
30-U AB, C	Mountain Sideslopes, 20-40%	Well Drained	Low	Low	Mod – Grass Competition	Moderate	Mod. Deep coarse soils reduce water and nutrients. South slopes very droughty.
30-U D	Mountain Sideslopes, 20-40%	Well Drained	Low	Moderate	Mod – Grass Competition	Moderate	Deep, productive soil. Topsoil depth important.
32-U C	Frost Churned Ridgetops, 20-40%	Well Drained	Low	Mod/High	Mod – Frost & Competition	Low	Topsoil depth important.

Wildlife Habitat Analysis

Field Review Dates: September 10, 2009 and December 2, 2009

Project Area Legal Description: T20N, R25W, Secs. 35 and 36

Analysis Methods

For each relevant species or issue, existing conditions of wildlife habitats are described and compared with the anticipated effects of the proposed action. Direct and indirect effects were evaluated for the 1,334-acre project area. Cumulative effects were analyzed for an 8,960-acre cumulative effects analysis area that includes the project area and surrounding lands within the upper reaches of McLaughlin Creek and Henry Creek. All DNRC lands within the 8,960-acre cumulative effects analysis area total 1,813 acres.

To assess the existing condition of the proposed project area and surrounding landscape, a variety of techniques were used. Field visits, scientific literature, SLI data, aerial photographs, Montana Natural Heritage Program (MNHP) data, and consultations with other professionals provided information for analysis. Cover and habitat assessments for this analysis primarily utilized visual observations from the field review and aerial photograph interpretation and dot grid analysis to obtain acreage estimates. These methods were used to allow for estimation of habitat conditions on neighboring lands where stand data were lacking. Species were dismissed from further analysis if habitat did not exist in the project area or would not be modified appreciably by the Action Alternative.

Affected Environment -- Coarse Filter

The project area is defined by two irregularly shaped parcels totaling 1,334 acres, which are situated 6 miles WSW of Plains, MT. The parcels lie immediately south of Henry Creek and occur on northerly aspects associated with Henry Peak. Lands surrounding these parcels include CSKT tribal lands, private lands, USFS lands and an adjoining DNRC parcel. Elevations on the project area range from about 4,000 to 5,200 feet and slopes range from 10 to 60%. About half of the project area has relatively gentle slopes associated with broad rolling ridge tops, particularly in section 35.

Forested stands on portions of the project area and surrounding lands were influenced by the large Henry Peak wildfire that burned in the late 1980's. The fire intensively burned about 3,000 to 5,000 acres on neighboring private and USFS lands to the south in the upper reaches of the McLaughlin Creek drainage. Connectivity of mature forest cover has been altered considerably during the last 20 years by the Henry Peak wildfire and logging. Portions of the project area have been pre-commercially thinned within the last 5 years. The forested headwaters of Henry Creek and ridge networks provide potential avenues for connectivity for wildlife. However, there are no specific areas of notable importance for habitat connectivity associated with the project area.

Most of this acreage is now forested with conifer saplings, which are beginning to provide cover. Several private residences occur on lands in the upper portions of McLaughlin Creek and the road system is extensive on the lands surrounding the project area. Several small permits for rock mining have also been previously authorized by DNRC in this area, which involve periodic equipment operation of short duration. The project area is unfenced and is also part of a broader grazing allotment involving other parties and agencies. Some trespass cattle use occurs on the parcels, which is difficult to regulate due to open range. A number of cattle trails are present in wet areas within the project area. Both open and restricted road densities are high on the project area. Open road amounts on the project area total 4.4 linear miles and existing restricted roads total 3.8 miles.

Cover types found on the project area include: western larch/Douglas-fir, ponderosa pine, lodgepole pine, subalpine fir and grand fir. Dwarf mistletoe is prevalent within many of the mature stands. Old growth stands that meet the Green et al. (1992) definitions do not occur within the project area. Stand structures

vary from previously logged open parks to single storied stands, to older multi-storied dense forest found in section 36. On warmer aspects, coarse woody debris ranges from ~3 to 8 tons/acre (visual estimation). On more moist productive sites, such as those found in the central portion of section 36, coarse woody debris amounts range from about 20 to 50 tons per acre. Inclusions of considerable deadfall also exist in the project area where amounts likely approach 100 tons/acre. Snag abundance is variable and densities of large snags >21 in. dbh range from <1per acre to ~4 per acre (visual estimation). Large snags are primarily western larch and risk of snags to loss due to firewood cutting is high along open roads. The mixed severity fire regime was likely the predominant historic disturbance type for stands within the project area. Southerly aspects where ponderosa pine stands occur were likely influenced by more frequent fires.

Shrubs are prevalent in the understories of most stands, and common shrub species observed included spiraea, serviceberry, woods rose, ninebark, willow, ocean spray, Rocky Mountain maple, shiny-leaf ceanothus, snowberry, blue huckleberry, buffalo berry, and Sitka alder. Other common understory species include elk sedge, pine grass, woods pussy toes, Oregon grape, wild strawberry, western meadow rue, bear grass, and spotted knapweed.

Past Forest Management Activities that Could Result in Cumulative Effects

Pre-Commercial Thinning Projects:

Henry Peak PCT (T20N, R25W, S35) October 2009 -- 126 acres.
Sunrise Springs PCT (T20N, R25W, S36) -- 83 acres.
Rocky Prairie PCT (T20N, R27W, S12) 2001 -- 100 acres.

Timber sales:

Camas Salvage (T 19N, R24W, S16) 2000-- fire salvage, 410 acres.
West Lynch (T21N R26W, S14, S23)) 2002 -- green sale, 687 acres.
Miller Creek (T19N, R26W, S16) 2002 -- green sale, 453 acres.
Swamp Ridge (T20N R27W, S36) 2004 -- green sale, 435 acres.
Combest Demonstration (T19N, R26W, S8) 2005 -- Demo Sale ~30 acres.
Rocky Prairie Thinning (T20N, R27W, S12) 2005 -- green sale, 260 acres.
Whisky Moth (T20N, R23W, S16) 2005 -- salvage, limited access, 160 acres.
Ranchettes Fuels Reduction (T21N, R26W, S 26) 2006 -- green sale, 52 acres.
Lynch Creek Salvage (T21N R26W, S14) 2007 -- salvage, 18 acres.
Rocky Prairie Limited (T20N, R26W, S18) 2009 -- green sale/limited access, 105 acres.
Combest Timber Sale (T19N, R26 W, Secs 6, 14, 22), 2010.

There are no timber sales or similar projects currently planned on USFS lands in the foreseeable future (D. Wrobleski, USFS Biologist pers. comm. 9/16/09).

Environmental Effects -- Coarse Filter: Cover Types, Stand Structure, Patch Characteristics, Connectivity of Forest Cover, Old Growth, Snags and Coarse Woody Debris

Issue: There is concern that activities that would occur under the proposed action could affect important habitat attributes at a landscape scale that could adversely wildlife species and maintenance of biodiversity.

No Action Alternative -- Under this alternative, there would be no short-term changes to cover types, stand structure, forest patches, habitat connectivity or the abundance of snags and coarse woody debris. Over time the abundance of mixed conifer cover types and greater representation of shade tolerant tree species would be expected. Snags and coarse woody debris would likely increase and, in the absence of fire or other broad scale disturbance, mature forest patches and connectivity of mature forest cover would tend to expand through forest succession. Dwarf mistletoe would likely continue to affect growth of trees for decades. Species that prefer habitat conditions resulting from these changes would presumably benefit, whereas those preferring open forest conditions, and young forest stands would not. Old growth does not occur within the project area, thus, it would not be affected.

Action Alternative -- Under the action alternative, approximately 392 acres of mature forest would be harvested, and diseased seed trees would be removed from an additional 45 acres that currently provide little overstory cover. Proposed treatments would encourage regeneration and growth of stands dominated by western larch and ponderosa pine. Stand structure on affected acres would be altered from closed canopy forest to open conditions that would vary in tree density given the abundance and presence of healthy trees to retain. Existing dense forest patches with relatively high levels of hard edge, would be altered and cover and stand density would be reduced considerably. All stands except for portions of Unit 36-2 would possess few saplings or mid story trees following timber harvest. Over several decades, resulting stands would contribute to a mosaic of similar-aged young forest across several thousand acres near the headwaters of McLaughlin Creek and Henry Creek that would provide a high degree of habitat connectivity of young-mature forest cover. In the short term, habitat connectivity would be facilitated by retention of: 1) a 14-acre retention area associated with riparian habitat that bisects Units 35-5 and 36-4, 2) maintenance of >39% overstory canopy and >39% understory canopy on 75 acres adjacent to Unit 36-2, and 3) maintenance of ≥40% overstory canopy on 7 acres in the NE corner of section 36, Unit 36-1. Areas with greater retention would be designed to maintain connectivity with mature and young forest patches on neighboring ownerships in the upper reaches of Henry Creek and McLaughlin Creek. Old growth does not occur within the project area, thus, it would not be affected. Under the proposed action, existing numbers of snags would be reduced from existing levels due to timber felling operations. Additional snags may also be lost in the short term following treatments due to wind throw. Given operability and human safety constraints, snags from 8 to 21 inches dbh would be left standing where possible. Additionally, across the project area, at least 1 large snag and 1 large recruitment tree per acre (both >21 inches dbh) would be retained. In cases where snags meeting this minimum size are not present, the largest available snags and recruitment trees would be retained. Available snag habitat would be reduced on all treated acres in the project area, which would be expected to reduce the abundance of species that require snags as a life requisite. However, snags and future recruitment trees would be retained in a well distributed manner across the project area, which would maintain habitat for fewer individuals. Effects on the abundance and distribution of coarse woody debris would be variable. Areas with high current concentrations of coarse woody debris (i.e., >50 tons per acre) would likely have amounts reduced due to operability needs and harvest operations. Whereas, the amounts of material in areas where down woody material is relatively sparse would increase following harvest to a level of about 10 to 20 tons per acre. While some changes in the amount and distribution of woody material would occur across the project area, ample amounts would be expected to remain, which would provide for soil structure, habitat structure and feeding substrate for many species that utilize woody material to meet life requisites. Retained snags and recruitment trees would further ensure the presence of downed woody material across the project area over time. Road construction associated with the proposed action would increase restricted road amounts from 3.8 miles to 6.2 miles. However, open road amounts would not change from the existing 4.4 miles within the project area.

Cumulative Effects

No Action Alternative -- Under this alternative, there would be no short-term cumulative effects involving cover types, stand structure, forest patches, habitat connectivity or the abundance of snags and coarse woody debris. Over the next several decades, a greater acreage of mixed conifer cover types would develop and there would be a greater representation of shade tolerant tree species found on the project area, causing a cumulative increase in these conditions. Old growth does not occur within the project area, thus, it would not be affected. Snags and coarse woody debris would likely increase and, in the absence of fire or other broad scale disturbance, mature forest patches and connectivity of mature forest cover would tend to expand through forest succession. Dwarf mistletoe would likely continue to affect growth of trees for decades, which would pose a greater cumulative risk of infection to young stands on nearby adjacent lands. Species that prefer habitat conditions resulting from these cumulative changes would presumably benefit, whereas those preferring open forest conditions, and young forest stands would not.

Action Alternative -- Approximately 4,118 acres (46%) of well stocked mature forest cover exist within the 8,960 acre cumulative effects analysis area. Of these acres, approximately 968 occur on DNRC lands, and 437 would be harvested affecting cover provided by mature forest stands on 392 acres (Some

diseased trees would be removed on 45 acres that currently have minimal forest cover). Thus following harvest, 576 acres of mature forest cover would remain on DNRC lands within the cumulative effects analysis area (59%) and about 3,726 acres (42%) would remain across all ownerships. Proposed treatments would encourage regeneration and growth of stands dominated by western larch and ponderosa pine. Stand structures on affected acres would be altered from closed canopy forest to open conditions that would vary in tree density given the abundance and presence of healthy trees to retain. These changes would be additive to those created similarly by previous timber harvesting activities and relatively recent wildfires in the vicinity of Henry Peak. Changes to forest vegetation under this proposal would also be additive to similar harvest activities conducted by DNRC in this general geographic area of western Montana during the last 10 years (see above list). In the short term, cumulative effects to habitat connectivity would be mitigated by retention of a 21-acre retention area associated with riparian habitat that bisects Units 35-5 and 36-4, maintenance of >39% overstory canopy and >39% understory canopy on 75 retained acres lying immediately adjacent and to the west of Unit 36-2, and maintenance of ≥40% overstory canopy on 7 acres in the NE corner of section 36, Unit 36-1. Retained patches would be relatively fragmented and isolated until neighboring sapling stands mature. Harvesting under the proposed action would not cumulatively affect any specific areas of notable importance for habitat connectivity. Old growth does not occur within the project area, thus, it would not be affected. Existing numbers of snags would be cumulatively reduced from existing levels due to timber felling operations. Available snag habitat would be reduced on all treated acres in the project area, which would be expected to reduce the abundance of species that require snags as a habitat component. However, snags and future recruitment trees would be retained in a well distributed manner across the project area, which would maintain these important habitat elements. Loss of snags attributable to timber harvesting would be cumulative to natural causes, such as wind and fire and unnatural causes such as, illegal firewood cutting from open roads. Cumulative effects on the abundance and distribution of coarse woody debris would be variable. However, associated cumulative effects to wildlife habitat would be expected to be minor because ample amounts would remain following timber harvesting (10-25 tons per acre), which would provide for soil structure, habitat structure, and feeding substrate for species that need woody material as a necessary habitat component. Within the cumulative effects analysis area short-term disturbance associated with proposed forest management activities and road construction would be additive and cumulative to activity in the area associated with existing open roads, management of the existing livestock license, and rock mining licenses in the project area. Road construction associated with the proposed action would increase restricted road amounts from 3.8 to 6.2 miles in the project area, which would cumulatively increase road densities in the CE analysis area and pose some additional minor risk of loss of snags due to illegal firewood cutting. However, open road amounts would not change.

Fine Filter Analysis

In the fine-filter analysis, individual species are evaluated. These species include wildlife species listed as threatened or endangered under the Endangered Species Act, species listed as sensitive by DNRC, and big game species of management importance to Montana Fish, Wildlife, and Parks. The species addressed below are analyzed in detail, because appreciable amounts of suitable habitat occur in the project area.

Canada Lynx

Issue: Concern was expressed that timber harvesting and related activities could reduce or alter habitat components needed by lynx.

Canada lynx are listed as “threatened” under the Endangered Species Act. Lynx prefer spruce-fir forests, and typically inhabit lands in western Montana between 4,000 to 7,000 feet in elevation (Ruediger et al. 2000). The proposed project area ranges from 4,000 to 5,200 feet in elevation and existing cover types consist primarily of ponderosa pine, mixed conifer, and western larch/Douglas-fir. Lynx habitat in western Montana is generally defined as stands with high levels of horizontal cover that provide habitat for snowshoe hares, which include dense, young conifer stands or mature stands with dense understory vegetation. Mature subalpine fir stands with abundant coarse woody debris also provide structure used for denning and cover for kittens. These conditions are found in a variety of habitat types described by

Pfister et al. (1977), which are preferred by lynx -- particularly those within the subalpine fir series (DNRC Lynx Habitat Mapping Protocol, unpubl. document, 2008). Habitat types that are preferred by lynx occur on 985 acres within the project area. The existing sum for the project area of all structural conditions that provide suitable habitat for lynx is 763 acres. Approximately 223 acres of potential habitat currently are classed as temporary non-habitat due to their low levels of structural attributes. Existing amounts of the various structural conditions of lynx habitat found on the project area are provided in Table WL-1 below. Coarse woody debris levels in the project area are variable and range from approximately 8 tons per acre in open, dry forest types to greater than 50 tons per acre in older stands on moist types. In the cumulative effects analysis area (8,960 acres), mature forest cover patches occurring at greater than 4,000 feet in elevation total approximately 4,118 acres (46%). The majority of these acres are likely to provide habitat for lynx, however, the actual acreage of stands in types preferred by lynx on all ownerships is unknown due to data limitations. Suitable lynx habitat on DNRC lands within the cumulative effects analysis area totals approximately 854 acres (9.5%). Due to the common presence of interspersed dry forest types, and recent wide-scale influences of wildfires and timber harvesting during the last two decades, the capability of this area to support lynx is relatively low. DNRC is not aware of any known breeding populations of Canada lynx in the vicinity of the project area or cumulative effects analysis area.

Table WL-1. Existing lynx habitat acreage by structural type on the Henry Fuels Timber Sale.

HABITAT CLASS	Existing Acres
Denning Habitat	78
Mature Foraging Habitat	133
Other Suitable/Travel Habitat	551
Young Foraging Habitat	0
Temporary Non-Habitat	(223)
TOTAL LYNX TYPE ACRES	**985**
TOTAL EXISTING SUITABLE ACRES	**763**

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

Under the No Action Alternative, no changes to lynx habitat would be expected in the project area, and connectivity of mature forest cover and stands in vegetation types preferred by lynx would not be altered. Thus, no resulting direct or indirect effects to lynx would be expected.

Action Alternative -- Direct and Indirect Effects on Canada Lynx

Under the Action Alternative 355 acres of the existing 763 acres of suitable lynx habitat would be harvested from the project area, leaving 408 acres (Table WL-2). The majority of the acres treated would occur in the denning habitat and other/travel habitat classes. High existing amounts of coarse woody debris are present in approximately 85 acres of the retained 99 acres of mature foraging habitat, meeting DNRC's retention requirements for lynx habitat under forest management administrative rules. Approximately 10-25 tons per acre of coarse woody debris would remain on logged stands in lynx habitat post harvest to maintain structure in the future for snowshoe hares and denning lynx. Habitat connectivity would be reduced for lynx over the next 20 to 30 years on the project area, and retained habitat patches would have low potential for use until neighboring stands regenerate with conifer saplings. Under this alternative, project activities involving motorized disturbance would occur for several years, potentially displacing lynx from the area, should they initially be present. Due to the fact that: 1) marginal quality and availability of existing habitat in the project area, 2) no known breeding populations of lynx occur in the area, 3) ample denning habitat and coarse woody debris would be retained, 4) some mature foraging habitat and 408 acres of suitable habitat would be retained, 5) short-term mechanized disturbance would occur for several years during project activities, and 6) a further reduction of connectivity of mature forest patches would occur, a low degree of adverse effects to lynx could occur as a result of the proposed activities.

Table WL-2. Lynx habitat acreage by structural type on the Henry Fuels Timber Sale project area for the No Action and Action Alternatives.

HABITAT CLASS	No Action Alternative [% of Total Potential Lynx Ac]	Action Alternative Post Harvest [% of Total Potential Lynx Ac]
Denning Habitat	78 [8%]	0*
Mature Foraging Habitat	133 [14%]	99* [10%]
Other Suitable/Travel Habitat	551 [56%]	309 [31%]
Young Foraging Habitat	0 [0%]	0 [0%]
Temporary Non-Habitat	(223) [23%]	(578) [59%]
TOTAL POTENTIAL LYNX HABITAT	**985**	**985**
TOTAL EXISTING SUITABLE HABITAT	**763 [77%]**	**408 [41%]**

*** 85 acres of the 99 acres of Mature Foraging Habitat also possess structural attributes that meet the denning habitat definition and DNRC ARMs requirements for retention.**

No-Action Alternative – Cumulative Effects on Canada Lynx

Under the No Action Alternative, no changes to lynx habitat would be expected in the project area or cumulative effects analysis area, and connectivity of mature forest cover and stands in vegetation types preferred by lynx would not be altered. Thus, no cumulative effects to lynx would be expected.

Action Alternative – Cumulative Effects on Canada Lynx

Under the Action Alternative 355 acres of the existing 1,077 acres of potential lynx habitat existing on DNRC lands would be harvested from the cumulative effects analysis area, leaving 722 acres following project completion (Table WL-3). Of the habitat that would remain, 465 acres (36%) would be other suitable/travel habitat, 152 acres (12%) would be mature foraging habitat, and 106 acres (8%) would be denning habitat. Across the 8,960-acre cumulative effects analysis area on all ownerships, there are about 4,118 acres (46%) of mature forest stands with greater than 40% canopy cover that are predominantly comprised of forest types preferred by lynx (Table WL-4). Following treatments proposed under the Action Alternative, 3,726 acres (42%) would remain. Cumulative effects on the abundance and distribution of coarse woody debris would be variable. However, associated cumulative effects to lynx habitat would be expected to be minor because ample amounts would remain following timber harvesting (10-25 tons per acre), which would provide for habitat structure for lynx and potential future den sites. Within the cumulative effects analysis area short-term disturbance associated with proposed forest management activities and road construction would be additive and cumulative to activity in the area associated with existing open roads, management of the existing livestock license, and rock mining licenses in the project area. Road construction associated with the proposed action would increase restricted road amounts from 3.8 to 6.2 miles in the project area, which would cumulatively increase road densities in the CE analysis area and pose some additional minor risk of loss of snags and coarse woody debris due to illegal firewood cutting. However, open road amounts would not change. Due to fact that: 1) marginal quality and availability of existing habitat in the project area and cumulative effects analysis area, 2) no known breeding populations of lynx occur in the area, 3) ample denning habitat and coarse woody debris would be retained, 4) some mature foraging habitat and 722 acres of suitable habitat would be retained on DNRC lands, 5) short-term mechanized disturbance would occur for several years during project activities, and 6) a further reduction of connectivity of mature forest patches would occur, a low degree of adverse cumulative effects to lynx could occur as a result of the proposed activities.

Table WL-3. Lynx habitat acreage on DNRC lands for the No Action and Action Alternatives in the cumulative effects analysis area for the Henry Fuels Timber Sale.

HABITAT CLASS	No Action Alternative [% of Total Potential Lynx Ac]	Action Alternative Post Harvest [% of Total Potential Lynx Ac]
Denning Habitat	184 [14%]	*106 [8%]
Mature Foraging Habitat	186 [14%]	*152 [12%]
Other Suitable/Travel Habitat	707 [55%]	465 [36%]
Young Foraging Habitat	0 [0%]	0 [0%]
Temporary Non-Habitat	(223) [17%]	(578) [45%]
TOTAL POTENTIAL LYNX HABITAT	**1,300**	**1,300**
TOTAL EXISTING SUITABLE HABITAT	**1,077 [83%]**	**722 [56%]**

* 85 acres of the 152 acres of Mature Foraging Habitat also possess structural attributes that meet the denning habitat definition and DNRC ARMs requirements for retention.

Table WL-4. Estimated acreage of moderate to dense (>40% overstory canopy closure) mature forest cover for the No Action and Action Alternatives on all ownerships in the cumulative effects analysis area for the Henry Fuels Timber Sale.

Habitat Condition	No Action Alternative Acres [% of CE Analysis Area]	Action Alternative Post Harvest Acres [% of CE Analysis Area]
Mature Forest with Greater Than 40% Overstory Canopy Cover	4,118 [46%]	3,726 [42%]
Sparse Forest and Non Forest	4,842 [54%]	5,234 [58%]
TOTAL CE Analysis Area	**8,960 [100%]**	**8,960 [100%]**

Fisher

Issue: Concern was expressed that timber harvesting and related activities could reduce the amount or alter the quality of habitat needed by fishers.

The fisher is a member of the weasel family that preys upon a variety of small mammals, birds, snowshoe hares, and porcupines. They also take feed on carrion and seasonally available fruits. Fishers use a variety of successional stages, but prefer older stands with dense canopies, and they avoid openings or young forested stands that provide little overhead cover. Thus, maintaining interconnected patches of dense, mature forest cover across the landscape is an important consideration for the conservation of fishers. Fishers occasionally use small forest openings for short hunting excursions, particularly if sufficient overhead cover provided by conifer saplings and shrubs is present. Fishers tend to select for stands that contain resting and denning sites and often use areas within 150 feet of water. Resting and denning sites occur in cavities of live trees and snags, downed logs, brush piles, mistletoe brooms, old raptor nests, and holes in the ground.

Within the 1,334-acre project area there are currently 570 acres (43%) of suitable habitat for fishers. Across the 1,813 acres of DNRC lands within the 8,960-acre cumulative effects analysis area there are currently 849 acres (9.5%) of suitable fisher habitat. Mature forest cover on all ownerships within the cumulative effects analysis area (includes some non-fisher habitat stand types) totals 4,118 acres (46%) (Table WL-4). Connectivity of mature forest cover on the project area and cumulative effects analysis area is relatively fragmented due to the presence of naturally interspersed dry forest types on steep south-facing exposures, removal of mature timber canopy on logged DNRC and neighboring lands, and deforestation resulting from several wildfires in the vicinity of Henry Peak during the last several decades.

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

Under the No Action Alternative, no changes to habitat for fishers would be expected in the project area, and connectivity of mature forest cover and stands in vegetation types preferred by fishers would not be altered. Thus, no resulting direct or indirect effects to fishers would be expected.

Action Alternative -- Direct and Indirect Effects on Fishers

Under the Action Alternative 392 acres of the existing 570 acres of suitable fisher habitat would be harvested from the project area, leaving 178 acres intact. Approximately 10-25 tons per acre of coarse woody debris and at least 2 snags greater than 21 inches dbh where possible would remain on logged stands in fisher habitat post harvest to maintain structure in the future for fishers and their prey. Habitat connectivity would be reduced for fishers over the next 20 to 30 years on the project area, and retained habitat patches would have low potential for use until neighboring stands regenerate with conifer saplings and shrub cover. Under this alternative, project activities involving motorized disturbance would occur for several years, potentially displacing fishers from the area, should they be present. Considering that: 1) marginal quality and availability of existing habitat occurs in the project area, 2) snags and coarse woody debris would be retained, 3) 178 acres of suitable habitat would be retained in the project area, 4) short-term mechanized disturbance would occur for several years during project activities, and 5) a further reduction of connectivity of mature forest patches would occur, a low degree of adverse effects to fishers could occur as a result of the proposed activities.

No-Action Alternative – Cumulative Effects on Fishers

Under the No Action Alternative, no changes to habitat for fishers would be expected in the cumulative effects analysis area, and connectivity of mature forest cover and stands in vegetation types preferred by fishers would not be altered. Thus, no resulting cumulative effects to fishers would be expected.

Action Alternative – Cumulative Effects on Fishers

Under the Action Alternative 392 acres of the existing 849 acres of potential fisher habitat existing on DNRC lands would be harvested from the cumulative effects analysis area, leaving 457 acres following project completion. Across the 8,960-acre cumulative effects analysis area on all ownerships, there are about 4,118 acres (46%) of mature forest stands with greater than 40% canopy cover, which are predominantly comprised of forest types preferred by fishers (Table WL-4). Following treatments proposed under the Action Alternative, 3,726 acres (42%) would remain. Cumulative effects on the abundance and distribution of coarse woody debris would be variable. However, associated cumulative effects to fishers and their habitat would be expected to be minor because ample amounts would remain following timber harvesting (10-25 tons per acre), and at least 2 snags per acre greater than 21 inches dbh where possible would remain. Retention of this dead woody material would provide for future habitat structure for fishers and their prey. Within the cumulative effects analysis area short-term disturbance associated with proposed forest management activities and road construction would be additive and cumulative to activity in the area associated with existing open roads, management of the existing livestock license, and rock mining licenses in the project area. Road construction associated with the proposed action would increase restricted road amounts from 3.8 to 6.2 miles in the project area, which would cumulatively increase road densities in the CE analysis area and pose some additional minor risk of loss of snags and coarse woody debris due to illegal firewood cutting. However, open road amounts would not change. Considering that: 1) marginal quality and availability of existing habitat occurs in the project area and cumulative effects analysis area, 2) snags and coarse woody debris would be retained, 3) 457 acres of suitable habitat would remain on DNRC lands in the cumulative effects analysis area, 4) short-term mechanized disturbance would occur for several years during project activities, and 5) a further reduction of connectivity of mature forest patches would occur, a low degree of adverse cumulative effects to fishers could occur as a result of the proposed activities.

Pileated Woodpecker

Issue: Concern was expressed that timber harvesting and related activities could reduce the amount or alter the quality of habitat needed by pileated woodpeckers.

The pileated woodpecker is a large, crow-sized bird that is associated with mature and old forest types found at low to mid elevations in western Montana. The feeding and nesting habitat requirements of pileateds, including large snags or decayed trees for nesting and downed wood for feeding, closely tie these woodpeckers to mature forests with late-successional characteristics. Pileated woodpeckers play an important ecological role by excavating cavities that are later used by other species of birds and mammals. Due to their size, pileated woodpeckers excavate the largest cavities of any woodpecker, and they primarily eat carpenter ants found in large logs, stumps, and snags. Preferred tree species for nest trees include western larch, ponderosa pine, cottonwood, and quaking aspen -- usually 20 inches dbh and larger. For this analysis, suitable habitat was defined as mature stands growing at 4,000 to 5,200 feet elevation that possessed at least 40% overstory canopy closure.

Within the 1,334-acre project area there are currently 540 acres (40%) of suitable habitat for pileated woodpeckers. Across the 1,813 acres of DNRC lands within the 8,960-acre cumulative effects analysis area there are currently 978 acres (11%) of suitable pileated woodpecker habitat. Mature forest cover on all ownerships within the cumulative effects analysis area totals 4,118 acres (46%) (Table WL-4). Connectivity of mature forest cover on the project area and cumulative effects analysis area is relatively fragmented due to the presence of naturally interspersed dry forest types on steep south-facing exposures, removal of mature timber canopy on logged DNRC and neighboring lands during the last decade, and deforestation resulting from several wildfires in the vicinity of Henry Peak during the last several decades.

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

Under the No Action Alternative, no changes to habitat for pileated woodpeckers would be expected in the project area, and mature forest cover and stands in vegetation types preferred by pileated woodpeckers would not be altered. Thus, no resulting direct or indirect effects to pileated woodpeckers would be expected.

<u>Action Alternative -- Direct and Indirect Effects on Pileated Woodpeckers</u>

Under the Action Alternative 392 acres of the existing 540 acres of suitable pileated woodpecker habitat would be harvested from the project area, leaving 169 acres intact following project completion. Approximately 10-25 tons per acre of coarse woody debris and at least 2 snags greater than 21 inches dbh where possible would remain on logged stands, which would maintain structure and feeding sites over time for pileated woodpeckers. Effective habitat patch size and habitat connectivity would be reduced for pileated woodpeckers over the next 40-50 years on the project area, and retained habitat patches would have greatest utility as feeding habitat. Road construction associated with the proposed action would increase restricted road amounts from 3.8 to 6.2 miles in the project area, which would increase road densities and pose some additional minor risk of loss of snags and coarse woody debris due to illegal firewood cutting. However, open road amounts would not change. Considering that: 1) marginal quality and availability of existing habitat occurs in the project area, 2) snags and coarse woody debris would be retained across treated stands, 3) 169 acres of suitable habitat would be retained in the project area, and 4) further reduction of connectivity of mature forest patches that could require 40-50 years to re-develop into usable habitat, a moderate degree of adverse effects to pileated woodpeckers could occur as a result of the proposed activities.

<u>No-Action Alternative – Cumulative Effects on Pileated Woodpeckers</u>

Under the No Action Alternative, no changes to habitat for pileated woodpeckers would be expected in the cumulative effects analysis area, and mature forest cover and stands in vegetation types preferred by pileated woodpeckers would not be altered. Thus, no resulting cumulative effects to pileated woodpeckers would be expected.

Action Alternative – Cumulative Effects on Pileated Woodpeckers

Under the Action Alternative 392 acres of the existing 968 acres of potential pileated woodpecker habitat existing on DNRC lands would be harvested from the cumulative effects analysis area, leaving 576 acres following project completion. Across the 8,960-acre cumulative effects analysis area on all ownerships, there are about 4,118 acres (46%) of mature forest stands with greater than 40% canopy cover, which are predominantly comprised of forest types preferred by pileated woodpeckers (Table WL-4). Following treatments proposed under the Action Alternative, 3,726 acres (42%) would remain. Cumulative effects on the abundance and distribution of coarse woody debris would be variable. However, related cumulative effects to pileated woodpeckers and their habitat would be expected to be minor because ample amounts would remain following timber harvesting (10-25 tons per acre), and at least 2 snags per acre greater than 21 inches dbh where possible would remain. Retention of this dead woody material would provide for future habitat structure and feeding substrate for pileated woodpeckers over time. Within the cumulative effects analysis area short-term disturbance associated with proposed forest management activities and road construction would be additive and cumulative to activity in the area associated with existing open roads, management of the existing livestock license, and rock mining licenses in the project area. Road construction associated with the proposed action would increase restricted road amounts from 3.8 to 6.2 miles in the project area, which would cumulatively increase road densities in the CE analysis area and pose some additional minor risk of loss of snags and coarse woody debris due to illegal firewood cutting. However, open road amounts would not change. Considering that: 1) marginal quality and availability of existing habitat occurs in the project area and cumulative effects analysis area, 2) snags and coarse woody debris would be retained across treated stands, 3) 3,726 acres of potentially suitable habitat would persist in the cumulative effects analysis area across all ownerships, and 4) further reduction of connectivity of mature forest patches that could require 40-50 years to re-develop into usable habitat, a low degree of adverse cumulative effects to pileated woodpeckers could occur as a result of the proposed activities.

Other Species Considered

The following species were considered, but detailed analyses were not warranted due to the absence of available suitable habitat within the project area or other relevant biological considerations that would place the species at minimal risk from the proposed activities.

ENDANGERED, THREATENED AND SENSITIVE SPECIES

Threatened and Endangered Species	[Y/N] Potential Impacts and Mitigation Measures N = Not Present or No Impact is Likely to Occur Y = Impacts May Occur (Explain Below)
Gray Wolf (*Canis lupus*) Habitat: ample big game pops., security from human activity	[Y] Due to the uncertainty of federal delisting, wolves were considered as endangered in this analysis. No denning or rendezvous sites within 1 mile of the project area are known. Wolves may occasionally use the project area and may be displaced by motorized activities associated with the proposed project. However, minimal direct, indirect or cumulative effects to wolves would be anticipated under either of the alternatives considered. If wolves or an active den site were detected in the immediate area, a DNRC biologist would be consulted and appropriate mitigations would be developed and applied.

Grizzly Bear (*Ursus arctos*) Habitat: recovery areas, security from human activity	[N] The project area lies approximately 15 miles southwest of the Cabinet Yaak Grizzly Bear Recovery Zone and approximately 25 miles west of the Northern Continental Divide Ecosystem. The area is currently not considered occupied by grizzly bears and habitat in the vicinity of the project area is relatively poor. No direct, indirect or cumulative effects to grizzly bears would be anticipated under either of the alternatives considered.

DNRC Sensitive Species	[Y/N] Potential Impacts and Mitigation Measures N = Not Present or No Impact is Likely to Occur Y = Impacts May Occur (Explain Below)
Bald Eagle (*Haliaeetus leucocephalus*) Habitat: late-successional forest <1 mile from open water	[N] No bald eagle nests, feeding areas, roosting areas or suitable nesting habitat occur within 1 mile of the project area. Thus, no direct, indirect or cumulative effects to bald eagles would be anticipated under either of the alternatives considered.
Black-Backed Woodpecker (Picoides arcticus) Habitat: mature to old burned or beetle-infested forest	[N] Several wildfires have occurred in the vicinity of the project area during the last 20 years, however, no recent burns within the last 5 years occur on the project area or within 1 mile of the project area. Thus, no direct, indirect or cumulative effects to black-backed woodpeckers would be anticipated under either of the alternatives considered.
Flammulated Owl (Otus flammeolus) Habitat: late-successional ponderosa pine and Doug.-fir forest	[Y] Within the project area there are 64 acres that would be harvested, which have appreciable component of ponderosa pine and Douglas-fir present. These areas currently provide marginal habitat conditions for flammulated owls due to the relatively high density of trees and/or relatively small size and young age of the stands. Proposed treatments under the action alternative would open up the treated stands and promote the sustainability of ponderosa pine on these sites, potentially resulting in a long-term minor benefit to flammulated owls. Given the current marginal habitat conditions and small size of the habitat area potentially affected, minimal direct, indirect or cumulative effects to flammulated owls would be anticipated under either of the alternatives considered.
Coeur d' Alene Salamander (Plethodon idahoensis) Habitat: waterfall spray zones, talus near cascading streams	[N] No moist talus habitat occurs within the project area. Thus, no direct, indirect or cumulative effects to Coeur d' Alene salamanders would be anticipated under either of the alternatives considered.

Columbian Sharp-Tailed Grouse (Tympanuchus Phasianellus columbianus) Habitat: grassland, shrubland, riparian, agriculture	[N] No grassland habitat suitable for use by Columbian sharp-tailed grouse occurs within or near the project area. Thus, no direct, indirect or cumulative effects to Columbian sharp-tailed grouse would be anticipated under either of the alternatives considered.
Common Loon (Gavia immer) Habitat: cold mountain lakes, nest in emergent vegetation	[N] No bodies of water suitable for use by common loons occur within or near the project area. Thus, no direct, indirect or cumulative effects to black-backed woodpeckers would be anticipated for either of the alternatives considered.
Harlequin Duck (Histrionicus histrionicus) Habitat: white-water streams, boulder and cobble substrates	[N] No white-water streams suitable for use by harleqin ducks occur within or near the project area, Thus, no direct, indirect or cumulative effects to harleqin ducks would be anticipated for either of the alternatives considered.
Northern Bog Lemming (Synaptomys borealis) Habitat: sphagnum meadows, bogs, fens with thick moss mats	[N] No sphagnum meadows, bogs or fens occur within or near the project area. Thus, no direct, indirect or cumulative effects to bog lemmings would be anticipated for either of the alternatives considered.
Peregrine Falcon (Falco peregrinus) Habitat: cliff features near open foraging areas and/or wetlands	[N] No cliff features or suitable foraging areas occur within or near the project area. Thus, no direct, indirect or cumulative effects to peregrine falcons would be anticipated for either of the alternatives considered.
Townsend's Big-Eared Bat (Plecotus townsendii) Habitat: caves, caverns, old mines	[N] No caves, caverns or old mines suitable for use by bats occur within or near the project area. Thus, no direct, indirect or cumulative effects to Townsend's big-eared bats would be anticipated for either of the alternatives considered.

Elk, Mule Deer and White-tailed Deer

Issue: Concern was expressed that timber harvesting and related activities could reduce the amount or alter the quality of winter range or security habitat needed elk, mule deer and white-tailed deer.

Relatively disturbance-free areas with low snow accumulation and ample cover and forage are important in winter for elk and deer herds in western Montana. Such areas are typically found at low to mid elevations (~3,000 to 5,600 ft.) and possess moderate to steep slopes – particularly associated with southerly or westerly exposures. Densely stocked thickets of conifer regeneration and densely forested mature stands provide thermal protection and hiding cover for elk and deer in winter, which can reduce energy expenditures and stress associated with cold temperatures, wind, and human-caused disturbance. Areas with mature forest cover are also important for snow interception, which makes travel and foraging less stressful for elk and deer during periods when snow is deep. Dense stands that are well connected provide for animal movements across wintering areas during periods with deep snow, which improves their ability to find forage and shelter under varied environmental conditions. Thus, removing cover that is important for wintering deer through forest management activities can increase their energy expenditures and stress in winter. Reductions in cover could ultimately result in a reduction in winter range carrying capacity and subsequent increases in winter mortality within local herds. Lands within the project area provide winter range habitat for elk, mule deer and white-tailed deer, particularly during mild winters. Because much of the acreage has gentle slope and occurs on gentle ridge tops, deep snow is more likely to accumulate in these areas making them less suitable for wintering ungulates during severe winters. Areas suitable for winter foraging by elk and deer are present on steep south-

facing exposures along both Henry and McLaughlin creeks. However, existing open roads present in the project area and cumulative effects analysis area, and relatively low cover quality and availability, reduce the effectiveness and suitability of this area to provide high quality winter range.

Regarding elk security, timber harvest can increase elk vulnerability by changing the size, structure, juxtaposition and accessibility of areas that provide security during hunting season (Hillis et al. 1991). As visibility and accessibility increase within forested landscapes, elk have a greater probability of being observed and subsequently harvested by hunters. Because the cow segment of the harvest is normally regulated carefully, primary concerns are related to substantial reduction of the bull segment and subsequent decrease in hunter opportunity. The presence of fewer mature bulls early in the hunting season, reduces the odds of any given hunter to see or harvest such an animal throughout the remainder of the general big game hunting season.

Within the 1,334-acre project area approximately 540 acres of mature forest cover capable of providing hiding cover and some interception of snow currently exist. Similarly, 968 acres of mature cover exist across all DNRC lands within the 8,960-acre cumulative effects analysis area, and approximately 4,118 acres of mature forest cover exist across all ownerships within the cumulative effects analysis area. Within the project area, approximately 794 acres of existing seedling and sapling stands are established and provide some additional limited hiding cover. None of the forested stands within the project area or cumulative effects analysis area meet the Hillis et al. (1991) definition of security cover, due to their small size and high accessibility by motorized vehicles and foot travel.

No-Action Alternative -- Direct and Indirect Effects on Elk, Mule Deer and White-tailed Deer
Under the No Action Alternative, no changes to habitat for elk, mule deer, or white-tailed deer would be expected in the project area. Thus, no resulting direct or indirect effects to these big game species would be expected.

Action Alternative -- Direct and Indirect Effects on Elk, Mule Deer and White-tailed Deer

Under the Action Alternative 392 acres of the existing 540 acres of mature forest cover would be harvested from the 1,334-acre project area, leaving 169 acres intact following project completion. Effective habitat patch size and habitat connectivity would be reduced on these acres for the next 40-50 years, lowering the capability of the habitat to provide usable wintering areas for elk and deer during severe winters. Hiding cover would be removed on the treated acres and would require about 10-20 years to regenerate. Road construction associated with the proposed action would increase restricted road amounts from 3.8 to 6.2 miles in the project area, which would increase road densities and pose additional minor increases in vulnerability of elk and deer during hunting season. However, open road amounts would not change. Disturbance associated with mechanized logging equipment could occur for several years during operations, which could temporarily displace elk and deer from the vicinity of the project area. Considering that: 1) high densities of elk and deer are not known to use the area 2) marginal quality and availability of existing wintering habitat and no security habitat occurs in the project area, 3) 169 acres of mature forest cover would be retained in the project area, 4) hiding cover would be reduced on 392 acres, 5) further reduction of cover and connectivity of mature forest patches could require 40-50 years to re-develop into usable habitat, 6) some hiding cover currently exists on an additional 794 acres of seedling and sapling stands within the project area that is expected to develop considerably over the next 10 years, and 7) mechanized disturbance associated with harvest activities would occur for several years during project completion, a low to moderate degree of adverse effects to winter range and local elk and deer herds would occur as a result of the proposed activities.

No-Action Alternative – Cumulative Effects on Elk, Mule Deer and White-tailed Deer

Under the No Action Alternative, no changes to habitat for elk, mule deer or white-tailed deer would be expected in the cumulative effects analysis area. Thus, no resulting cumulative effects to these big game species would be expected.

Action Alternative – Cumulative Effects on Elk, Mule Deer and White-tailed Deer

Under the Action Alternative 392 acres of the existing 968 acres of mature forest cover existing on DNRC lands would be harvested from the cumulative effects analysis area, leaving 576 acres following project completion. Across the 8,960-acre cumulative effects analysis area on all ownerships, there are about 4,118 acres (46%) of mature forest stands with greater than 40% canopy cover, which are predominantly comprised of forest types usable by elk and deer (Table WL-4). Following treatments proposed under the Action Alternative, 3,726 acres (42%) would remain. Within the cumulative effects analysis area short-term disturbance associated with proposed forest management activities and road construction would be additive and cumulative to activity in the area associated with existing open roads, management of the existing livestock license, and rock mining licenses in the project area. Road construction associated with the proposed action would increase restricted road amounts from 3.8 to 6.2 miles in the project area, which would cumulatively increase road densities in the CE analysis area and pose additional minor increases in vulnerability of elk and deer during hunting season. However, open road amounts would not change. Considering that: 1) high densities of elk and deer are not known to use the area 2) marginal quality and availability of existing wintering habitat and no security habitat occurs in the cumulative effects analysis area, 3) 3,726 acres of mature forest cover would persist in the cumulative effects analysis area across all ownerships, 4) hiding cover would be reduced on 392 acres, 5) further reduction of cover and connectivity of mature forest patches could require 40-50 years to re-develop into usable habitat, 6) some hiding cover currently exists on an additional 794 acres of seedling and sapling stands within the project area that is expected to develop considerably over the next 10 years, and 7) mechanized disturbance associated with harvest activities would occur for several years during project completion, a low degree of adverse cumulative effects to winter range and local elk and deer herds would be anticipated as a result of the proposed activities.

References

Green, P., J. Joy, D. Sirucek, W. Hann, A. Zack, and B. Naumann. 1992. Old-growth forest types of the Northern Region. R-1 SES. Unpublished report on file at U.S. Forest Service, Northern Region, Missoula, Montana.

Hillis, J.M., and M.J. Thompson, J.E. Canfield, L.J. Lyon, C.L. Marcum, P.M. Dolan, and D.W. McCleerey. 1991. Defining elk security: the Hillis paradigm. pp.38-43 in A.G. Christensen, L.J. Lyon, and T.N. Lonner, comps., Proc. Elk Vulnerability Symp., Mont. State Univ., Bozeman, MT. 330pp.

Pfister, R., B. Kovalchik, S. Arno, and R. Presby. 1977. Forest habitat types of Montana. USDA For. Serv. Gen. Tech. Rep. INT-34. Intermountain Forest and Range Experiment Station Ogden, Utah. 174pp.

Ruediger, B., J. Claar, S. Mighton, B. Nanaey, T. Tinaldi, F. Wahl, N. Warren, D. Wenger, A. Williamson, L. Lewis, B. Holt, G. Patton, J. Trick, A. Vandehey, and S. Gniadek, 2000. Canada Lynx Conservation Assessment (2nd Edition). USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Missoula, Montana. 122 pp.

Archaeological Analysis

From: Rennie, Patrick
Sent: Tuesday, April 07, 2009 8:06 AM
To: Peters, Dale
Subject: RE: 'Henry Peak Fuels Reduction' timber sale proposal

Hi Dale:

The DNRC archaeologist conducted a Class III intensity level cultural and paleontological resources inventory of the entire area of potential effect. Despite a detailed examination, no cultural or fossil resources were identified and no additional archaeological or paleontological investigative work is recommended. The proposed timber sale/fuels reduction project will have *No Effec*t to *Antiquities* as defined under the Montana State Antiquities Act. A formal report of findings has been prepared and is on file with the DNRC and the Montana State Historic Preservation Officer.

Thanks,

Patrick Rennie
DNRC Archaeologist

THE CONFEDERATED SALISH AND KOOTENAI TRIBES
OF THE FLATHEAD NATION
P.O. BOX 278
Pablo, Montana 59855
(406) 275-2700
FAX (406) 275-2806
www.cskt.org

A People of Vision

A Confederation of the Salish, Upper Pend d'Oreilles and Kootenai Tribes

Tribal Preservation Office

Cultural and Historical Sites Review

TRIBAL COUNCIL MEMBERS:
E.T. "Bud" Moran – Chairman
Joe Durglo – Vice Chair
Steve Lozar – Secretary
Jim Malatare – Treasurer
Michel Kenmille
Carole Lankford
Reuben A. Mathias
Charles L. Morigeau
Terry L. Pitts
Mark Sorrels

14-Apr-10

RP # **10-026** Agency Number: 826-4722 Project Name DNRC-State Lands Mod/Sunrise

Requesting Agency: NRCS-D.Pete Project Type: Timber harvest, road building & reconstruction.

Location: T20N, R25W, E 1/2 Of Section 36 of the Sunrise Springs quad map. Or West of Camas Prairie.

The Tribal Preservation Office recommends the following conditions:

- ☐ *There are no known historical or cultural sites present. No further consultation is required.*
- ☑ *The potential exists for encountering historical or cultural sites. Therefore, we request that consultation with us be maintained throughout the period of activity.*
- ☐ *Site(s) are present which have cultural or historical significance. The following special conditions are recommended.*

Comments: PROJECT APPROVED for the timber harvest, road building & reconstruction, Post harvest forest improvement activities.

IMPORTANT STIPULATIONS: If the activity plan is altered, this clearance is no longer valid. This cultural clearance expires one year after the date issued. If historical or cultural artifacts or sites are discovered during the project activity, all impacts to the site of discovery should be halted and the Tribal Preservation Office should be contacted immediately.

Wain Lefthand
Preservation Specialist

Marcia Pablo
Concurred by

Attachment III
Harvest Prescriptions

Footnote: All proposed road miles, harvest boundaries and acreages are close approximations as this proposal has not yet been implemented on the ground.

Unit:	36-1	**Elevation:**	3380' – 4480'	**Slope:**	6 - 50%
Acres:	133	**Location:**	NE1/4	**Aspect:**	Northeast

Habitat Types: 133 acres 591 ABGR/LIBO - LIBO

Current Cover Type:	92 acres	Ponderosa Pine
	41 acres	Mixed Conifer
Desired Future Condition:	133 acres	Western Larch/Douglas Fir

Soil Type:

60% 34E Winfall gravelly loam, 8 to 30 percent slopes
20% 32F Mitten gravelly ashy silt loam, 35 to 60 percent slopes
20% 25E Wildgen gravelly loam, 15 to 30 percent slopes

SLI Stand # 1		69 acres	**591**	**PP**	**Good - Ave Vigor**	
Saw timber; Med stocked 40-69%			Multi-storied (three or more canopy levels)			
	Upper Canopy %		**Middle Canopy %**		**Lower Canopy %**	
1st spp	PP	40-49	DF	60-69	DF	90-100
2nd spp	DF	30-39	PP	20-29	GF	0-9
3rd spp	WL	20-29	WL	10-19	WL	0-9
4th spp			GF	0-9	PP	0-9
Ave DBH	21		11		3	
Height	100		75		25	
Age	200		90		60	
Vigor	Below ave to poor		Good to average		Below ave to poor	
Potential Productivity			Coarse Woody Debris		Insect & Disease	
105	M.A.I. (ft3/acre/yr)		1	ton/acre	Mistle-toe	Bark beetle

Current Stand Conditions: **Unit:** 36-1

SLI Stand # 2		37 acres	**521**	**MC**	**Below- Poor Vigor**	
Saw timber; Med stocked 40-69%			Multi-storied (three or more canopy levels)			
	Upper Canopy %		**Middle Canopy %**		**Lower Canopy %**	
1st spp	DF	30-39	DF	40-49	GF	50-59
2nd spp	WL	30-39	GF	30-39	DF	40-49
3rd spp	PP	20-29	WL	10-19	WL	0-9
4th spp	GF	10-19	PP	0-9	LLP	0-9
Ave DBH	19		10		3	
Height	100		70		15	
Age	150		60		50	
Vigor	Very poor		Below average to poor		Below average to poor	
Potential Productivity 105 M.A.I. (ft3/acre/yr)			Coarse Woody Debris 32 ton/acre		Insect & Disease Mistle-toe Bark beetle	

SLI Stand # 3		4 acres	**591**	**PP**	**Below- Poor Vigor**	
Saw timber; Poor stocked 15-39%			Multi-storied (three or more canopy levels)			
	Upper Canopy %		**Middle Canopy %**		**Lower Canopy %**	
1st spp	WL	50-59	GF	40-49	GF	80-89
2nd spp	GF	30-39	WL	40-49	WL	10-19
3rd spp	DF	0-9	DF	0-9	LLP	0-9
4th spp	LLP	0-9	LLP	0-9	DF	0-9
Ave DBH	14		7		3	
Height	75		50		25	
Age	100		100		70	
Vigor	Very poor		Below ave to poor		Very poor	
Potential Productivity 105 M.A.I. (ft3/acre/yr)			Coarse Woody Debris 1 ton/acre		Insect & Disease Mistle-toe Bark beetle	

Current Stand Conditions: **Unit:** 36-1

SLI Stand # 18		23 acres	**521**	**MC**	**Below- Poor Vigor**	
Saw timber; Well stocked 70%+			Multi-storied (three or more canopy levels)			
	Upper Canopy %		**Middle Canopy %**		**Lower Canopy %**	
1st spp	PP	30-39	DF	50-59	DF	50-59
2nd spp	WL	20-29	GF	30-39	GF	30-39
3rd spp	DF	20-29	WL	10-19	WL	0-9
4th spp	GF	10-19	PP	0-9		
Ave DBH	20		10		4	
Height	95		65		25	
Age	150		60		60	
Vigor	Below average to poor		Good to Average		Below average to poor	
Potential Productivity			Coarse Woody Debris		Insect & Disease	
105	M.A.I. (ft3/acre/yr)		8	ton/acre	Mistle-toe	Stem rots

Treatment Objectives: **Henry Fuels; 36-1**

- Remove unhealthy trees, as well as those with poor vigor to promote long term forest health, growth and vitality.
- Promote a healthy stand of timber by significantly reducing the dwarf mistletoes *(Arceuthobium spp)* affecting this stand of timber.
- Move this stand toward the desired future condition classification of western larch/Douglas-fir.
- Broadcast burn and/or scarify the site sufficiently to make an available seedbed to promote natural regeneration, particularly western larch and ponderosa pine.

Prescribed Treatment:

- Seed tree harvest. Leave tree marking healthy vigorous trees with good crown and bark characteristics, with a variable spacing of 65 - 75 feet, leaving 8 - 10 trees per acre.
- Favor leaving dominant and co-dominant western larch and ponderosa pine that are wind firm and that have the bark characteristics that would withstand a low intensity burn.
- Retain a minimum of two snags per acre, 14” DBH & greater, and two snag recruits per acre, where present, if they are not a safety hazard.

Harvest Method:

- Ground based harvesting with conventional, mechanical, or cut-to-length operations on dry, frozen or snow covered ground are applicable to this unit.
- Utilization of the old existing roads and skid trails that do not violate Best Management Practices (BMP’s) is encouraged to be incorporated within the harvest plan of operations. These old existing roads and skid trails would have erosion control measures installed following harvest, as per BMP’s.
- Trees marked to leave and ponderosa pine 16” dbh & greater designated to leave.

Hazard Reduction:

- Landing piles to be burned and/or ground at landings following harvest.
- Residual submerchantable material would be slashed then broadcast burned and/or piled and burned.

Site Preparation and Regeneration:

- Broadcast burn to prepare exposed mineral seedbed; preferred option.
- Mechanical scarification to a minimum of 35% exposed mineral seedbed for natural regeneration; secondary option.
- Leave trees to provide seed source for natural regeneration.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from time of site preparation, and the need for supplemental planting determined.
- This stand should be evaluated for pre-commercial thinning and overstory removal treatments approximately 20 years from time of harvest.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

……

Unit:	36-2	**Elevation:**	4380’ – 4840’	**Slope:**	6 - 50%
Acres:	49	**Location:**	Center of Section	**Aspect:**	Northeast

Habitat Types:	49 acres	591 ABGR/LIBO - LIBO
Current Cover Type:	42 acres	Mixed Conifer
	7 acres	Ponderosa Pine
Desired Future Condition:	48 acres	Western Larch/Douglas Fir
	1 acres	Lodgepole Pine

Soil Type:

82%	35E Courville gravelly ashy silt loam, 8 to 30 percent slopes
18%	34E Winfall gravelly loam, 8 to 30 percent slopes

Current Stand Conditions: **Unit:** 36-2

SLI Stand # 2		22 acres	**591**	**MC**	**Below- Poor Vigor**	
Saw timber; Med stocked 40-69%			Multi-storied (three or more canopy levels)			
	Upper Canopy %		**Middle Canopy %**		**Lower Canopy %**	
1st spp	DF	30-39	DF	40-49	GF	50-59
2nd spp	WL	30-39	GF	30-39	DF	40-49
3rd spp	PP	20-29	WL	10-19	WL	0-9
4th spp	GF	19-Oct	PP	0-9	LLP	0-9
Ave DBH	19		10		3	
Height	100		70		15	
Age	150		60		60	
Vigor	Very poor		Below ave to poor		Below ave to poor	
Potential Productivity 105 M.A.I. (ft3/acre/yr)			Coarse Woody Debris 32 ton/acre		Insect & Disease Mistle-toe	Bark beetle

SLI Stand # E		17 acres	**521**	**MC**	**Below- Poor Vigor**	
Saw timber; Med stocked 40-69%			Multi-storied (three or more canopy levels)			
	Upper Canopy %		**Middle Canopy %**		**Lower Canopy %**	
1st spp	DF	30-39	DF	50-59	GF	90-100
2nd spp	WL	30-39	GF	40-49	DF	0-9
3rd spp	PP	20-29	WL	0-9		
4th spp	GF	0-9	PP	0-9		
Ave DBH	19		10		4	
Height	100		65		25	
Age	200		80		70	
Vigor	Below average to poor		Below average to poor		Below average to poor	
Potential Productivity 105 M.A.I. (ft3/acre/yr)			Coarse Woody Debris 20 ton/acre		Insect & Disease Mistle-toe	Bark beetle

Current Stand Conditions: **Unit:** 36-2

SLI Stand # 1		7 acres	**591**	**PP**	**Below- Poor Vigor**	
Saw timber; Poor stocked 15-39%			Multi-storied (three or more canopy levels)			
	Upper Canopy %		**Middle Canopy %**		**Lower Canopy %**	
1st spp	PP	40-49	DF	60-69	DF	90-100
2nd spp	DF	30-39	PP	20-29	GF	0-9
3rd spp	WL	20-29	WL	10-19	WL	0-9
4th spp			GF	0-9	PP	0-9
Ave DBH	21		11		3	
Height	100		75		25	
Age	200		90		60	
Vigor	Below ave to poor		Good to average		Below ave to poor	
Potential Productivity 105 M.A.I. (ft3/acre/yr)			Coarse Woody Debris 1 ton/acre		Insect & Disease Mistle-toe Bark beetle	

SLI Stand # A		3 acres	**521**	**MC**	**Below- Poor Vigor**	
Saw timber; Med stocked 40-69%			Multi-storied (three or more canopy levels)			
	Upper Canopy %		**Middle Canopy %**		**Lower Canopy %**	
1st spp	PP	40-49	DF	60-69	DF	90-100
2nd spp	DF	30-39	PP	20-29	GF	0-9
3rd spp	WL	20-29	WL	10-19	WL	0-9
4th spp			GF	0-9	PP	0-9
Ave DBH	21		11		3	
Height	100		75		25	
Age	200		90		60	
Vigor	Below average to poor		Good to Average		Below average to poor	
Potential Productivity 105 M.A.I. (ft3/acre/yr)			Coarse Woody Debris 1 ton/acre		Insect & Disease Mistle-toe Bark beetle	

Treatment Objectives: **Henry Fuels; 36-2**

- Remove unhealthy trees, as well as those with poor vigor to promote long term forest health, growth and vitality.
- Promote a healthy stand of timber by significantly reducing the dwarf mistletoes *(Arceuthobium spp)* affecting this stand of timber.
- Move this stand toward the desired future condition classification of western larch/Douglas-fir.
- Scarify the site sufficiently to make an available seedbed to promote natural regeneration, particularly western larch and ponderosa pine

Prescribed Treatment:

- Seed tree harvest. Leave tree marking healthy vigorous trees with good crown and bark characteristics, with a variable spacing of 65 - 75 feet, leaving 8 - 10 trees per acre.
- Favor leaving dominant and co-dominant western larch and ponderosa pine that are wind firm and that have the bark characteristics that would withstand a low intensity burn.
- Retain a minimum of two snags per acre, 14" DBH & greater, and two snag recruits per acre, where present, if they are not a safety hazard.

Harvest Method:

- Ground based harvesting with conventional, mechanical, or cut-to-length operations on dry, frozen or snow covered ground are applicable to this unit.
- Utilization of the old existing roads and skid trails that do not violate Best Management Practices (BMP's) is encouraged to be incorporated within the harvest plan of operations. These old existing roads and skid trails would have erosion control measures installed following harvest, as per BMP's.
- Trees marked to leave and ponderosa pine 16" dbh & greater designated to leave.

Hazard Reduction:

- Landing piles to be burned and/or ground at landings following harvest.
- Residual submerchantable material would be slashed then piled and burned.

Site Preparation and Regeneration:

- Mechanical scarification to a minimum of 35% exposed mineral seedbed for natural regeneration.
- Leave trees to provide seed source for natural regeneration.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from time of site preparation, and the need for supplemental planting determined.
- This stand should be evaluated for pre-commercial thinning and overstory removal treatments approximately 20 years from time of harvest.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

.....

Unit:	36-3	**Elevation:**	4560' – 4720'	**Slope:**	6 - 15%
Acres:	37	**Location:**	NW 1/4	**Aspect:**	West

Habitat Types: 37 acres 313 PSME/SYAL - SYAL

Current Cover Type: 37 acres Ponderosa Pine

Desired Future Condition: 37 acres Ponderosa Pine

Soil Type:

100% 25E Wildgen gravelly loam, 15 to 30 percent slopes

Current Stand Conditions:

SLI Stand #	C	37 acres	**313**		**PP**	**Good - Ave Vigor**	
Saw timber; Med stocked 40-69%			Multi-storied (three or more canopy levels)				
	Upper Canopy %		**Middle Canopy %**			**Lower Canopy %**	
1st spp	PP	70-79	PP	20-59		DF	60-69
2nd spp	DF	20-29	DF	30-39		PP	30-39
3rd spp	WL	0-9	WL	10-19			
4th spp							
Ave DBH	21		13			2	
Height	95		70			8	
Age	150		70			40	
Vigor	Good - Average		Good - Average			Below ave to poor	
Potential Productivity			Coarse Woody Debris			Insect & Disease	
66	M.A.I. (ft3/acre/yr)		16.1	ton/acre		Bark beetle	Mistle-toe

Treatment Objectives: **Henry Fuels; 36-3**

- Remove unhealthy trees, as well as those with poor vigor to promote long term forest health, growth and vitality.
- Protect the established areas of regeneration.
- Scarify the site sufficiently to make an available seedbed to promote natural regeneration, particularly ponderosa pine and western larch.

Prescribed Treatment:

- Seed tree harvest. Leave tree marking healthy vigorous trees with good crown and bark characteristics, with a variable spacing of 65 - 75 feet, leaving 8 - 10 trees per acre.
- Favor leaving dominant and co-dominant ponderosa pine, western larch and Douglas-fir that are wind firm and that have the bark characteristics that would withstand a low intensity burn.
- Retain a minimum of two snags per acre, 14” DBH & greater, and two snag recruits per acre, where present, if they are not a safety hazard.

Harvest Method:

- Ground based harvesting with conventional, mechanical, or cut-to-length operations on dry, frozen or snow covered ground are applicable to this unit.
- Trees marked to leave.

Hazard Reduction:

- Landing piles to be burned and/or ground at landings following harvest.
- Residual submerchantable material would be slashed then piled and burned.

Site Preparation and Regeneration:

- Mechanical scarification of those areas void of established regeneration, to a minimum of 35% exposed mineral seedbed for natural regeneration
- Leave trees to provide seed source for natural regeneration.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from time of site preparation, and the need for supplemental planting determined.
- This stand should be evaluated for pre-commercial thinning and overstory removal treatments approximately 10 and 20 years from time of harvest.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

Unit:	36-4	**Elevation:**	4600' - 4760'	**Slope:**	6 - 15%
Acres:	14	**Location:**	NW 1/4	**Aspect:**	West

Habitat Types:	14 acres	591 ABGR/LIBO - LIBO
Current Cover Type:	14 acres	Mixed Conifer
Desired Future Condition:	14 acres	Ponderosa Pine

Soil Type:

100% 25E Wildgen gravelly loam, 15 to 30 percent slopes

Current Stand Conditions: **Unit:** 36-4

SLI Stand # 12		14 acres	**591**	**MC**	**Good - Ave Vigor**	
Saw timber; Well stocked >70%			Multi-storied (three or more canopy levels)			
	Upper Canopy %		**Middle Canopy %**		**Lower Canopy %**	
1st spp	WL	20-29	DF	30-3-	GF	70-79
2nd spp	DF	20-29	WL	20-29	DF	20-29
3rd spp	GF	20-29	GF	10-19	ES	0-9
4th spp	ES	10-19	ES	19-Oct	AF	0-9
Ave DBH	17		10		1	
Height	100		70		8	
Age	140		110		70	
Vigor	Below ave to poor		Good - Average		Below ave to poor	
Potential Productivity			Coarse Woody Debris		Insect & Disease	
105	M.A.I. (ft3/acre/yr)		5.2	ton/acre	Mistle-toe	Bark beetle

Treatment Objectives: **Henry Fuels; 36-4**

- Remove unhealthy trees, as well as those with poor vigor to promote long term forest health, growth and vitality.
- Promote a healthy stand of timber by significantly reducing the dwarf mistletoes *(Arceuthobium spp)* affecting this stand of timber.
- Move this stand toward the desired future condition classification of ponderosa pine.
- Scarify the site sufficiently to make an available seedbed to promote natural regeneration, particularly ponderosa pine and western larch.

Prescribed Treatment:

- Seed tree harvest. Leave tree marking healthy vigorous trees with good crown and bark characteristics, with a variable spacing of 45 - 55 feet, leaving 15 - 20 trees per acre.
- Favor leaving dominant and co-dominant ponderosa pine and western larch that are wind firm and that have the bark characteristics that would withstand a low intensity burn.
- Retain a minimum of two snags per acre, 14” DBH & greater, and two snag recruits per acre, where present, if they are not a safety hazard.

Harvest Method:

- Ground based harvesting with conventional, mechanical, or cut-to-length operations on dry, frozen or snow covered ground are applicable to this unit.
- Trees marked to leave and ponderosa pine 16” dbh & greater designated to leave.

Hazard Reduction:

- Landing piles to be burned and/or ground at landings following harvest.
- Residual submerchantable material would be slashed then piled and burned.

Site Preparation and Regeneration:

- Mechanical scarification to a minimum of 35% exposed mineral seedbed for natural regeneration.
- Leave trees to provide seed source for natural regeneration.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from time of site preparation, and the need for supplemental planting determined.
- This stand should be evaluated for pre-commercial thinning and overstory removal treatments approximately 20 years from time of harvest.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

……..

Unit:	35-5	**Elevation:**	4520' – 4920'	**Slope:**	6 - 45%
Acres:	58	**Location:**	NE 1/4	**Aspect:**	Northeast

Habitat Types: 58 acres 592 ABGR/LIBO - XETB

Current Cover Type:	30 acres	Mixed Conifer
	28 acres	Western Larch/Douglas Fir
Desired Future Condition:	45 acres	Western Larch/Douglas Fir
	13 acres	Lodgepole Pine

Soil Type:

81% 32E Mitten gravelly ashy silt loam, 15 to 35 percent slopes

19% 35E Courville gravelly ashy silt loam, 8 to 30 percent slopes

Current Stand Conditions:

SLI Stand # 5		36 acres	**592**	**MC**	**Below- Poor Vigor**	
Saw timber; Med stocked 40-69%			Multi-storied (three or more canopy levels)			
	Upper Canopy %		**Middle Canopy %**		**Lower Canopy %**	
1st spp	WL	40-49	DF	40-49	GF	80-89
2nd spp	DF	40-49	WL	30-39	DF	10-19
3rd spp	GF	0-9	LLP	10-19		
4th spp			GF	9-Oct		
Ave DBH	19		9		2	
Height	90		60		15	
Age	200		100		60	
Vigor	Below ave to poor		Below ave to poor		Very poor	
Potential Productivity			Coarse Woody Debris		Insect & Disease	
105	M.A.I. (ft3/acre/yr)		41.2	ton/acre	Mistle-toe	Bark beetle

Current Stand Conditions: **Unit:** 35-5

SLI Stand # 4		13 acres	**592**	**MC**	**Below- Poor Vigor**	
Saw timber; Poor stocked 15-39%			Multi-storied (three or more canopy levels)			
	Upper Canopy %		**Middle Canopy %**		**Lower Canopy %**	
1st spp	WL	40-49	DF	40-49	DF	90-100
2nd spp	LLP	20-29	LLP	30-39	GF	0-9
3rd spp	DF	20-29	GF	10-19	WL	
4th spp	GF	0-9	WL	0-9		
Ave DBH	10		8		2	
Height	70		55		12	
Age	10		90		50	
Vigor	Below average to poor		Below average to poor		Very poor	
Potential Productivity 105 M.A.I. (ft3/acre/yr)			Coarse Woody Debris 4.5 ton/acre		Insect & Disease Mistle-toe Bark beetle	

SLI Stand # 2		9 acres	**592**	**WL**	**Below- Poor Vigor**	
Saw timber; Medium stocked 40-69%			Multi-storied (three or more canopy levels)			
	Upper Canopy %		**Middle Canopy %**		**Lower Canopy %**	
1st spp	WL	30-39	DF	40-49	DF	50-59
2nd spp	DF	20-29	WL	30-39	GF	30-39
3rd spp	GF	20-29	GF	20-29	Cedar	0-9
4th spp	PP	0-9	LLP	0-9		
Ave DBH	19		9		3	
Height	95		65		18	
Age	200		70		50	
Vigor	Below ave to poor		Good to average		Below ave to poor	
Potential Productivity 105 M.A.I. (ft3/acre/yr)			Coarse Woody Debris 5.2 ton/acre		Insect & Disease Mistle-toe Bark beetle	

Treatment Objectives: **Henry Fuels; 35-5**

- Remove unhealthy trees, as well as those with poor vigor to promote long term forest health, growth and vitality.
- Promote a healthy stand of timber by significantly reducing the dwarf mistletoes *(Arceuthobium spp)* affecting this stand of timber.
- Move this stand toward the desired future condition classification of western larch/Douglas-fir and lodgepole pine.
- Scarify the site sufficiently to make an available seedbed to promote natural regeneration, particularly western larch, lodgepole pine and ponderosa pine.

Prescribed Treatment:

- Seed tree harvest. Leave tree marking healthy vigorous trees with good crown and bark characteristics, with a variable spacing of 45 - 55 feet, leaving 15 - 20 trees per acre.
- Favor leaving dominant and co-dominant western larch and ponderosa pine that are wind firm and that have the bark characteristics that would withstand a low intensity burn.
- Retain a minimum of two snags per acre, 14” DBH & greater, and two snag recruits per acre, where present, if they are not a safety hazard.

Harvest Method:

- Ground based harvesting with conventional, mechanical, or cut-to-length operations on dry, frozen or snow covered ground are applicable to this unit.
- Trees marked to leave and ponderosa pine 16” dbh & greater and all western redcedar designated to leave.

Hazard Reduction:

- Landing piles to be burned and/or ground at landings following harvest.
- Residual submerchantable material would be slashed then piled and burned.

Site Preparation and Regeneration:

- Mechanical scarification to a minimum of 35% exposed mineral seedbed for natural regeneration.
- Leave trees to provide seed source for natural regeneration.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from time of site preparation, and the need for supplemental planting determined.
- This stand should be evaluated for pre-commercial thinning and overstory removal treatments approximately 20 years from time of harvest.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

……

Unit:	35-6a	**Elevation:**	4600' – 5200'	**Slope:**	6 - 50%
Acres:	76	**Location:**	S1/2	**Aspect:**	North

Habitat Types:

56 acres 591 ABGR/LIBO - LIBO
20 acres 661 ABLA/LIBO - LIBO

Current Cover Type:

50 acres Mixed Conifer
20 acres Subalpine
6 acres Ponderosa Pine

Desired Future Condition:

63 acres Western Larch/Douglas Fir
13 acres Ponderosa Pine

Soil Type:

67% 32E Mitten gravelly ashy silt loam, 15 to 35% slopes
21% 32F Mitten gravelly ashy silt loam, 35 to 60 percent slopes
12% 122G Winkler, cool-Sharrott, cool-Rubble land complex, 40 to 85%

Current Stand Conditions:

SLI Stand #	11	20 acres	**661**	**SUBALP**	**Below- Poor Vigor**	
Saw timber; Med stocked 40-69%			Multi-storied (three or more canopy levels)			
	Upper Canopy %		**Middle Canopy %**		**Lower Canopy %**	
1st spp	DF	50-59	DF	60-69	GF	40-49
2nd spp	WL	30-39	GF	30-39	SUBALP	30-39
3rd spp	GF	0-9	WL	0-9	DF	20-29
4th spp	SUBALP	0-9	SUBALP	0-9	WL	0-9
Ave DBH	13		9		3	
Height	65		50		25	
Age	100	(85-220)	90		60	
Vigor	Below ave to poor		Below ave to poor		Very poor	
Potential Productivity			Coarse Woody Debris		Insect & Disease	
72	M.A.I. (ft3/acre/yr)		9.8	ton/acre	Mistle-toe	Bark beetle

Current Stand Conditions: **Unit:** 35-6a

SLI Stand # 12		19 acres	**591**	**MC**	**Below- Poor Vigor**	
Saw timber; Med stocked 40-69%			Multi-storied (three or more canopy levels)			
	Upper Canopy %		**Middle Canopy %**		**Lower Canopy %**	
1st spp	WL	30-39	GF	20-29	GF	90-100
2nd spp	GF	20-29	LPP	20-29	SUBALP	0-9
3rd spp	DF	20-29	WL	20-29	DF	0-9
4th spp	ES	0-9	DF	19-Oct	ES	0-9
Ave DBH	20		8		4	
Height	100		55		25	
Age	110		90		70	
Vigor	Below average to poor		Very poor		Very poor	
Potential Productivity			Coarse Woody Debris		Insect & Disease	
105 M.A.I. (ft3/acre/yr)			18.4 ton/acre		Mistle-toe	Bark beetle

SLI Stand # 13		31 acres	**591**	**MC**	**Below- Poor Vigor**	
Saw timber; Poorly stocked 15-39%			Multi-storied (three or more canopy levels)			
	Upper Canopy %		**Middle Canopy %**		**Lower Canopy %**	
1st spp	WL	30-39	DF	30-39	DF	50-59
2nd spp	DF	20-29	LPP	30-39	GF	20-29
3rd spp	LPP	20-29	WL	10-19	SUBALP	0-9
4th spp	GF	19-Oct	GF	19-Oct	ES	0-9
Ave DBH	15		8		0	
Height	75		55		5	
Age	110		90		20	
Vigor	Below ave to poor		Below ave to poor		Good to Average	
Potential Productivity			Coarse Woody Debris		Insect & Disease	
105 M.A.I. (ft3/acre/yr)			13.2 ton/ac		Mistle-toe	Bark beetle

Current Stand Conditions: **Unit:** 35-6a

SLI Stand # 14		6 acres	**591**	**PP**	**Below- Poor Vigor**	
Saw timber; Poorly stocked 15-39%			Multi-storied (three or more canopy levels)			
	Upper Canopy %		**Middle Canopy %**		**Lower Canopy %**	
1st spp	DF	30-39	DF	50-59	DF	90-100
2nd spp	PP	20-29	PP	30-39	PP	0-9
3rd spp	WL	20-29	WL	10-19	GF	0-9
4th spp	GF	0-9	GF	0-9		
Ave DBH	16		8		2	
Height	75		50		12	
Age	120		70		40	
Vigor	Below average to poor		Below average to poor		Below average to poor	
Potential Productivity			Coarse Woody Debris		Insect & Disease	
105 M.A.I. (ft3/acre/yr)			27.4 ton/acre		Root rots	Mistle-toe

Treatment Objectives: **Henry Fuels; 35-6a**

- Remove unhealthy trees, as well as those with poor vigor to promote long term forest health, growth and vitality.
- Promote a healthy stand of timber by significantly reducing the dwarf mistletoes *(Arceuthobium spp)* affecting this stand of timber.
- Move this stand toward the desired future condition classification of western larch/Douglas-fir and ponderosa pine.
- Broadcast burn and/or scarify the site sufficiently to make an available seedbed to promote natural regeneration, particularly western larch and ponderosa pine.

Prescribed Treatment:

- Seed tree harvest. Leave tree marking healthy vigorous trees with good crown and bark characteristics, with a variable spacing of 95 - 100 feet, leaving 1 - 5 trees per acre.
- Favor leaving dominant and co-dominant western larch and ponderosa pine that are wind firm and that have the bark characteristics that would withstand a low intensity burn.
- Retain a minimum of two snags per acre, 14” DBH & greater, and two snag recruits per acre, where present, if they are not a safety hazard.

Harvest Method:

- Ground based harvesting with conventional, mechanical, or cut-to-length operations on dry, frozen or snow covered ground are applicable to this unit.
- Utilization of the old existing roads and skid trails that do not violate Best Management Practices (BMP’s) is encouraged to be incorporated within the harvest plan of operations. These old existing roads and skid trails would have erosion control measures installed following harvest, as per BMP’s.
- Trees marked to leave and ponderosa pine 16” dbh & greater and all western redcedar designated to leave.

Hazard Reduction:

- Landing piles to be burned and/or ground at landings following harvest.
- Residual submerchantable material would be slashed then broadcast burned and/or piled and burned.

Site Preparation and Regeneration:

- Broadcast burn to prepare exposed mineral seedbed; preferred option.
- Mechanical scarification to a minimum of 35% exposed mineral seedbed for natural regeneration; secondary option.
- Leave trees to provide seed source for natural regeneration.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from time of site preparation, and the need for supplemental planting determined.
- This stand should be evaluated for pre-commercial thinning and overstory removal treatments approximately 20 years from time of harvest.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

……..

Unit:	35-6b	**Elevation:**	5040’ – 5160’	**Slope:**	6 - 35%
Acres:	25	**Location:**	SE1/4 Sec 35	**Aspect:**	North
			SW1/4 Sec 36		
Habitat Types:		18 acres	591 ABGR/LIBO - LIBO		
		7 acres	661 ABLA/LIBO - LIBO		
Current Cover Type:		15 acres	Subalpine		
		10 acres	Western Larch/Douglas Fir		
Desired Future Condition:		25 acres	Western Larch/Douglas Fir		

Soil Type:

100% 35E Courville gravelly ashy silt loam, 8 to 30 percent slopes

Current Stand Conditions: **Unit:** 35-6b

SLI Stand # 9	10 acres	**591**	**WL**	**Below- Poor Vigor**
Saw timber; Med stocked 40-69%		Single-storied		
	Upper Canopy %	**Middle Canopy %**		**Lower Canopy %**
1st spp	DF 50-59			
2nd spp	WL 40-49			
3rd spp	LPP 0-9			
4th spp	PP 0-9			
Ave DBH	9			
Height	65			
Age	150 (85-220)			
Vigor	Below ave to poor			
Potential Productivity 105 M.A.I. (ft3/acre/yr)		Coarse Woody Debris 5.2 ton/acre		Insect & Disease Mistle-toe Bark beetle

SLI Stand # 10	7 acres	**661**	**SUBALP**	**Below- Poor Vigor**
Saw timber; Med stocked 40-69%		Multi-storied (three or more canopy levels)		
	Upper Canopy %	**Middle Canopy %**		**Lower Canopy %**
1st spp	WL 40-49	LPP 50-59		DF 80-89
2nd spp	LPP 40-49	DF 30-39		ALP 10-19
3rd spp	DF 10-19	ALP 0-9		GF 0-9
4th spp		GF 0-9		
Ave DBH	11	6		1
Height	65	50		12
Age	100	90		50
Vigor	Below average to poor	Below average to poor		Below average to poor
Potential Productivity 72 M.A.I. (ft3/acre/yr)		Coarse Woody Debris 12 ton/acre		Insect & Disease Mistle-toe Bark beetle

Current Stand Conditions: **Unit:** 35-6b

SLI Stand # 11		8 acres	**661**	**SUBALP**	**Below- Poor Vigor**	
Saw timber; Med stocked 40-69%			Multi-storied (three or more canopy levels)			
	Upper Canopy %		**Middle Canopy %**		**Lower Canopy %**	
1st spp	DF	50-59	DF	60-69	GF	40-49
2nd spp	WL	30-39	GF	30-39	ALP	30-39
3rd spp	GF	0-9	WL	0-9	DF	20-29
4th spp	ALP	0-9	ALP	0-9	WL	0-9
Ave DBH	13		9		3	
Height	65		50		25	
Age	100	(85-220)	90		60	
Vigor	Below ave to poor		Below ave to poor		Very poor	
Potential Productivity			Coarse Woody Debris		Insect & Disease	
72	M.A.I. (ft3/acre/yr)		9.8	ton/acre	Mistle-toe	Bark beetle

Treatment Objectives: **Henry Fuels; 35-6b**

- Remove unhealthy trees, as well as those with poor vigor to promote long term forest health, growth and vitality.
- Promote a healthy stand of timber by significantly reducing the dwarf mistletoes *(Arceuthobium spp)* affecting this stand of timber.
- Move this stand toward the desired future condition classification of western larch/Douglas-fir.
- Scarify the site sufficiently to make an available seedbed to promote natural regeneration, particularly western larch and ponderosa pine.

Prescribed Treatment:

- Seed tree harvest. Leave tree marking healthy vigorous trees with good crown and bark characteristics, with a variable spacing of 45 - 55 feet, leaving 15 - 20 trees per acre.
- Favor leaving dominant and co-dominant western larch and ponderosa pine that are wind firm and that have the bark characteristics that would withstand a low intensity burn.
- Retain a minimum of two snags per acre, 14” DBH & greater, and two snag recruits per acre, where present, if they are not a safety hazard.

Harvest Method:

- Ground based harvesting with conventional, mechanical, or cut-to-length operations on dry, frozen or snow covered ground are applicable to this unit.
- Utilization of the old existing roads and skid trails that do not violate Best Management Practices (BMP’s) is encouraged to be incorporated within the harvest plan of operations. These old existing roads and skid trails would have erosion control measures installed following hares, as per BMP’s.
- Trees marked to leave and ponderosa pine 16” dbh & greater designated to leave.

Hazard Reduction:

- Landing piles to be burned and/or ground at landings following harvest.
- Residual submerchantable material would be slashed then piled and burned.

Site Preparation and Regeneration:

- Mechanical scarification to a minimum of 35% exposed mineral seedbed for natural regeneration.
- Leave trees to provide seed source for natural regeneration.

Anticipated Future Treatments:

- Natural regeneration should be evaluated approximately five years from time of site preparation, and the need for supplemental planting determined.
- This stand should be evaluated for pre-commercial thinning and overstory removal treatments approximately 20 years from time of harvest.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

……

Unit:	36-7	**Elevation:**	4240' – 4640'	**Slope:**	16 - 25%
Acres:	45	**Location:**	N1/2	**Aspect:**	Northeast

Habitat Types: 45 acres 591 ABGR/LIBO - LIBO

Current Cover Type: 45 acres Ponderosa Pine

Desired Future Condition: 45 acres Western Larch/Douglas Fir

Soil Type:

100% 34E Winfall gravelly loam, 8 to 30 percent slopes

SLI Stand # 17	45 acres	**591**	**PP**	**Good - Ave Vigor**	
Saw timber; Poorly stocked 15-39%		Two-storied (two distinct canopy levels)			
	Upper Canopy %	**Middle Canopy %**		**Lower Canopy %**	
1st spp	PP	60-69		PP	30-39
2nd spp	WL	30-39		WL	20-29
3rd spp				DF	20-29
4th spp				LPP	10-19
Ave DBH	24			1	
Height	95			6	
Age	150			10	
Vigor	Good to average			Full	
Potential Productivity		Coarse Woody Debris		Insect & Disease	
105	M.A.I. (ft3/acre/yr)	0	ton/acre	Mistle-toe	

Treatment Objectives: **Henry Fuels; 36-7**

- Remove unhealthy trees, as well as those with poor vigor to promote long term forest health, growth and vitality.
- Promote a healthy stand of timber by significantly reducing the dwarf mistletoes *(Arceuthobium spp)* affecting this stand of timber.
- Move this stand toward the desired future condition classification of western larch/Douglas-fir.
- Promote the existing natural regeneration, particularly western larch and ponderosa pine.

Prescribed Treatment:

- Selective tree harvest. Cut tree marking of the existing western larch seed trees that exhibit significant dwarf mistletoe.
- Favor leaving dominant and co-dominant ponderosa pine and western larch that are wind firm that have the bark characteristics that would withstand a low intensity burn and are relatively free of dwarf mistletoe.
- Retain a minimum of two snags per acre, 14" DBH & greater, and two snag recruits per acre, where present, if they are not a safety hazard.

Harvest Method:

- Ground based harvesting with conventional, mechanical, or cut-to-length operations on dry, frozen or snow covered ground are applicable to this unit.
- Utilization of the old existing roads and skid trails that do not violate Best Management Practices (BMP's) is encouraged to be incorporated within the harvest plan of operations. These old existing roads and skid trails would have erosion control measures installed following hares, as per BMP's.
- Trees marked to cut.

Hazard Reduction:

- Landing piles to be burned and/or ground at landings following harvest.
- Residual submerchantable material would be slashed and lopped.

Site Preparation and Regeneration:

- Natural regeneration has been established and the protection of it is the primary goal, therefore, site preparation is not a concern for this unit.

Anticipated Future Treatments:

- This stand should be evaluated for pre-commercial thinning and overstory removal treatments approximately 5 years from time of harvest.
- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire or other unanticipated circumstances on a case-by-case basis.

……..

Attachment IV
Mitigations

MITIGATION MEASURES

Roads: A transportation system minimizing road miles meeting Best Management Practices (BMP's) has been designed by the DNRC. This system proposes the construction of approximately 1.9 miles of new road, which would remain in place following project activity. After harvest activities have been completed the roads would be grass seeded, fertilized and closed to use. Upon completion of roadwork, all haul roads would meet BMP's standards.

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

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

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

Manage for snags (minimum of 2 snags/acre > 14 in. dbh; > 21 in. dbh where they exist), snag recruits (minimum of 2 recruits/acre > 14 in. dbh; > 21 in. dbh where they exist), and coarse woody debris (5-10 tons/acre), particularly favoring western larch and ponderosa pine (ARM 36.11.439(1) (b)).

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

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

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

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

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

Tractor skidding should be limited to slopes less than 40% unless the operation can be completed without causing excessive erosion. Short steep slopes above incised draws may require a combination of mitigation measures based on site review, such as adverse skidding to ridge or winch line skidding from more moderate slopes less than 40%.

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

Limit disturbance and scarification combined to 30-40% of harvest units. No dozer piling on slopes over 35%; no excavator piling on slopes over 40% unless the operation can be completed without causing excessive erosion.

Slash Disposal: No dozer piling on slopes over 35%; no excavator piling on slopes over 40% unless the operation can be completed without causing excessive erosion. Consider lop and scatter or jackpot burning on steeper slopes. Accept disturbance incurred during skidding operations to provide adequate scarification for regeneration.

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

Hydrology: All timber harvest would be regulated by the SMZ law and prohibit equipment operation within any SMZ. In addition to the resource protection provided by the SMZ law, forestry BMP's would be implemented in all aspects of the proposed timber harvest.

Weed Management: Measures to control the introduction or increases to infestations of noxious weeds would be implemented through the Timber Sale Contract. Control measures include the washing of all equipment prior to entering the project area and seeding all areas of disturbed soil associated with road construction or upgrades. Roads and skid trail approaches would again be seeded at the close of project activity. Measures to control any unforeseen outbreak would be implemented as needed through and beyond the project operational period.

Insects and Diseases: Promotion of open healthy timber stands would assist in controlling insect and disease activity in the project area.

Visual Impacts/Aesthetic Values: Prescriptions are designed to mimic historical stand conditions. Harvest unit shapes and residual tree retention patches would follow topographical features such as natural contour breaks and riparian retention zones. The cumulative visual effects of this proposed action in conjunction with current adjacent land management practices would blend into the landscape and soften any hard ownership boundaries.

Fuel Hazards: Harvest treatments would reduce ladder fuels and trees susceptible to fire. Slash would be treated either through logging system design, excavator piling and the burning of these piles, as designated by prescription per each individual harvest unit.

Stand Growth and Vigor: Silvicultural prescriptions are designed to maintain and improve stand growth and vigor, while maintaining DNRC's commitments to managing for a biologically diverse landscape.

Attachment V
Consultants & References

INDIVIDUALS CONSULTED

Larry Ballantyne; MT DNRC, Unit Manager, Plains Unit

Ross Baty; MT Forest Management Bureau, Wildlife Biologist

Jim Bower; Forest Management Bureau, Fisheries Specialist, Missoula, Montana

Tyrell Colombo; MT DNRC, Intern Forester, Plains Unit

Kyle Johnson; MT DNRC, Management Forester, Plains Unit

Nate Kegel; USFS, Civil Engineer, Lolo National Forest

Calvin Minemyer; MT DNRC, Unit Fire Supervisor, Plains Unit

Tony Nelson; MT DNRC, Hydrologist/Resource Analyst, Northwestern Land Office

Dave Olsen; MT DNRC, Forest Management Supervisor, Plains Unit

Patrick Rennie; MT DNRC, Archaeologist, Trust Land Mgt. Division, Helena, Montana

Garrett Schairer; MT DNRC, Wildlife Biologist, Northwestern Land Office

Doug Shaner; retired USFS Forester, Express Services, Plains, Montana

Leonard Two Teeth; CS&KT, Right-of-Way Technician, Tribal Lands Department

Marc Vessar; MT DNRC, Hydrologist, Northwestern Land Office

Everett Young; MT DNRC, Service Forester, Plains Unit

Document Preparation

Ross Baty; MT Forest Management Bureau, Wildlife Biologist

Tony Nelson; MT DNRC, Hydrologist/Resource Analyst, Northwestern Land Office

Dale Peters; MT DNRC, Management Forester, Plains Unit

REFERENCES

- Forestry Best Management Practices

- DNRC, 1996, State Forest Land Management Plan. Montana DNRC Forest Management Bureau. Missoula, Montana.

- Green, P. J. Joy, D. Sirucek, W. Hann, A. Zack, and B. Naumann. 1992. Old-Growth forest types of the Northern Region. USDA Forest Service, Northern Region. Missoula, Montana.