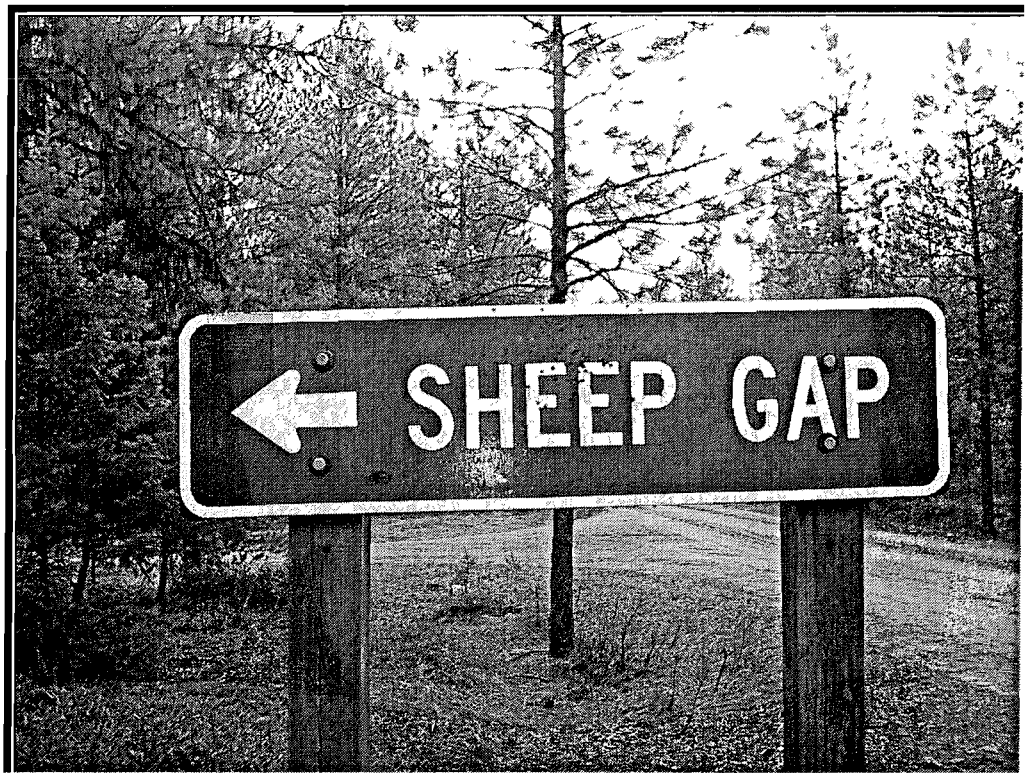

Environmental Analysis for the Sheep Gap Timber Sale

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LEGISLATIVE ENVIRONMENTAL POLICY OFFICE
DNRC - Trust Land Management Division

Prepared By
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November 2004
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DEPARTMENT OF NATURAL
RESOURCES AND CONSERVATION
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MEMORANDUM

To: Shawn Thomas, Forest Management Supervisor, Plains Unit

From: Larry Ballantyne, Plains Unit Resource Program Manager

Date: March 20, 2003

RE: Sheep Gap Timber Sale Objectives

Primary Objective

The primary objective of the Sheep GapTimber Sale is to generate income for the Montana School for the Deaf and Blind trust. This sale should provide approximately 1.5 MMBF of merchantable timber toward the Northwestern Land Office 's FY 05 timber sale program targeted volume goal.

Secondary Objectives

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

Reduce fire hazard and associated risks of loss to both State 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 to all management operations.

CHECKLIST ENVIRONMENTAL ASSESSMENT

Project Name:	Sheep Gap Timber Sale
Proposed Implementation Date:	February, 2005
Proponent:	Department of Natural Resources and Conservation, Northwestern Land Office, Plains Unit
Location:	Section 22, Township 20N, Range 27W
County:	Sanders

I. TYPE AND PURPOSE OF ACTION

The Department of Natural Resources and Conservation Proposes to sell 12,000 tons (1.8 MMBF) of timber in the West Fork Swamp Creek Drainage. Three harvest units totaling 480 acres are proposed. The project would require the construction of approximately 2.4 miles of new road, and upgrade 6.3 miles of cost share road. This action would produce an estimated revenue of $329,000.00 for the School for the Deaf and Blind Trust Grant (D.&DA.). Activities proposed would maintain and improve forest health, reduce fuel loadings, and increase forest productivity beneficial to future Trust actions. (See Attachment 1, Area Maps and Project Plan).

Lands involved in this proposed project are held by the State of Montana in trust for the support of the specific beneficiary institutions such as the public buildings trust, public schools, state colleges, universities, and other specific State institutions such as the School for the Deaf and Blind (Enabling Act of February 22, 1889; 1972 Montana Constitution, Article 1 Section 11). The Board of Land Commissioners and the Department of Natural Resources and Conservation are required by law to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run for these beneficiary institutions (Section 77-1-202, MCA). In March 2003,the Montana Department of Natural Resources and Conservation adopted Administrative Rules for Forest Management (ARM 36.11.401 through 450). The DNRC would manage lands involved in this project in accordance with the Rules.

II. PROJECT DEVELOPMENT

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

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

Public involvement has been solicited through newspaper advertisements plus letters sent to adjacent landowners and other known interested parties and organizations. Public response was received and used to assist in defining issues surrounding the proposed project. Hydrological, soils, wildlife and vegetative concerns were identified by DNRC specialist and field foresters for the Action Alternative as well as the effects of the No Action Alternative. Issues and concerns have been resolved or mitigated through project design or would be included as specific contractual requirements of the project. Recommendations to minimize direct, indirect and cumulative impacts have been incorporated in the project design (see Attachment 1, Area Maps and Project Plan; Attachment 2, Resource Analysis; Attachment 3, Prescriptions; Attachment 4, Mitigation; Attachment 5, Consultants and References).

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

The DNRC has an existing Reciprocal Access Agreement with Plum Creek Marketing Inc. and an access agreement with USFS. Temporary road use permits would be obtained for road segments not covered by these agreements prior to beginning this project.

3. ALTERNATIVES CONSIDERED:

Action: The Action Alternative is shown under section I. Type and Purpose of Action. No other action alternatives were identified during project scoping or analysis, therefore only forest product removal and sale are analyzed in the EA checklist.

No Action: Under the No Action alternative no activity would be undertaken. No timber would be harvested and no road construction or improvements would occur. This alternative would not produce revenue for the School for the Deaf and Blind Trust Grant. Effects of the No Action alternative are shown in the Checklist and Attachments and can be used to compare effects of the proposed action.

III. IMPACTS ON THE PHYSICAL ENVIRONMENT

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

4. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE:

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

Recommendations to minimize direct, indirect and cumulative impacts have been incorporated in the project design (see Attachment 1, Area Maps and Project Plan; Attachment 2, Resource Analysis; Attachment 3, Prescriptions; Attachment 4, Mitigation).

5. WATER QUALITY, QUANTITY AND DISTRIBUTION:

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

A DNRC hydrologist has reviewed the project area, transportation system, and harvest plan. Recommendations to minimize direct, indirect and cumulative impacts have been incorporated in the project design (see Attachment 1, Area Maps and Project Plan; Attachment 2, Resource Analysis; Attachment 4, Mitigation).

6. AIR QUALITY:

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

The project area is located in Montana State Airshed 2; it is not within a Class 1 Airshed. Some particulate matter would be introduced into the Airshed from the burning of logging slash. All burning would be conducted during times of adequate ventilation within the existing rules and regulations.

7. VEGETATION COVER, QUANTITY AND QUALITY:

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

Silvicultural prescriptions have been developed to maintain existing conditions to reflect historic desired cover types through the removal of diseased, insect infested, and non-preferred timber species. Recommendations to minimize direct, indirect and cumulative impacts have been incorporated in the project design (see Attachment 1, Area Maps and Project Plan; Attachment 2, Resource Analysis, Attachment 3, Prescriptions; Attachment 4, Mitigation). Tree removal would change some age classes, size classes, and remove approximately 9.5 acres from timber production to create road access into the section. The Action Alternative affects no old growth stands as defined by "Green et al". 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 4, Mitigation).

8. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS:

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

The Sheep Gap sale area is in big game habitat. The proposed activities are designed to limit impacts to wildlife habitat with special emphasis directed toward big game. Unit marking and treatments would retain some visual screening in the project area. Wildlife security would be maintained through active road management. Treatments would also help improve available forage for big game. The West Fork Swamp Creek has been identified as having a possible population of westslope cutthroat trout. The cumulative watershed effects boundary incorporates the West Fork Swamp Creek drainage. Due to unit prescription design and location it is unlikely that any effects for the proposed activities would be detectable down stream of section 22. Recommendations to minimize direct, indirect and cumulative impacts have been incorporated in the project design (see Attachment 1, Area Maps and Project Plan; Attachment 2, Resource Analysis; Attachment 4, Mitigation).

9. UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES:

Consider any federally listed threatened or endangered species or habitat identified in the project area. Determine effects to wetlands. Consider Sensitive Species or Species of special concern. Identify cumulative effects to these species and their habitat.

Direct use by Threatened and Endangered species has not been indicated in the wildlife biologist reports (see Attachment 2, Resource Analysis, Wildlife). Recommendations to minimize direct, indirect and cumulative impacts have been incorporated in the project design (see Attachment 1, Area Maps and Project Plan; Attachment 2, Resource Analysis; Attachment 4, Mitigation).

10. HISTORICAL AND ARCHAEOLOGICAL SITES:

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

A DNRC archeologist has reviewed this project. Significant sites or artifacts were not identified during these reviews. (see Attachment 2, Resource Analysis).

11. AESTHETICS:

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

The project is located on the state owned portion of section 22 in Township 20 N, Range 27 W east of Sacajawea Peak. Portions of the project area would be visible from the Town of Plains, portions of Hwy 200, as well as various properties and locations along River Road West and the Blackjack road. Openings from a new road, skid trails, skyline corridors and changes in tree cover density would be seen from these locations until regeneration has reached the point of canopy closure again.

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

None

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.

Swamp Buggy EA (1996, USFS), East Fork Swamp Creek Timber Sale EA (1993 DNRC), Swamp Ridge Timber Sale EA (2004 DNRC). These documents were used to evaluate and minimize direct, indirect and cumulative impacts in the projects design (see Attachment 2, Resource Analysis; Attachment 4, Mitigation).

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.

None

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

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

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

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

17. LOCAL AND STATE TAX BASE AND TAX REVENUES:
Estimate tax revenue the project would create or eliminate. Identify cumulative effects to taxes and revenue.

None

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

Log trucks hauling to the purchasing mill would result in temporary increases in traffic on the River Road West, and Montana Highway 200. This increase is a normal contributor to the activities of the local community and industrial base and cannot be considered a new or increased source.

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

In June 1996, DNRC began a phased-in implementation of the State Forest Land Management Plan (The Plan). In March 2003, the DNRC adopted Administrative Rules for Forest Management (ARM 36.11.401 through 450). The DNRC will manage lands involved in this project in accordance to the Rules.

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

Use is expected to remain the same following the project. Recreational areas and wilderness are not accessed through this tract.

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

None

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

None

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

None

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

Costs, revenues and estimates of return are estimates intended for relative comparison of alternatives. They are not intended to be used as absolute estimates of return. The estimated stumpage is based on comparable sales analysis. This method compares recent sales to find a market value for stumpage. These sales have similar species, quality, average diameter, product mix, terrain, date of sale, distance from mills, road building and logging systems, terms of sale, or anything that could affect a buyer's willingness to pay for. The effect of the proposed project would generate an estimated return to the trust of $410,000 in the Action Alternative. The No Action alternative does not generate any return to the trust at this time.

EA Checklist Prepared By:	**Name:**	James B Kibler	**Date:**	November, 1, 2004
	Title:	Management Forester, Northwest Land Office, Plains Unit, DNRC,		

V. FINDING

25. ALTERNATIVE SELECTED:

The Action Alternative as proposed meets the stated project objectives. It complies with all applicable environmental laws and the DNRC State Forest Land Management Plan and the associated administrative rules. A consensus of professional opinion finds this alternative within the limits of acceptable environmental impact. The No Action alternative meets none of the project objectives and does not provide fiscal income to the Trust. For these reasons I have selected the Action Alternative for implementation on this project.

26. SIGNIFICANCE OF POTENTIAL IMPACTS:

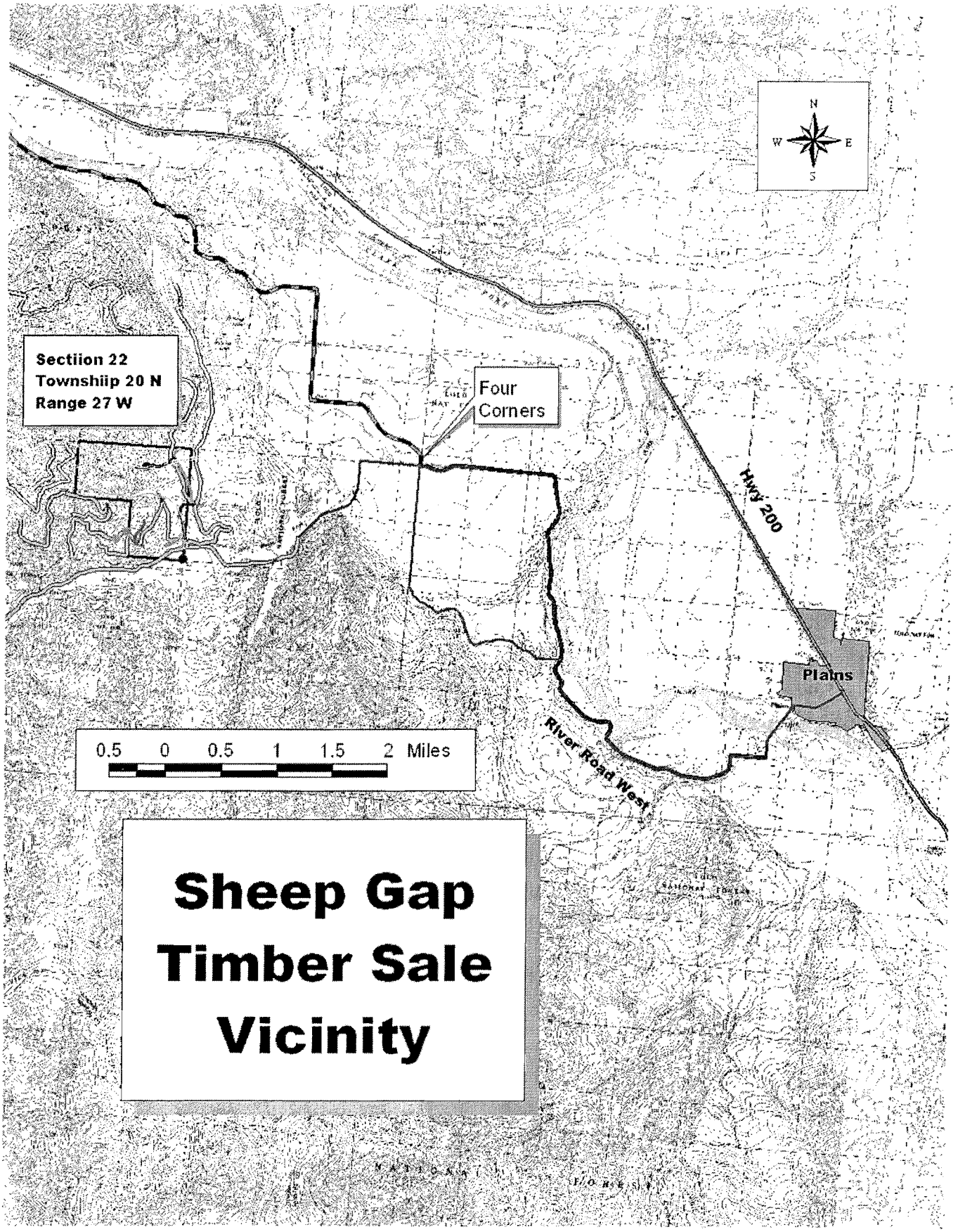
After thorough review of the Project File and all scoping documents, I find all identified resource management concerns have been fully addressed in this environmental assessment. Specific mitigation measures surrounding resource concerns are listed in Attachment 4. The Action Alternative provides for Trust income in the present while assuring the long-term productivity of the site. It does not eliminate other as yet unidentified revenue generating opportunities. Specific project design features and resource management specialist recommendations have been included to ensure this project will fall within the limits of acceptable environmental change. Considering the content of this analysis I find there would be no significant impact to the physical or human environment as a result of implementing the Action Alternative.

27. NEED FOR FURTHER ENVIRONMENTAL ANALYSIS:

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

EA Checklist Approved By:	**Name:**	Larry Ballantyne
	Title:	Resource Program Manager
Signature: Larry Ballantyne		**Date:** 11-18-04

Attachment 1: Area Maps and Tables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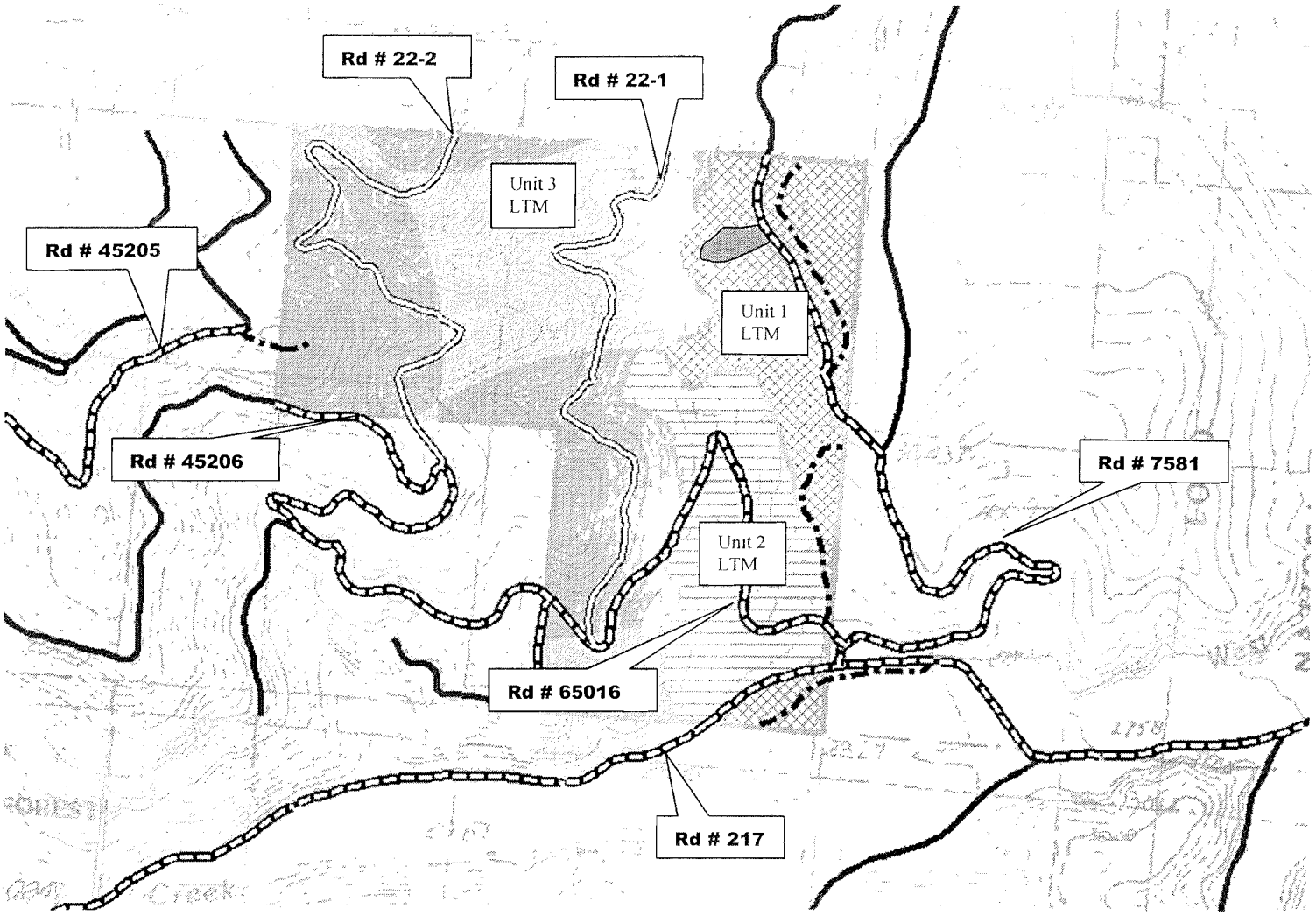
Sheep Gap
Timber Sale
Vicinity

Sheep Gap Timber Sale



N

Scale
1:15,840
4 inches = 1 mile

0 *2,640' – 1/2 mile*

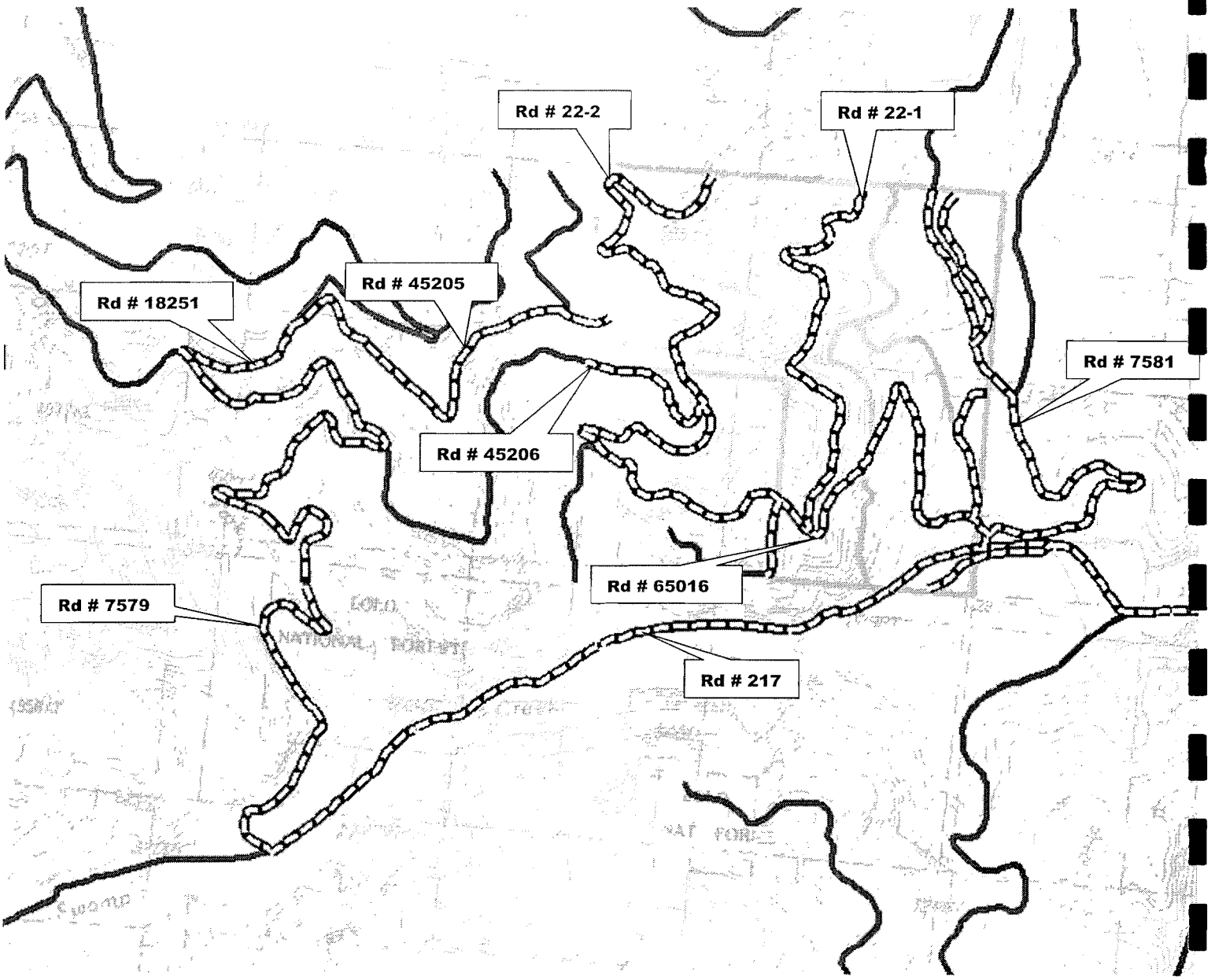
Harvest Plan

	Haul Routes		*New Construction*		*Unit 1 Tractor*	*101 ac*	*Section*	*22*
	Existing Roads		*ERZ*		*Unit 2 Tractor*	*86 ac*	*Township*	*20N*
	Temporary Road		*Unit Boundaries*		*Unit 3 Skyline*	*272 ac*	*Range*	*27W*

Table 1
Harvest Plan

Treatment Area	Acres	Volume	Tons	Treatment	Harvest Method
1	101	330 mbf	2,144 Tons	Shelterwood Improvement Cutting	Tractor
2	86	280 mbf	1,820 Tons	Shelterwood seed cutting / group selection	Tractor
3	286	1,150 mbf	7,475 Tons	Shelterwood seed cutting	Skyline
R/W	7	84 mbf	561 Tons	Right – of – Way timber	Tractor
Total	480	1.8 MMBF	12,000Tons		

Sheep Gap Timber Sale



N

Scale
1:24,000
1 inch = 2,000 feet

0 *2,000 feet*

Haul Routes

	Haul Routes	*Section*	*22*
	Existing Roads	*Township*	*20N*
	Unit Boundaries	*Range*	*27W*

Attachment 2: Resource Analysis

VEGETATION ANALYSIS

Introduction

This analysis is designed to disclose the existing condition of the vegetative resources and display the anticipated effects that may result from each alternative of this proposal. During and following the initial scoping, the public and DNRC specialists identified the following issues regarding the effects of proposed alternatives on vegetation:

- Growth and Vigor: There are concerns that not treating overstocked existing stands will perpetuate and/or contribute to decreased growth, vigor and change the appropriate species characteristics identified for the area.
- Fire Ecology: There is concern that the exclusion of fire from the site has changed stand compositions, and age classes from what would have historically occurred in the area. There is also concern that forest fuels have accumulated to a point that would leave this area predisposed to a catastrophic fire event.
- Forest Health: There are concerns that endemic populations of diseases and insects are increasing on the site and have the potential reach epidemic proportions or reduce productivity.
- Aesthetics: There are concerns that harvesting activities would reduce the visual quality of the Plains area.

History and surrounding conditions

Past and current events have changed the forest conditions on the land parcel involved in the proposed project area. The area has had stand replacing fire events in the late 1800's and early 1900's. Normally the area would be characterized as having periodic low intensity under burns. Since the late 1800's, fire has virtually been excluded from the area. Past logging activity has occurred in the state owned portion of the section. Section records indicate that this section had timber sales in the 1940's and as late as 1994. Evidence from these past logging activities can be found on the section..

The properties adjacent to these sections are federal, industrial private, or owned by the state. Sections 21,27,28 and the southwest quarter of section 22 of Township 20N Range 27W are owned by Plum Creek Timber and managed for commercial timber uses Sections15,16, 23 and the adjacent corner of section16 are lands in Federal ownership managed by the United States Forest Service. Adjacent to the southeast corner of the project area in section 22 of Township 20N Range 27W is sub-divided land held in state and private ownership. Fuel loadings on commercial lands surrounding the project area are lower than on the land managed by the State.

Analysis Methods

The Plains Office typically prepares two to four timber sales per year. Each proposed project is evaluated for its potential direct, indirect and cumulative effects on lands managed by the DNRC. 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. In this analysis, past and existing conditions are compared to determine what future conditions might be expected.

Analysis Levels and Associated Areas

In developing the proposed project, analysis was done on two levels. The first level comprises lands managed on the Plains Unit by the State of Montana, Department of Natural Resources and Conservation. This level is shown in Tables 1 and 2 in this analysis. The second level comprises lands adjacent and in Section 22 in Township 20 North, Range 27 West in Sanders County, Montana. In Section 22, 480 acres are managed by the DNRC. The remaining 160 acres in the section are owned by Plum Creek Timber and managed for commercial timber uses. This area is shown on the Sheep Gap Timber Sale Vicinity map.

Existing Condition

Vegetation conditions that currently exist at the Plains Unit level are evaluated by cover types described in Losensky's "Historical Vegetation of Montana" (1997). Stand level inventories are compared to the cover types that historically would be expected on areas managed by the DNRC (see Table 1, Table 2, Table 3, and the Sheep Gap Stand Map). Section 22 is approximately five miles west of Plains, Montana. Current cover types on this section and the Plains Unit in general, are the result of stand replacing fires in the late 1800's and early 1900's. The literature indicates that, prior to this time, many of these cover types were influenced by periodic low intensity under burns. This would suggest that the stands were historically open and dominated by seral shade intolerant tree species. The average cycle of these under burns was 20 to 30 years. It is believed that conditions from at least the 1500's till about 1850 were considerably cooler and wetter than subsequent times helping to create conditions similar to the effects from fire suppression and predisposing these and other stands to stand replacement severity burns. In the period around 1900 weather conditions and the influence of expanding settlement contributed to the events that helped create the large fires that occurred during this period. Since that time an aggressive attempt to exclude fire from the area has influenced the current vegetation.

Past logging events have also influenced the area. Large seral overstory trees were typically removed leaving subdominant, shade tolerant species and smaller seral species on the area. The selection of primarily large Ponderosa Pine for removal in the past was driven by availability, accessibility, economic forces and market preferences. The pine removed in the Plains area in the early 1900s was used to supply mining timbers in the Superior area. After the railroads moved into the area, timbers were also supplied to the mines in Butte. Later, Ponderosa pine became a preferred species in construction. Section 22 stand records indicate that some logging had occurred in the 1940s. The most recent activities were in the occurring from 1961, 1994, 1995 and 2002. These recent entries were salvage sales harvesting relatively small quantities.

The result is that many of the cover types on the Plains Unit comprise two- and three-storied stands that are less than 150 years old with older overstory remnants. Cover-types are progressively changed from what would historically be expected to exist, to the present condition (see Table 3, Plains Unit Cumulative effects on Cover Types). Three-storied stands are typically overcrowded and stagnated with the 150-year-old overstory component the same age as the mid-level. Regeneration is occurring in small openings created by the death of individual or groups of overstory trees. Regeneration is usually shade tolerant Douglas-fir or true firs, and on many areas the overstory is infected with dwarf mistletoe. These stands are converting from shade intolerant seral forest to shade tolerant climax forest. Stands are also showing increased available fuels due to fire exclusion.

The second level of analysis looks at the vegetative conditions of timber stands in section 22 (see the Sheep Gap Timber Sale Vicinity and Sheep Gap Existing Stand maps). In section 22, the DNRC manages 480 acres. The stands in the proposed project are characterized as multistoried stands. The overstory is remnant seral ponderosa pine and larch. The understory is comprised of Douglas-fir, grand fir and some lodgepole pine (see Table 2). The stands range from 90 to 190 years old. No stands were identified as old growth as described by Green et al. (1996). The stands have variable basal areas and stand structures that reflect a change from shade intolerant seral

structures to shade tolerant species. Insect and disease activity is found in all species. The Douglas-fir is heavily affected by a variety of root diseases. Douglas-fir beetle (Dendroctonus pseudotsugae) is active and expanding rapidly through the Douglas-fir. Mountain pine beetle (Dendroctonus ponderosae) is present in the ponderosa pine. Dwarf mistletoe is present at very high occurrence in the Douglas-fir, with lesser occurrences in western larch. The stands are also showing increases in forest fuel loadings and increases in ladder fuels from tolerant species regeneration in the understory. Many snags are present on the section due to infestations of disease, insects, and competition from the under-story. There are noxious weed populations scattered throughout the proposed project area in small openings and along roads rights-of way.

Direct and Indirect Effects

No Action Alternative

Conditions that now exist will remain the same in a No Action Alternative. Insect and disease related mortality is expected to increase. Noxious weed populations are expected to remain the same or increase slightly over time.

Action Alternative

The proposed action alternative would harvest timber from approximately 462 acres. Proposed harvest would maintain 62 acres of western larch / Douglas-fir cover type. Harvest would also maintain 386 acres of ponderosa pine cover type. Due to road construction 7 acres would be removed from production. Trees affected or susceptible to insects and disease would be removed. All snags greater than 14 inches DBH and not creating a safety hazard would be retained. Unauthorized removal of snags would be reduced by the road management measures shown in the project plan. Because forest fuel loadings would be reduced by logging system design, post harvest thinning, excavator piling and spot prescribed burning, the fuel loading across the harvest area would be 5 -10 tons per acre of material larger than 3 inches diameter; and small groupings of regeneration greater than 15 feet in height and free of insects and disease. Available fire fuels would be reduced by site treatment, crown spacing and the removal of understory ladder fuels. Adverse visual effects would occur in the short term but are expected to decrease as seral species invade openings created during logging. The impact would be reduced, by using, road screening, skid trail and corridor design with the appropriate logging systems. Noxious weeds may increase in canopy openings. Spot treatment with chemicals would be used to manage small weed outbreaks. Closed roads and skid trails would be fertilized and seeded to help reduce invasion from noxious weeds.

Cumulative Effects

No Action Alternative

In the No Action Alternative stand structure and species composition on State lands across the Plains Unit are expected to continue the change towards shade tolerant species. This would reduce the number of acres in the western/larch and ponderosa pine cover types. This management approach would move these stands from the desired future condition. This portion of section 22 would be expected to have increases in fuel loading and become more susceptible stand replacing fires, as well as mortality from insects and disease.

Action Alternative

Across the Plains Unit, 386 acres of ponderosa pine and 62 acres of western larch/Douglas-fir would be maintained. Due to road construction 7 acres would be removed from production. Trees affected by, or susceptible to insects and disease would be removed. Table 4 shows the resulting acreages of each cover type at the stand level. Harvest in the proposed project would change the age classes and species composition on 462 acres. (see Existing Stand Map, and Sheep Gap Harvest Plan map)

Within the second level of analysis, timber stands in section 22 would have fuel loading and ladder fuels reduced to a level similar to the fuel loading on adjacent private property. Tree spacing, insect and disease incidence, and weed occurrence would be at similar levels to adjacent property (see Sheep Gap Timber Sale Vicinity map).

TABLE 2

SHEEP GAP PROJECT COVER TYPE COMPARATIVE TABLE

Cover Type	Estimated Historic Appropriate Acres	Current Acres	Post Project Acres	Net Change Acres
ALP	0	0	0	0
DF	0	0	0	0
HW	0	0	0	0
LPP	0	0	0	0
MC	0	0	0	0
PP	396	396	389.5	-6.5
WL/DF	66	66	63	-3
WWP	0	0	0	0
NSTKD	18	18	25	+7
TOTAL	480	480	480	

Updated 08/11/2004

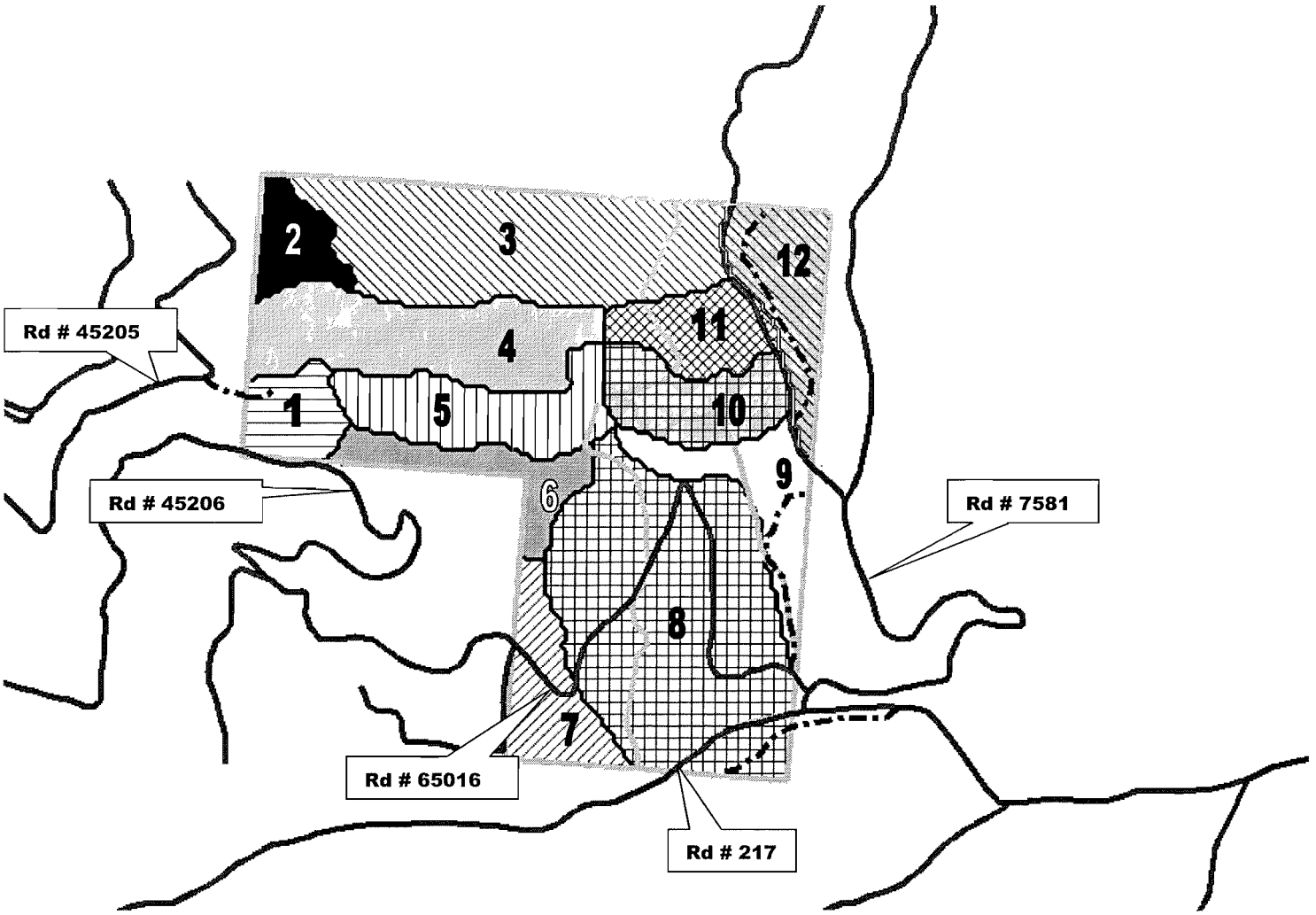
TABLE 3

PLAINS UNIT CUMULATIVE EFFECTS on COVERTYPES

Cover Type	Estimated Historic Appropriate Acres	Current Acres	Post Project Acres	Net Change Acres
ALP	179	692	692	0
DF	2,261	1,865	1,865	0
HW	110	110	110	0
LPP	2,763	3578	3578	0
MC	1.479	8220	8220	0
PP	27,948	28205	28198.5	-6.5
WL/DF	17,686	9420	9417	-3
WWP	366	306	306	0
NSTKD	Evenly distributed by type	393	400	+7
TOTAL	52,795	52,795	52,795	

Updated 08/11/2004

Sheep Gap Timber Sale



N

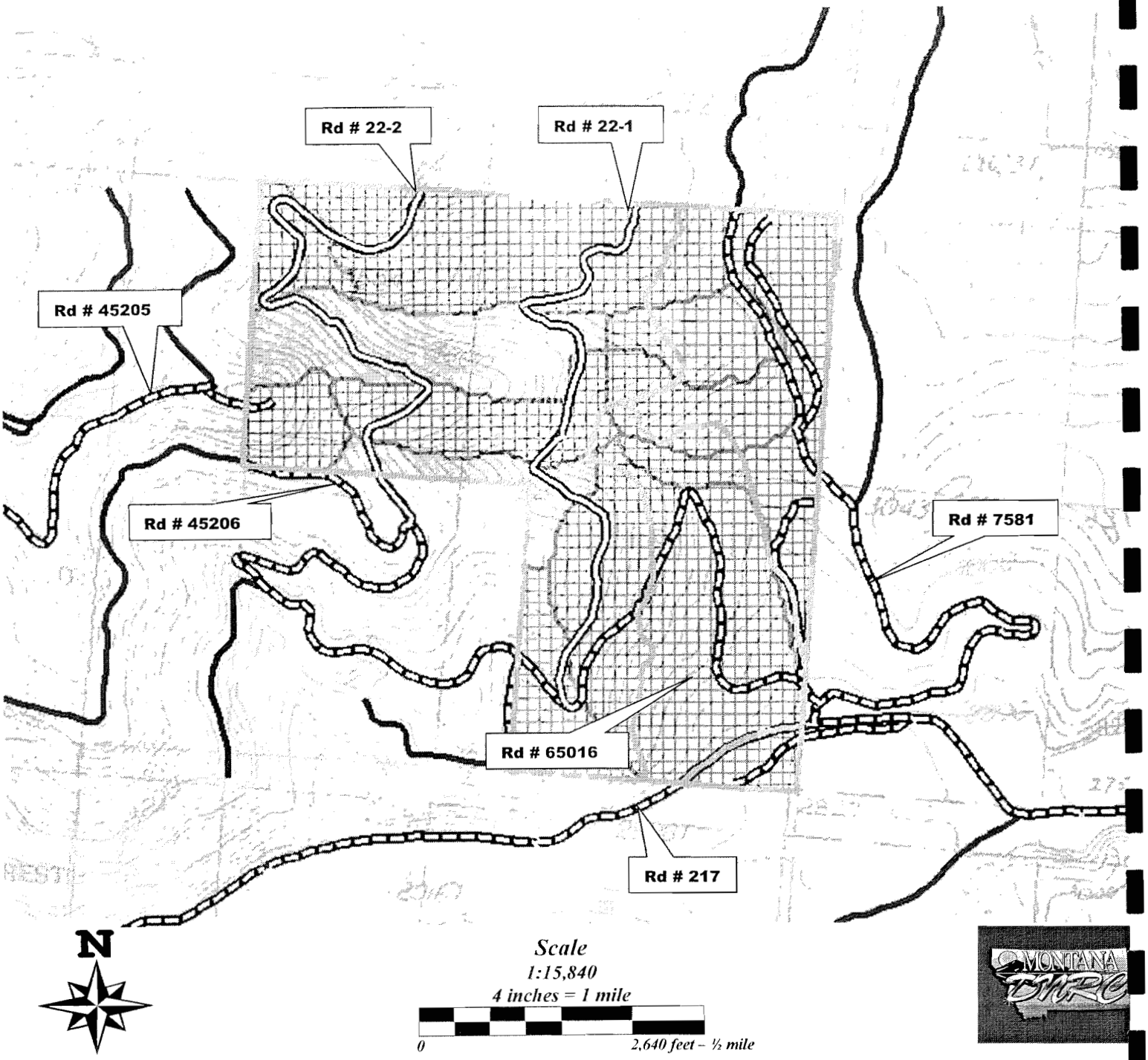
Scale
1:15.840
4 inches = 1 mile

0 *2,640' – 1/2 mile*

Existing Stands

Section	*22*
Township	*20N*
Range	*27W*

Sheep Gap Timber Sale



Appropriate Cover Types

Haul Routes	Ponderosa Pine		*Section*	*22*
Existing Roads	Western larch / Douglas - fir		*Township*	*20N*
Unit Boundaries			*Range*	*27W*

TABLE 4
SHEEP GAP PRE-HARVEST AND POST-HARVEST COVER TYPES
FOR SECTION 22

Stand Number	Stand Acres	Treatment Acres	Appropriate Cover Type	Existing Stand		Post Treatment		Harvest Treatment Area Number
				Cover Type	Composition Species %	Cover Type	Composition Species %	
1	16	16	PP	PP	PP30-WL30-DF10	PP	PP60-WL30-DF10	3
2	14	14	PP	DF	DF60-PP30-GF10	PP	PP70-WL20-DF10	3
3	85	85	PP	PP	PP60-DF40	PP	PP80-DF10-WL10	1,3
4	53	53	WL/DF	WL/DF	DF40-WL30-GF20	WL/DF	WL60-DF30-PP10	3
5	36	36	PP	DF	DF60-PP40	PP	PP80-DF20	3
6	21	21	WL/DF	WL/DF	DF40-WL30-GF20	WL/DF	WL60-DF30-PP10	3
7	26	26	PP	PP	PP50-DF40-WL10	PP	PP80-WL10-DF10	3
8	124	124	PP	DF	DF50-PP40-WL10	PP	PP60-WL30-DF10	1,2,3
9	27	27	PP	DF	DF50-PP40-WL10	PP	PP70-DF20-WL10	1
10	28	28	PP	PP	PP50-DF30-WL10-GF10	PP	PP70-WL20-DF10	1,3
11	23	23	PP	DF	DF60-PP30-WL-10	PP	PP70-WL20-DF10	1,3
12	27	27	PP	WL/DF	DF-40-WL40-PP20	PP	PP70-DF20-WL20	1
Total	**480**	**480**						

HYDROLOGY ANALYSIS

Introduction

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

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

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

Analysis Methods

Sediment Delivery

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

Water Yield

The water-yield increase for the watershed in the project area was determined using the Equivalent Clearcut Acres (ECA) method as outlined in *Forest Hydrology, Part II (Haupt et. al., 1976).*

ECA is a function of total area roaded, harvested or burned, percent of crown removed during harvesting or wildfire, and amount of vegetative recovery that has occurred in the harvested or burned areas. As live trees are removed, the water that would have evaporated and transpired either saturates the soil or is translated to runoff. This method also calculates the recovery of these increases as new trees vegetate the site and move toward pre-harvest water use.

In order to evaluate the watershed risk of water yield increase effectively, a threshold of concern for each watershed was established. Thresholds were established based on evaluating the acceptable risk level, resources value, and watershed sensitivity.

Water yield will be disclosed as a cumulative effect in the 'Existing Conditions' portion of this report because the existing condition is a result of all past harvesting and associated activities. In the 'Environmental Effects' portion of this report, water yield increases as a result of *this project* will be disclosed as a direct effect. The cumulative water yield increase as predicted to include each alternative will be disclosed as a cumulative effect.

Analysis Area

Sediment Delivery

The analysis area for sediment delivery is limited to the harvest units and roads used for hauling. This includes in-channel and upland sources of sediment that could result from this project.

Water Yield

The analysis areas for water yield are the West Fork Swamp Creek and the mainstem Swamp Creek.

Cumulative Effects

The analysis for cumulative impacts, including sediment delivery and water yield, will be the West Fork Swamp Creek watershed, which is a 16,015-acre watershed. This is a reasonable scale of analysis due to the size of the project versus the watershed size and the low potential for impacts. Additional harvest is proposed outside of the West Fork Swamp Creek watershed in the mainstem of Swamp Creek.

Water Uses and Regulatory Framework

Water Quality Standards

This portion of the Clark Fork River basin, including the Swamp Creek watershed is classified as B-1 by the State of Montana Department of Environmental Quality (DEQ), as stated in the Administrative Rules of Montana (ARM 17.30.607). The water quality standards for protecting beneficial uses in B-1 classified watersheds are located in ARM 17.30.623. Water in B-1 classified waterways is suitable for drinking, culinary and food processing purposes after conventional treatment, bathing, swimming and recreation, growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers, and agricultural and industrial water supply.

State water quality regulations prohibit any increase in sediment above naturally occurring concentration in water classified B-1. Naturally occurring means condition or materials present from runoff or percolation over which man has no control or from developed land where all reasonable land, soil and water conservation practices have been applied. Reasonable land, soil and water conservation practices include methods, measures or practices that protect present and reasonably anticipated beneficial uses. The State of Montana has adopted Best Management Practices (BMPs) through its non-point source management plan as the principle means of meeting the Water Quality Standards.

Water Quality Limited Waterbodies

Swamp Creek is listed as a water quality limited water body in the 1996 and 2000 303(d) lists. Swamp Creek is cited in the Draft 2004 Montana Water Quality Integrated 303(d)/305(b) Report as not having sufficient credible data for listing. The 303(d) list is compiled by the Montana Department of Environmental Quality as required by Section 303(d) of the Federal Clean Water Act and the Environmental Protection Agency Water Quality Planning and Management Regulations (40 CFR, Part 130). Under these laws, DEQ is required to identify water bodies that do no fully meet water quality standards, or where beneficial uses are threatened or impaired.

Streamside Management Zone Law (SMZ)

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

Water Rights and Beneficial Uses

Water rights for surface water exist downstream of the project area on the West Fork Swamp Creek and mainstem of Swamp Creek for stock watering and irrigation.

Existing Condition

The proposed Sheep Gap Timber Sale is located approximately five miles west of Plains, Montana (T20N, R27W, Section 22). The majority of the section is within the immediate West Fork Swamp Creek drainage with the remaining portion drained by an unnamed tributary to the Clark Fork River.

Elevations in the West Fork Swamp watershed range from 2,600 feet at the confluence with the East Fork Swamp Creek to approximately 7,160 feet at the watershed divide near Penrose Peak. Precipitation varies from 20 inches per year at the lowest point to near 50 inches at the higher elevations

The West Fork Swamp Creek watershed is a 16,015-acre tributary to Swamp Creek and ultimately the Clark Fork River. Management of the drainage is mixed between US Forest Service (12,343 acres), Plum Creek Timber Company (3,071 acres), State of Montana (505 acres) and the remaining acreage owned by private non-industrial entities.

During field review, no perennial streams were identified in the state section (T20N, R27W Section 22) although the USGS topography map indicates two intermittent tributaries to the West Fork Swamp Creek and one unnamed intermittent tributary to the Clark Fork River.

The West Fork of Swamp Creek is characterized by high flows during snowmelt runoff with relatively low base flows. Water quality in the drainage has likely been impacted by sedimentation as described in the East Fork Swamp Creek Timber Sale Environmental Assessment (DNRC, 1993) and Swamp Buggy Environmental Assessment (USFS, 1996). The stream stability in the upper reaches is generally fair-to-good but degrades downstream. The reduced stability downstream is likely attributable to grazing encroachment, undesirable past harvesting methods and poor road locations.

During field review, no substantial sediment sources to streams were identified on the proposed haul route. Past upgrades on the haul route are evidenced with the surface drainage features installed.

Cumulative Effects

Water yield in the West Fork of Swamp Creek was modeled in 1990 using the WATSED model. The Swamp Buggy EA (USFS, 1996) further modeled water yield using the Equivalent Clearcut Acre (ECA) method as described in Haupt et al. The projected 1995 water yield increase during the Swamp Buggy EA process was estimated at 2%. No substantial harvesting has occurred in the drainage on Lolo National Forest lands since the Swamp Buggy EA was published. An analysis of the potential annual water yield increase from non-federal lands results in an estimated cumulative annual water yield increase of less than 6%. The threshold of concern is set at 12% after considering the watershed sensitivity; beneficial uses present and the acceptable level of risk.

Environmental Effects

This section discloses the anticipated indirect, direct and cumulative effects to water resources within the affected environment from proposed actions. Past, current, and future planned activities on all ownerships within the West Fork Swamp Creek watershed have been taken into account for the cumulative effects analysis.

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

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

Description of Alternatives

No Action Alternative

No timber harvest or associated activities would take place under this alternative.

Action Alternative

Approximately 278 acres of timber harvest would be implemented in the West Fork Swamp Creek watershed and 184 acres of harvest would occur in the mainstem of Swamp Creek for total harvest acreage of 462 acres. Associated activities include approximately:

2.4 miles of road construction,
6.3 miles of drainage improvements; and
1.0 miles of temporary road construction followed by rehabilitation.

Direct and Indirect Effects

No Action Alternative

Sediment Delivery

No timber harvest or road construction is associated with this alternative. Changes in stream channel conditions and water quality would be dictated by natural events and future actions.

Water Yield

No timber harvest or road construction is associated with this alternative. Annual water yield increases would continue to decrease as vegetation increases or decreases due to natural and anthropogenic causes.

Action Alternative

Sediment Delivery

Approximately 278 acres of the state section would be treated with a silviculture prescription in the West Fork Swamp Creek watershed and 184 acres of harvest in the mainstem of Swamp Creek. In addition, approximately 21 acres would be disturbed for road construction.

Due to the lack of perennial streams on the state section, it is unlikely that sediment delivery to streams would occur. In addition, all forestry Best Management Practices (BMPs) would apply to limit the potential for sediment delivery to dry draws and swales. This would further limit the potential for sediment introduction. Road drainage improvements would be implemented on approximately 6.3 miles of road to reduce the potential for erosion to haul routes.

By implementing this alternative as presented and in accordance with the all applicable forestry BMPs, it is unlikely that adverse long-term impacts to water quality and beneficial uses, including cold-water fisheries, would result from the harvesting and road construction

Water Yield

The proposed harvest in the West Fork Swamp Creek watershed would increase the estimated annual water yield by less than 1 percent and would not exceed the recommended 12% threshold. The mainstem of Swamp Creek would have a small increase in annual water yield, but due to the size of the

watershed in relation to the amount of harvest, the proposed harvest level would not result in a measurable increase.

Cumulative Watershed Effects

Sediment Delivery

No Action Alternative

No timber harvest or road construction is associated with this alternative. Existing sediment sources would continue to contribute sediment to streams until remedial action were implemented or natural healing occurs.

Action Alternative

Due to the harvest methods that would be employed on harvest, units this alternative would not likely result in adverse impacts to water quality. By implementing BMPs on all new and existing roads and harvest units, potential sediment introduction into surface waterbodies would likely reduce cumulative effects to water quality.

Water Yield

No Action Alternative

No timber harvest or road construction activities are proposed under this alternative; therefore no water yield increase would result from implementation of this alternative. Water yield would continue at or near the current level and would decline as past harvest units within the watershed regenerate and move closer to pre-disturbance levels.

Action Alternative

The cumulative annual water yield increase from this alternative is estimated to be less than 7% over modeled pre-disturbance levels. This includes all actions on all ownerships within the watershed that contribute to water yield increase. The threshold of concern set at 12% annual water yield increase; this alternative would be within the recommended threshold. Due to the limited increase expected in the mainstem of Swamp Creek, no cumulative effects from annual water yield increases would be expected.

By keeping the annual water yield increases below the recommended threshold; it is unlikely that adverse impacts to beneficial uses would result from the implementation of this alternative.

REFERENCES

DNRC. 1993. Environmental Analysis for the East Fork Swamp Creek Timber Sale. Montana Department of Natural Resources and Conservation, Plains, MT.

Haupt, H.F., et al., 1974. Forest Hydrology Part II Hydrologic Effects of Vegetation Manipulation. USDA Forest Service, Region 1. Missoula, Montana.

USFS, 1996. Swamp Buggy Salvage Timber Sale. USDA Forest Service. Plains, MT.

FISHERIES ANALYSIS

Introduction

This analysis is designed to disclose the existing condition of the fisheries resources and display the anticipated effects that may result from each alternative of this proposal. During the initial scoping the following issues were expressed regarding the effects of proposed timber harvesting:

- Timber harvesting and road construction activities may affect fish habitat by increasing sediment delivery to streams.

These issues can best be evaluated by analyzing the anticipated effects of sediment delivery on streams supporting fish habitat within the project area.

Analysis Area

Sediment Delivery

The analysis area for sediment delivery is limited to the harvest units and roads used for hauling. This includes in-channel and upland sources of sediment within the proposed project area that could result from no action and the proposed action.

Cumulative Effects

The analysis area for sediment delivery is limited to the harvest units and roads used for hauling. This includes in-channel and upland sources of sediment within the proposed project area that could result from no action and the proposed action.

Analysis Methods

Expected effects to fisheries habitat will be addressed qualitatively using the current condition as a baseline and disclosing the expected changes due to the alternatives proposed.

Sediment Delivery

The analysis methods for sediment delivery will mimic those used in the Hydrology portion of this report.

Existing Condition

Information regarding existing fish populations in West Fork Swamp Creek is limited. According to the Montana Rivers Information System (MRIS), West Fork Swamp Creek contains resident populations of westslope cutthroat trout. MRIS also documents that genetic sampling was completed on the westslope cutthroat trout. No evidence of hybridization was found, but due to a small sample size, genetic purity is not conclusive. Since no rainbow trout were identified in MRIS, the westslope cutthroat trout population may be genetically pure. Estimated abundance of westslope cutthroat trout are considered common based on extrapolated surveys.

During field review, no streams were identified in the state section (T20N, R27W Section 22) although the USGS topography map indicates two intermittent tributaries to the West Fork Swamp Creek and one unnamed intermittent tributary to the mainstem of Swamp Creek. These drainage features were evaluated and found to consist of ephemeral draws with no discernable stream channels.

Sediment delivery

Swamp Creek is characterized by high flows during snowmelt runoff with relatively low base flows. Water quality in the drainage has likely been impacted by sedimentation as described in the East Fork Swamp Creek Timber Sale Environmental Assessment (DNRC, 1993) and Swamp Buggy Environmental Assessment (USFS, 1996). Stream channel stability was rated using the Pfankuch methodology (Pfankuch, 1975). The stream channel stability in the upper reaches is generally fair-to-good but degrades downstream. The reduced stability downstream is likely attributable to grazing encroachment, undesirable past harvesting methods and poor road locations.

During the field review, no substantial sediment sources to streams were identified on the proposed haul route.

Environmental Effects

This section discloses the anticipated indirect, direct and cumulative effects to fisheries within the affected environment from proposed actions. Past and current activities on all ownerships within the West Fork Swamp Creek watershed have been taken into account for the cumulative effects analysis as well as future planned state actions.

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

-Miles of new road construction on fish bearing streams
-Potential for sediment delivery to streams

Description of Alternatives

No Action Alternative

No timber harvest or associated activities would take place under this alternative.

Action Alternative

Approximately 278 acres of timber harvest would be implemented in the West Fork Swamp Creek watershed and 184 acres of harvest would occur in the mainstem for total harvest acreage of 462 acres. Associated activities include approximately:

2.4 miles of road construction,
6.3 miles of drainage improvements; and
1.0 miles of temporary road construction/rehabilitation.

Direct and Indirect Effects

No Action Alternative

Sediment Delivery

No timber harvest or road construction is associated with this alternative. Changes in stream channel conditions and water quality would be dictated by natural events and future actions. Current areas sediment sources would continue to contribute sediment to surface waterbodies.

Action Alternative

Sediment Delivery

Approximately 278 acres of the state section would be treated with a silvicultural prescription in the West Fork Swamp Creek watershed and 184 acres would be treated in the mainstem of Swamp Creek. In addition, approximately 7 acres of would be disturbed for road construction

Due to the lack of streams on the state section, it is unlikely that sediment delivery to streams would occur. In addition, all forestry Best Management Practices (BMPs) would apply to limit the potential for sediment delivery to dry draws and swales. This would further limit the potential for sediment introduction.

Road drainage improvements would be implemented on approximately 6.3 miles of road to reduce the potential for erosion on haul routes.

Water yield increases in the West Fork Swamp Creek would remain below the threshold of concern for unacceptable channel scour and subsequent sediment inchannel sources as discussed in the Hydrology portion of this EA.

By implementing this alternative as presented and in accordance with the all applicable forestry BMPs, it is unlikely that adverse long-term impacts to water quality and beneficial uses, including cold-water fisheries, would result from the harvesting and road construction. DNRC does not expect measurable adverse effects to westslope cutthroat trout from the implementation of this alternative.

Cumulative Effects

No Action Alternative

No timber harvest or road construction is associated with this alternative. Existing sediment sources would continue to contribute sediment to streams until remedial action were implemented or natural stabilization occurs.

Action Alternative

Sediment Delivery

Due to the harvest methods that would be employed on harvest, units this alternative would not likely result in adverse cumulative impacts to water quality. By implementing BMPs on all new and existing roads and harvest units, potential sediment introduction into surface waterbodies would not likely resulting in adverse cumulative effects to water quality.

Current fisheries habitat and populations would not likely be adversely affected with the implementation of this alternative due to the water yield increase as described in the Hydrology analysis and low potential for sediment introduction from harvest units. In order to ensure an acceptable level of risk for potential impacts, all applicable BMPs and mitigation measures would be implemented as described in

the *Hydrology* and *Soil* analysis

REFERENCES

DNRC. 1993. Environmental Analysis for the East Fork Swamp Creek Timber Sale. Montana Department of Natural Resources and Conservation, Plains, MT.

Pfankuch, D.J. 1975. Stream reach inventory and channel stability evaluation. USDA Forest Service, R1-75-002. Government Printing Office #696-260/200, Washington D.C. 26 pp.

USFS, 1996. Swamp Buggy Salvage Timber Sale. USDA Forest Service. Plains, MT.

SOILS ANALYSIS

Introduction

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

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

Analysis Area

The analysis area for soils is the state parcel (Section 22, T20N, R27W). This analysis area will adequately allow for disclosure of existing conditions, direct, indirect and cumulative impacts.

Analysis Methods

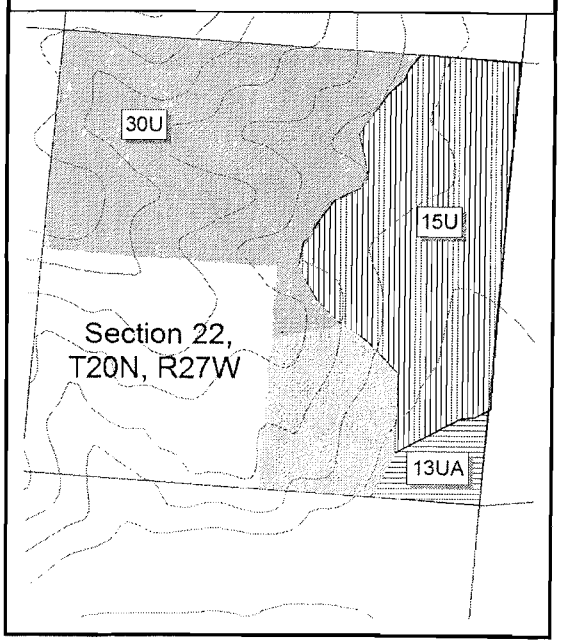
Soil productivity will be analyzed by evaluating the current levels of soils disturbance in the proposed project area.

Existing Conditions

Geology/Soils

Bedrock geology is undifferentiated mixed argillites and siltites (U) that are well fractured. No especially unique or unstable geology was note in the project area. This parcel has three basic soil units with varying vegetation characteristics dependent upon slope, aspect and elevation. Figure S-1 exhibits the mapped soil units in the project area.

Figure S-1: Mapped Soil Units



The map unit **13UA** consists of deep alluvial deposits on terraces and gentle slopes above streams. Terrain is typically smooth and weakly dissected by intermittent, ephemeral drainages. Slope ranges are typically up to 10%.

Soils are well-drained but weakly developed and generally only 4-6 inches thick. Typical subsoils range from 20 to 25 inches deep and consist of very gravelly loam and very gravely sandy loam. Infiltration of precipitation is rapid and soil moisture retention is moderate.

Management Implications

Timber productivity is low/moderate on this soil type. Due the rapid infiltration and low water holding capacity of the soils, seedling establishment may be difficult. The season of use is long and equipment operations are limited for only the short wet period during spring runoff.

Material provides for rough road surfaces due to the cobbly nature. Road cut and fillslopes are difficult

to revegetate due to the droughty soils. Reseeding immediately following construction activities can mitigate revegetation difficulty.

The map unit **15U** occurs on mountain footslopes and alluvial fans above the stream terraces. Deep soils are forming in mixed colluvium, which has been subject to alluvial slope wash. Slope shape is gently undulating with moderate slope dissection by ephemeral drainages. Slope ranges are typically up to 20%. Soils are somewhat excessively well-drained and well developed with typical surface soils 10-20 inches thick. Typical subsoils range from 15 to 20 inches deep and consist of gravelly to very gravelly sandy clay loam.

Management Implications

Timber productivity is low/moderate on this soil type. Seedling establishment may be difficult due to the drought nature of the soils coupled with grass competition. This soil type is well suited to tractor operations with a long season of use. Planning operations for periods when soils are dry or frozen/snow covered easily mitigates compaction potential. Material quality is fair for native roads. Potentially high stone and boulder content may hamper construction. Road surface is likely rough due to the cobbly material. Road cut and fillslopes are difficult to revegetate due to the droughty soils. Reseeding immediately following construction activities can mitigate revegetation difficulty.

The map unit **30U** consists of deep gravelly soils forming in colluvium and residium. Slope shape is concave vertically on the lower one-third of slope and mid slope grading to convex near the ridgeline. This terrain is moderately dissected by ephemeral drainages that typically flow only during runoff periods. Wave sorting of gravel by glacial lake Missoula is apparent on protected slopes below 4200 feet.

Soils are deep and well drained. Typical soils range from 5 to 15 inches deep underlying organic layers 1 to 2 inches deep. Volcanic ash influence is intermittent throughout the section. Infiltration of precipitation is rapid and soil moisture retention is moderate.

Management Implications

Timber productivity is moderate to high on this soil type. Locations containing ash are more productive than areas without an ash cap most likely due to the nutrient and moisture holding capacity. Due the rapid infiltration capacity of the soils the season of use is long and equipment operations are limited for only the short wet period during spring runoff. Due to the droughtiness of the soils in this parcel, especially soils without an ash cap, conifer regeneration is a concern because of competition with grasses. Well-distributed scarification of up to 30% of site can enhance establishment of serial conifers, yet maintain most of the duff, which is important for moisture and nutrient retention.

Material is well suited to road construction. Rocky outcrops are generally limited to ridge locations. Road cut and fillslopes are difficult to revegetate due to the droughty soils. Reseeding immediately following construction activities can mitigate revegetation difficulty. Providing proper road drainage can mitigate moderate erosion and sediment delivery hazards.

Cumulative Effects

Past harvesting in this section employed conventional ground based equipment for harvest activities. Estimated skid trail spacing used during the past entry ranged from 60 to more than 100 feet apart. Some skid trails were located in draw bottoms .All skid trail observed during field reconnaissance were vegetated with the same species as surrounding areas, however productivity of the skid trails was reduced compared to adjacent areas.

Environmental Effects

Description of Alternatives

No Action Alternative

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

Action Alternative

Approximately 462 acres of timber harvest would be implemented under this alternative. Associated activities include approximately:

2.4 miles of road construction
6.3 miles of drainage improvements

Direct and Indirect Effects of Activities on Soil Productivity

No Action Alternative

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

Action Alternative

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

Under the action alternative cable yarding is required on 279 acres of the 462 total harvest areas. The remaining 183 acres would be harvested using conventional ground based yarding systems. Table SS exhibits the expected impacts to soil from compaction and displacement if:

1) Season of operation is during the summer and fall.
2) Trafficked areas of skid trails and landings are restricted to 20% of the harvest units
3) Summer harvest restricts harvest equipment operation to periods of 20% or less soil moisture at 6 inches below the soil surface.

Table SS: Expected acres of impact to soil from compaction and displacement

Harvest Method and Season	No Action Alternative	Action Alternative
Ground Based[1]	0	27
Cable[2]	0	28
Total (acres)	0	55
Total Harvest Acres	0	462
Percent Area Impacted	0	**11.9%**

[1] 75 percent of the summer ground-based skid trails may exhibit impacts
[2] 10 percent of the cable ground may exhibit impacts

In addition to the potential impacts from harvesting, approximately 7 acres would be removed from production and converted to roads.

Due to the compaction and displacement impacts to the soil as show in Table SS, DNRC would expect a reduction in soil productivity from the action alternative on the displayed acres. As vegetation begins to establish on the impacted areas, and freeze-thaw cycles occur, the area of reduced productivity would decrease. Therefore, direct effects to long-term soil productivity in the project area would be considered acceptable. Additional mitigation measures to maintain long-term soil productivity can be found at the end of this document.

Cumulative Soil Effects

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

Wildlife Analysis

EXISTING CONDITION

INTRODUCTION

In the following sections, the existing environment is discussed. This description occurs on 2 scales. The first scale relates to the project area and/or the unit(s) proposed for harvest. Full descriptions for the project area and proposed harvest units are presented in the Vegetation Analysis. The second scale (cumulative effects) describes how the project relates to the surrounding landscape. This analysis area differs by species. If habitat does not exist in the project area or the project is not expected to affect a species, the analysis for that species was dropped from further analysis.

METHODS

To assess the existing condition of the project area and the surrounding landscape, a variety of techniques were used. Field visits, scientific literature, stand level inventory (SLI) data, aerial photography, Montana Natural Heritage Program data, and consultations with other professionals provided information for the following discussion and effects analysis. If specialized methodologies were used, they are discussed under the species section to which they apply.

COARSE FILTER ASSESSMENT

DNRC recognizes that it is an impossible and unnecessary task to assess an existing environment or the effects of proposed actions on all wildlife species. We assume that if landscape patterns and processes similar to those that species adapted to are maintained, then the full complement of species will be maintained across the landscape (DNRC 1996). This "coarse filter" approach supports diverse wildlife populations by managing for a variety of forest structures and compositions that approximate historic conditions across a landscape.

The project area ranges from 2800' to 4200' elevation with a predominantly eastern aspect. Ponderosa pine cover types on Douglas-fir habitat types dominate the area. In the project area, the current cover type is what would be expected based on these sites. However, the stocking levels and proportions of shade-tolerant trees are greater than would be expected if natural processes, primarily fire, were allowed to occur. The project area provides habitats ranging from relatively open ponderosa pine stands to similar stands encroached by Douglas-fir, and more dense stands, which include western larch trees, on the northern slopes and in draws. These habitats provide wildlife species with a variety of habitats and edge.

Due to fire suppression, tree densities increased and shade tolerant species, such as DF and GF, become more prevalent than they were historically. This situation led to more habitats with closed canopy and limited understory than expected under natural conditions.

The vegetation analysis demonstrates that fire suppression and past harvests led to current conditions that differ from historical conditions reported by Losensky (1997). Shade-tolerant species increased at the expense of fire fire-resistant ponderosa pine and western larch. In the project area and on the Plains Unit, wildlife species that use forests dominated by Douglas fir, and grand fir probably benefited from this succession at the expense of species that require ponderosa pine, western larch, and unforested habitats. The shade tolerant tree species generally provide better snow intercept than shade intolerant species, thus favoring species that have trouble with deep snow. Conversely, shade intolerants are often well adapted to fire, having thick bark that allows the presence of heart-rot without weakening the entire tree, thus providing excellent raw materials for snag users and cavity-dependent species.

FINE FILTER ASSESSMENT

Site-specific analyses were also conducted for individual species recognized to be sensitive or of special concern are evaluated (a "fine filter analysis"). They include wildlife species federally listed as "Threatened" or "Endangered", species listed as "Sensitive" by DNRC, and species managed as "big game" by Montana Fish, Wildlife, and Parks.

THREATENED AND ENDANGERED SPECIES

Four species indigenous to northwestern Montana are classified as "Threatened" or "Endangered" under the Endangered Species Act of 1973. The bald eagle, Canada lynx, gray wolf, and grizzly bear are listed as "Threatened". No use of the project area of any of those species is documented and is not expected in the near term, therefore these species were dropped from further analyses.

SENSITIVE SPECIES

When conducting forest management activities, the SFLMP directs DNRC to give special consideration to the several "sensitive" species. These species are sensitive to human activities, have special habitat requirements that may be altered by timber management, or may become listed under the Federal Endangered Species Act if management activities result in continued adverse impacts. Because sensitive species usually have specific habitat requirements, consideration of their needs serves as a useful "fine filter" for ensuring that the primary goal of maintaining healthy and diverse forests is met.

A search of the Montana Natural Heritage Database did not return any sensitive species sightings in or within 1 mile of the project area. Pileated woodpecker sign (feeding holes) were observed in the project area. The following sensitive species were considered for analysis. Each sensitive species either was included in the following analysis or was dropped from further analysis for various reasons (Table 1).

Table 1. Listed sensitive species for the Northwest Land Office showing the status of these species in relation to this project.

Species	Determination - Basis
Black-backed woodpecker	No recently (<5 years) burned areas in the project area. No further analysis conducted
Boreal owl	No further analysis conducted– The project area occurs below 5,000 and does not provide boreal habitat types.
Coeur d'Alene Salamander	No further analysis conducted – no moist talus or streamside talus habitat occurs in the project area.
Columbian sharp-tailed grouse	No further analysis conducted – no suitable grassland communities occur in the project area.
Common loon	No further analysis conducted - no large lakes occur in the project area
Ferruginous hawk	No further analysis conducted – no suitable grassland communities occur in the project area.
Fisher	**Included** – No perennial streams occur, but some limit habitat occurs in the project area.
Flammulated owl	**Included** – Dry ponderosa pine habitats occur in the project area.
Harlequin duck	No further analysis conducted-no potential streams occur in the project area.
Mountain plover	No further analysis conducted – no suitable grassland communities occur in the project area.

Northern bog lemming	No further analysis conducted – no sphagnum or other fen/moss mats occur in the area.
Pileated woodpecker	**Included** – ponderosa pine, western larch/Douglas fir and mixed conifer habitats occur in the area.
Townsend's big-eared bat	No further analysis conducted – no caves or mine tunnels occur in the project area.

FLAMMULATED OWL

Flammulated owls are listed by DNRC as a sensitive species. This species uses of mature to old stands of open ponderosa pine/Douglas-fir habitats with a canopy closure of 35-65%, abundant large snags and understory thickets (Wright et al. 1997). Flammulated owls prefer old stands of open ponderosa pine and Douglas-fir. They usually nest in cavities in 12-25" dbh aspen, ponderosa pine, or Douglas-fir excavated by pileated woodpeckers or northern flickers.

The uplands in the project area mainly consist of 10-24" dbh Douglas-fir and grand fir with mistletoe infestations and scattered large ponderosa pine, western larch, and Douglas-fir live trees and snags. Snags occur throughout the project area at varying densities. Presently, suitable nesting trees occur in the project area. Approximately 390 acres of potential flammulated owl habitat occurs in the project area. Many of these acres contain stocking levels that are too dense to provide valuable habitat to flammulated owls primarily due to fire suppression and lack of forest management.

For cumulative effects analysis, the project area and other lands within a ½ mile buffer were considered. This area (2,243 acres) would provide enough area for one or more pairs of flammulated owls. The cumulative effects analysis area encompasses 734 acres of Corporate Industrial, 622 acres of DNRC (includes the project area), and 887 acres of Forest Service. Approximately 390 acres of nesting habitat occur in the project area, with an additional 130 acres of habitat on the adjacent DNRC section. Other nesting habitat could occur outside DNRC lands, however, the quantity and quality is largely unknown. Due to management practices and the lack of fire, habitat quality and quantity on adjacent lands is expected to be low. The potential for habitat is higher on the FS lands to the north and east of the project area, than for surrounding private timberlands.

FISHER

Fishers are listed by DNRC as a sensitive species due to their use of old growth habitats. Fishers are generalist predators and use a variety of habitat types, but are disproportionately found in stands with dense canopy. Fishers appear to be highly selective of resting and denning sites. In the Rocky Mountains, fishers appear to prefer late-successional coniferous forests for resting sites and tend to use areas within 155' of water. Such areas typically contain large live trees, snags, and logs, which are used for resting and denning sites and dense canopy cover, which is important for snow intercept. Resting and denning habitats were modeling using preferred cover types (Heinemeyer and Jones 1994), age class, and canopy closure.

Strategies that promote or maintain habitat elements important for fishers typically involve protection of valuable resting habitat near riparian areas and maintaining travel corridors with dense overhead canopy. The project area ranges from 3,000' and 4,200' in elevation with 2-3 intermittent streams. These areas are comprised of denser vegetation with grand fir. These riparian bottoms and some uplands could provide forage and travel corridors for fishers. However, these habitats are not near perennial water sources and are intermixed with many drier habitat types making the project area unlikely to be used by fishers. Therefore, fisher use of the area is unlikely and the species will not be considered further in this document.

PILEATED WOODPECKER

The pileated woodpecker plays an important ecological role by excavating cavities that are used in subsequent years by many other species of birds and mammals. Due to their important role as a keystone species and their preference for forested habitats in latter stages of successional development, DNRC considers the pileated woodpecker as a sensitive species.

Pileated woodpeckers excavate the largest cavities of any woodpecker. Preferred nest trees are western larch, ponderosa pine, cottonwood, and aspen, usually 20 inches dbh and larger. Pileated woodpeckers primarily eat carpenter ants, which inhabit large downed logs, stumps and snags. Aney and McClelland (1985) described nesting habitat for pileated woodpeckers as "stands of 50-100 contiguous acres, generally below 5,000' in elevation with basal areas of 100-125 ft2/ac and a relatively closed canopy." The feeding and nesting habitat requirements, including large snags or decayed trees for nesting and large downed wood for feeding, closely tie these woodpeckers to mature forests with old growth characteristics. The density of pileated woodpeckers is positively correlated with the amount of dead and/or dying wood in a stand (McClelland 1979). Using SLI data, the above information was modeled to estimate pileated woodpecker habitat.

The project area contains 90 acres of contiguous potential nesting habitat. Nesting potential is dependent on availability of suitable snags needed for nesting substrate. Foraging habitat is present throughout the project area and on the adjacent DNRC lands. During field surveys, pileated woodpeckers use the project area for foraging was documented. Snags occur throughout the area and will continue to develop, especially in Douglas-fir and grand fir, due to the present insect and disease infestations. Therefore, pileated woodpecker foraging substrate appears to be abundant throughout the area. Of the existing potential nesting habitat, all acres are proposed for harvest.

For cumulative effects analysis, the project area and other lands within a ½ mile buffer were considered. This area (2,243 acres) would provide enough area for one or more pairs of pileated woodpeckers. The cumulative effects analysis area encompasses 734 acres of Corporate Industrial, 622 acres of DNRC (includes the project area), and 887 acres of Forest Service. Pileated woodpecker nesting habitat only occurs in the 90 acres of DNRC lands. Foraging habitat is present throughout the project area and on the adjacent DNRC lands. The amount and quality of habitat on adjacent lands is unknown, but the potential for habitat is higher on the FS lands to the north and east of the project area, than for surrounding private timberlands.

BIG GAME SPECIES

The project area provides year-round habitat for white-tailed deer, mule deer, and elk. Wintering habitat is generally confined to the lower slopes, however, in milder winters habitat could expand into higher elevations. Henderson et al. (1993) determined that this area lies along an elk migration route and possibly provides elk calving habitat. The proposed project could affect big game species by altering habitat and decreasing security. Big game winter habitat and security, especially during the general hunting season, are important management consideration. Hiding cover and unrestricted motorized access contribute to big game security.

The project area is generally unroaded with an overstory of ponderosa pine, Douglas-fir, and/or western larch. The understory consists of Douglas-fir and grand fir seedling and saplings, with a variety of shrub species. These conditions provide thermal and hiding cover patches along with visual screening

throughout the project area. Presently, all roads that access the edges of the project area are restricted to motorized use, except the main Sheep Gap road, which cuts through the northeast corner of the section. These conditions provide winter habitat and a relatively secure area for big game throughout the summer and during the hunting season. Presently, hiding cover exists throughout the project area, while about 146 acres of thermal cover is present on 184 acres of winter range that occur within the project area.

Cumulative effects analysis will generally consider the surrounding landscape within 1 mile of the project area, especially in relation to migration corridors. This area encompasses 4,930 acres and is comprised of approximately 2,025 acres of Forest Service, 1,680 acres of Plum Creek, 840 acres of DNRC, and 385 acres of private ownerships. Approximately, 2,130 acres of the cumulative effects area is delineated as winter range, with 1,680 acres providing thermal cover.

SPECIAL AND UNIQUE HABITATS

No special or unique habitats were found in any harvest units or in the project area.

ENVIRONMENTAL CONSEQUENCES

Direct and Indirect Effects - Coarse Filter

Effects of the No Action Alternative – Coarse Filter

Under this alternative, additional disturbance in the area would not occur. Continued disease and insect infestations would continue, and possibly increase, resulting in increased snag densities and decreasing canopy cover. Succession would continue to trend towards shade tolerant species, such as Douglas-fir and grand fir. Shade-intolerant tree species, such as ponderosa pine and western larch would decline. These changes would favor species that use dead wood and shade tolerant dominated habitats. In the short-term cavity nesting species could benefit by the increase in snag densities for nesting and forage. In the longer term, nesting substrate in the form of shade-intolerant snags is expected to decline due to the lack of regeneration, while foraging sites in shade-tolerant trees are expected to increase.

Effects of the Action Alternative – Coarse Filter

Under this alternative, 480 acres of habitat would be altered. These activities would increase human disturbance in the area. Wildlife species respond differently to these activities. These activities would be confined to the project area and the use of approximately 3 miles of access road for a period of 3 years or less, therefore direct effects to wildlife species would be relatively localized and short-term. Therefore, these effects are expected to be negligible.

The proposed Action Alternative would retain current cover types, but reduce tree stocking and the proportion of shade tolerant tree species. Within these areas, patches of advanced regeneration pockets would be retained to provide variation within the harvest units. All large snags (>14" Dbh) are planned for retention, however, some snags undoubtedly would be cut due to safety concerns, line unit corridors, or other logistic reasons. Most of this material would remain on site to provide coarse woody debris. Large snag (14" Dbh) retention is expected to exceed 5 snags per acre, thereby providing habitat structure for cavity nesting species for species that use larger snags. These changes would modify habitats toward more historic habitats with abundant deadwood, thereby benefiting species adapted to more open stands dominated by shade intolerant tree species.

Cumulative Effects - Coarse Filter

Effects of the No Action Alternative – Coarse Filter

This alternative would not contribute to changes toward historical conditions. The stands proposed for harvests would continue to develop into shade-tolerant dominated species.

Effects of the Action Alternative – Coarse Filter

This project would treat 480 acres of stands that experienced increased tree densities and proportions of shade-tolerant tree species. These cover types maintained on 480 acres would be cumulative to other projects on the Plains Unit that similarly maintained or converted cover types to those expected under more historic conditions, while retaining important deadwood structure. Overall, this alternative is expected to benefit species that use more open forested stands with a high proportion of shade-intolerant species.

Direct and Indirect Effects to Flammulated Owls

Effects of the No Action Alternative

Under the No Action Alternative, flammulated owls would not be disturbed by harvest activities and the existing habitat condition on 480 acres. The quality of habitat is expected to decline as habitat succession continues to increase the stand density and decrease ponderosa pine and western larch trees and snags. Currently, several pathogens are functioning in the area, primarily Douglas-fir beetle and rot root fungi. These pathogens could aid in reducing tree density that result in positive effects to flammulated owls. These effects would be sporadic and unpredictable. Overall, this alternative is expected to result in a loss of flammulated owl habitat through time, resulting in negative effects to flammulated owls in the long-term.

Effects of the Action Alternative

Flammulated owls appear to tolerate human disturbance and rarely abandon a nest. If harvesting occurs during nesting and rearing periods (May-July), a nest tree could be inadvertently cut down. This risk would be low because most nest trees posses some rot, therefore, they have low merchantability and would likely not be harvested. Therefore, this alternative is not expected to directly affect flammulated owls.

Under the Action Alternative, timber harvest would open the canopy of the forested areas by removing primarily suppressed or competing subdominant live trees over 390 acres of flammulated owl habitat. Large, dominant trees and scattered pockets of seedling/sapling thickets, would be retained in the harvest units. Due to reduced competition, the retention trees are expected to grow faster and live longer, especially younger trees. All snags are planned for retention, however, some snags undoubtedly would be cut due to safety concerns, line unit corridors, or other logistic reasons. Most of these snags would remain on site to provide coarse woody debris. After harvest, snag retention is expected to average approximately 5 snags per acre greater than 14" dbh and scattered smaller non-merchantable snags, thereby retaining habitat structure for nesting flammulated owls.

This proposal would alter habitat quality on 390 acres of the flammulated owl potential habitat. The proposed harvests would reduce overstory canopy closure to 5-15% (seedtree) and 30-40% (commercial thin) within these areas. In the seedtree units, this action could reduce flammulated owl in the short-term by large reductions in canopy closure in those areas, however, structural components important to flammulated owl habitat (large ponderosa pine, Douglas-fir trees, snags, and understory thickets) would be retained or would develop in the near future. In the commercial thin units, harvests would retain flammulated owl habitat that could be used by owls. Therefore, short-term reductions in flammulated owl habitat could occur in seedtree harvest areas, however important structure that requires a long time to develop would be retained. Any reduction of habitat would last for approximately 5-50 years, until the overstory canopy cover recovers to >35%.

Cumulative Effects to Flammulated Owl

Effects Common to the No Action and Action Alternatives

The surrounding landscape is marked by historic and continued timber harvest on Plum Creek ownership and little activity on Forest Service lands. If treatments on adjacent lands retained large trees and snags, they could provide additional habitat outside of DNRC lands. However, the quantity and quality of this habitat is largely unknown. Due to management practices and the lack of fire, habitat quality and quantity on adjacent lands is expected to be low. The potential for current habitat is higher on the Forest Service lands to the north and east of the project area, than for surrounding private timber lands, due to the increased potential of retention of large trees and snags that offer important nesting and foraging substrate. However, the lack of treatment would allow increased canopy closure resulting in decreased habitat quality.

Effects of the No Action Alternative

The No Action Alternative would not alter the existing amount of habitat on the landscape. However, in the longer-term, this alternative is expected to result in reduced habitat over time. These losses could be offset if habitat develops on adjacent ownership. No additional projects are planned on the adjacent DNRC land, so an existing potential flammulated owl habitat is expected to remain in the existing condition. Overall, this alternative is expected to result in reduced habitat through time. These losses could be additive to those on adjacent lands or development of habitat on adjacent lands could offset these losses.

Effects of the Action Alternative

In the longer-term, this alternative is expected to result in an additional 390 acres of habitat over time. The short-term losses could be offset if habitat develops on adjacent ownership in the near future. No additional projects are planned on the adjacent DNRC land, so the 130 acres of currently potential flammulated owl habitat is expected to remain in the existing condition. Overall, this alternative is expected to increase the amount of habitat in the analysis area in approximately 50 years. The increase in habitat could be additive to the development of habitat on adjacent lands or offset some of those loses.

Direct and Indirect Effects to Pileated Woodpecker

Effects of the No Action Alternative

Under the No Action Alternative, timber harvest would not occur. In the short-term pileated woodpecker nesting and feeding habitat would be retained. In the longer term, the area is expected to continue to undergo succession to shade tolerant Douglas-fir and grand fir cover types, baring any disturbances. During this time, the existing trees are expected to continue to grow to provide nesting and foraging substrate. Through time, these changes could lead to an increase in feeding substrate, but a reduction of shade-intolerant trees used for nesting. Presently, the area is experiencing insect and disease infestations that are mainly affecting Douglas-fir and grand fir, thereby reducing the speed of conversion to mixed conifer stands. However, substantial regeneration of shade-intolerant species is not expected to occur in openings created by the disease and insect infestations due to a lack of ground scarification. Therefore under this alternative, pileated woodpecker habitat would be retained in the short-term, while increasing through time, then declining as shade intolerant tree species are replaced by less-preferred shade tolerant species. Foraging habitat would increase as shade-tolerant trees gain in DBH. No short-term additional effects to pileated woodpeckers would occur under this alternative. However, in the longer-term, pileated woodpecker use of the area for nesting could decline, while foraging opportunities could increase.

Effects of the Action Alternative

Under the action alternatives, pileated woodpeckers could be affected if harvests occurred during the nesting period. Nesting woodpeckers could be displaced by the harvest activities. The effects of harvest disturbance are unknown; however, *Bull et al. (1995)* observed a discernible woodpecker roosting near a harvest unit consistently throughout harvesting. Additionally, mortality of individual woodpeckers could occur if nest trees were inadvertently cut. The risk of this mortality source would be low because most nest trees posses some rot, therefore, they have low merchantability and would likely not be harvested. Therefore, this alternative is not expected to directly affect pileated woodpeckers.

Under the Action Alternatives, nesting and feeding substrate in snags, coarse woody debris, numerous leave trees, and snag recruits would be retained, but quality nesting habitat could decline on 90 acres due to the removal of the midlevel forest canopy layer and reduction of overstory canopy cover. In commercially thinned stands, nesting habitat could be retained following harvests. The resulting open canopy, mechanical and jackpot burning scarification would allow for natural regeneration and growth of replacement shade-intolerant tree species to provide nesting structure in the distant future. The existing trees would increase in growth due to reduced competition, resulting in potential recruitment of large snags in the future. All snags are planned for retention, however, past monitoring indicates approximately 40% of snags would be lost during harvests due to safety concerns, line unit corridors, or other logistic reasons. Most of these snags, butts, and cull material would remain on site to provide coarse woody debris for additional feeding substrate, thereby offsetting loses if they were removed. After harvest, snag retention is expected to average 5 snags per acre over 14" Dbh, thereby providing habitat structure for nesting and feeding for pileated woodpeckers. Due to the road restrictions, firewood cutting of the retention trees and snags should be negligible to non-existent.

Based on the above discussion, pileated woodpecker habitat, especially nesting habitat, could be reduced in the harvest units. These reductions are expected to last for about 50-80 years until the regenerating conifers grow to contribute to the midlevel canopy. Structural components that require a long-time to develop (large trees, snags) would be retained in the harvest units, thereby reducing the amount of time needed for nesting habitat to redevelop. Additionally, the retention trees are expected to release and grow faster, thus reducing the time needed to grow large enough to provide feeding and nesting substrate. Some reduction in potential feeding habitat could be removed by harvesting Douglas-fir and grand fir trees. In the long-term, regeneration of shade-intolerant trees are expected to provide nesting substrate in 100+ years. Overall, pileated woodpeckers could be negatively affected by the reduction in nesting habitat for about 50-80 years. Since feeding substrate would be retained, foraging use of the area is expected to continue. In the long-term, pileated woodpeckers are expected to benefit by regeneration of shade-intolerant tree species resulting from this project.

Cumulative Effects to Pileated Woodpecker

Effects Common to the No Action and Action Alternatives

The surrounding landscape is marked by historic and continued timber harvest on Plum Creek ownership and little activity on Forest Service lands. If treatments on adjacent lands retained large trees and snags, they could provide additional habitat outside of DNRC lands. However, the quantity and quality of this habitat is largely unknown. If these treatments retained large trees and snags, they could provide additional habitat outside of DNRC lands. Nesting habitat is likely to occur on the adjacent Forest Service lands. However, the quality and quantity of this any habitat is largely unknown. The potential for current habitat is higher on the Forest Service lands to the north of the project area, than for surrounding private timber lands, due to the increased potential of retention of large trees and snags that offer important nesting and foraging substrate. In time, the existing harvested areas on adjacent lands could develop into pileated woodpecker habitat. The trees retained in the harvest units are expected to release and grow faster than in untreated areas. These areas could contribute to pileated woodpecker habitat in the future if canopy, large trees, and snags are allowed to develop over the next 100-150 years.

Effects of the No Action Alternative

The No Action Alternative would not alter the existing amount of habitat on the landscape. However, in the longer-term, this alternative is expected to result in reduced habitat over time. These losses could be offset if habitat develops on adjacent ownership. No additional projects are planned on the adjacent DNRC land, so the potential pileated woodpecker habitat is expected to remain unchanged in the near-term. Overall, this alternative is expected to result in reduced habitat through time. These losses could be additive to those on adjacent lands or development of habitat on adjacent lands could offset these losses.

Effects of the Action Alternatives

The Action Alternative would reduce the existing amount of nesting habitat on the landscape by 90 acres, while the quantity of foraging habitat is expected to remain relatively unchanged. The quality of this habitat could be reduced by snag losses that occur during harvests. If these snags are left on site, foraging habitat would be reduced slightly. In the longer-term, nesting habitat is expected to redevelop in these areas and continue to provide habitat for a longer duration than if left untreated due to the regeneration of shade-intolerant tress. The short-term losses could be offset if habitat develops on adjacent ownership in the near future. No additional projects are planned on the adjacent DNRC land,

so potential pileated woodpecker habitat is expected to remain in its current condition. Overall, this alternative is expected to decrease the amount of nesting habitat in the general area for approximately 50-80 years, while providing foraging habitat and nesting substrate. The short-term reduction of nesting habitat could be offset, to some degree, by developing habitat on adjacent lands.

Direct and Indirect Effects to Big Game

Effects of the No Action Alternative

Under the No Action Alternative, big game deer habitat and security would not be altered in the short-term. In the longer term, succession would continue to occur resulting in increased thermal and possible hiding cover, while reducing forage.

Effects of the Action Alternative

Under the Action Alternative, approximately 2.4 miles of road construction would occur, with 1 mile of this road built to a temporary standard and obliterated following use. The remaining road commences from a road system that contains 2 gates between the take off points and the main Swamp Creek road. The newly constructed roads would be restricted during the harvest activities by a sign, while 2 gates would restrict access to the newly built roads during inactive periods (evenings, weekends, shutdown periods, etc.). Following completion of harvesting and follow up treatments, Berms would restrict the newly constructed road system along with the 2 gates along the access road.

Within the proposed units (480 acres), timber harvests would reduce the overstory canopy cover from 70+% to 5-40%, while retaining pockets of regeneration conifer trees for hiding cover, visual screening, and parturition cover. Draws and ridges within the harvest units would be left with higher canopy closure.

The effects of road building and use under this alternative could result in short-term negative effects to big game species. The new road construction could result in decreased big game security and increased avoidance of habitat if the road closures area not effective. Several closure devises occur on the road used to access the project area, therefore additional road building and use is expected to decrease big game habitat for the duration of the project (up to 3 years). Increases in big game mortality are not expected because contractors would not be allowed to use the restricted road for hunting purposes and the general public would be restricted from using the area. However, some illegal use could occur, but this use is expected to be minor. The use of the road system could result in avoidance of habitat, especially bull elk. Again, this would be short-term and big game are expected to regain habitat in these areas when use of the road ceases. Harvest activities would occur primarily in the summer and autumn, thereby winter and parturition areas are not expected to experienced increased disturbance.

The effects of timber harvesting in the project area is expected to result decreased thermal and hiding cover. The proposed project would harvest in all 146 acres of existing thermal cover on winter range, resulting in reduction in winter habitat and potential increased winter mortality. Additionally, harvests in all 480 acres are expected to reduce hiding cover, which would result in decreased security. However, decreased security is not expected to result in increased substantial human mortality as long as visual screening is retained along the Swamp Creek road and scattered throughout the units and the

current and planned road restriction devises are effective. Reduction of canopy cover and subsequent burning could increase forage production in the project area. Pockets of submerchantable conifer trees within the harvest units are expected to provide cover for big game species. These effects are expected to last approximately 50-80 years, when the canopy cover approaches the existing closure percentage.

Cumulative Effects to Big Game

Effects of the No Action Alternative

Under the No Action Alternative, forage production is expected to decrease as succession occurs in the forest and the abundance of cover would remain unchanged in the short term and increase in density over the long term. No changes in security are expected from under this alternative. Therefore, no additional effects are expected under this alternative.

Effects of the Action Alternative

Under the Action Alternative, cover would be removed and forage production would increase. In the winter range cumulative effects analysis area, approximately 146 acres of 1679 acres (9%) potentially available thermal cover would be harvested, retaining approximately 72% of the cumulative effects winter range analysis area with thermal cover. Motorized access would remain similar to the existing situation following completion of this alternative. No activities are planned on the adjacent DNRC parcel. The effects of this project would be additive to the contributions of adjacent lands to forage production, while decreasing cover. However, the amount of cover projected to remain in the analysis area would provide for winter animals. Travel routes through the project area could be retained through lighter harvest areas along draws and ridges. However, the proposed harvest strategy would not prohibit travel through the project area. Over all, this alternative could result is some slight habitat shifts, but is not expected to result in substantial effects to big game.

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Montana Department of Natural Resources and Conservation

Memo

To: Jim Kibler

From: Patrick Rennie

CC:

Date: 11/3/2004

Re: Sheep Gap Timber Sale

Hi Jim:

The following should work for your EA:

I have consulted with the Montana State Historic Preservation Officer and conducted a search of the DNRC's cultural resource files. Because no cultural resources have been identified in the project area, and because of the steepness of the terrain (from and archaeological perspective), I am not recommending any additional archaeological investigative work before the proposed timber sale proceeds.

Patrick Rennie
DNRC Archaeologist

Attachment 3: Prescriptions

PROPOSED SHEEP GAP TIMBER SALE
TIMBER STAND/HARVEST UNIT PRESCRIPTIONS

Treatment Area:	1	**Harvest Treatment Acres:**		101	
Elevation:	2800' - 4000'	**Slope:**	10-40%	**Aspect:**	East
Current Cover Type:	Mixed conifer	**Appropriate Cover Type:**		Ponderosa pine	
Habitat Type:	PSME/VACA, PSME/PHMA, PSME/CARU				
Soils Type:	Combest Gravely Silt Loam, Winkler Gravely Sandy Loam, Wildgen Gravely Loam, Tevis Gravely Loam, Krause Gravely Silt Loam				

Description of Existing Area: This area is located in the northeast quarter, and southeast corner of section 22. The unit is comprised of five identified stands in the Stand Level Inventory. The overstory consists of Douglas-fir (50%), ponderosa pine (30%), western larch (10%), and grand fir (10%). Intermediate stand age averages 110 years, but scattered older trees remain as remnants of pre-1910 stands. DBH ranges from 10" to 24" in all species. Height of all tree species averages 45' to 90', with western larch occasionally reaching 100'. Overstory trees are evenly distributed and form a closed upper canopy layer. Regeneration is limited to scattered groupings of Douglas-fir and grand fir. Insect and disease activity is found in all species. The Douglas-fir is heavily affected by a variety of root diseases. Douglas-fir beetle (Dendroctonus pseudotsugae) is active and expanding rapidly through the Douglas-fir. Mountain pine beetle (Dendroctonus ponderosae) is present in some of the ponderosa pine. Dwarf mistletoe is present at very high occurrence in the Douglas-fir, with lesser occurrences in western larch. Large snags (>14" DBH) are common, generally found at 10 to 12 per acre. Surface fuel loading of down material ranges from 20 to 40 tons per acre.

Treatment Objectives:

- Promote the stand components of ponderosa pine and western larch into a traditionally appearing open stand configuration.
- Reduce occurrence of insect and disease activity within this stand.

Prescribed Treatment:

- Shelterwood Improvement cutting
- Spacing of retention trees at 35' X 35' spacing
- Reduce stocking in Douglas-fir and grand fir.
- Remove trees affected by insects, root rots, dwarf mistletoes, or other diseases.
- Retain all snags > 14" DBH, and all obvious large diameter disease free trees.
- Cut all non-merchantable decadent trees less than 6" DBH

Harvest Method:

- Tractor skidding is applicable for this unit.
- Individual tree selection with trees marked to leave.

Hazard Reduction:

- Excavator pile and burn all slash in excess of retention requirements of 5 to 10 tons per acre.
- Burn landing piles following harvest activity.

Regeneration/Site Preparation:

- Spatial openings created by the proposed treatments should provide opportunities for establishment of natural regeneration.
- Excavator piling should provide exposed sites for the establishment of natural regeneration.
- Regeneration should be assessed five years after harvest, if to determine success of appropriate species and encroachment of undesirable species.

Anticipated Future Treatment:

- The proposed treatment progresses the area towards characteristics of an open ponderosa pine stand.
- Stand conditions would be monitored regular intervals following the project period. Salvage or sanitation operations associated with insect or disease occurrences, extreme weather events, or other unexpected circumstances would be evaluated for action on a case-by-case basis
- The proposed treatment enters the area to establish future entries to remove the overstory

Treatment Area:	2	**Harvest Treatment Acres:**		86	
Elevation:	2840' - 3400'	**Slope:**	10-40%	**Aspect:**	East
Current Cover Type:	Mixed conifer	**Appropriate Cover Type:**		Ponderosa pine	
Habitat Type:	PSME/VACA, PSME/CARU				
Soils Type:	Wildgen Gravely Loam, Krause Gravely Silt Loam, Winfall Gravely Loam				

Description of Existing Area: This area is located in primarily in the southeast quarter of section 22. The unit is covers 63 acres of stand 8, and approximately seven acres of stand 9 as identified in the Stand level Inventory. The overstory consists of Douglas-fir (50%), ponderosa pine (47 %), and western larch (3%). Stand age averages 120 years, but scattered older trees remain as remnants of pre-1910 stands. DBH ranges from 10" to 24" in all species. Height of all tree species averages 70' to 90', with some individual trees occasionally reaching 100'. Overstory trees are generally evenly distributed with some openings due to root rot diseases. Regeneration is limited to scattered groupings of Douglas-fir and grand fir. Insect and disease activity is found in all species. The Douglas-fir is heavily affected by a variety of root diseases. Douglas-fir beetle (Dendroctonus pseudotsugae) is active and expanding rapidly through the Douglas-fir. Mountain pine beetle (Dendroctonus ponderosae) is present in younger drought stressed of the ponderosa pine. Dwarf mistletoe is present at very high occurrence in the Douglas-fir, with lesser occurrences in western larch. Large snags (>14" DBH) are common, generally found at 10 to 12 per acre. Surface fuel loading of down material ranges from 20 to 40 tons per acre.

Treatment Objectives:

- Promote the stand components of ponderosa pine into a traditionally appearing open stand configuration.
- Reduce occurrence of insect and disease activity within this stand.

Prescribed Treatment:

- Shelterwood seed cutting / group selection.
- Spacing of retention trees at 54' X 54' spacing
- Reduce stocking in Douglas-fir.
- Remove trees affected by insects, root rots, dwarf mistletoes, or other diseases.
- Retain all snags > 14" DBH, and all obvious large diameter disease free trees.

Harvest Method:

- Tractor skidding is applicable for this unit.
- Individual tree selection with trees marked to leave.

Hazard Reduction:

- Excavator pile and burn all slash in excess of retention requirements of 5 to 10 tons per acre.
- Burn landing piles following harvest activity.

Regeneration/Site Preparation:

- Spatial openings created by the proposed treatments should provide opportunities for establishment of natural regeneration.
- Excavator piling should provide exposed sites for the establishment of natural regeneration.
- Regeneration should be assessed five years after harvest, if to determine success of appropriate species and encroachment of undesirable species.

Anticipated Future Treatment:

- The proposed treatment progresses the area towards characteristics of an open ponderosa pine stand.
- Stand conditions would be monitored regular intervals following the project period. Salvage or sanitation operations associated with insect or disease occurrences, extreme weather events, or other unexpected circumstances would be evaluated for action on a case-by-case basis
- The proposed treatment enters the area to establish future entries to remove the overstory

Treatment Area:	3	**Harvest Treatment Acres:**	293		
Elevation:	2800' - 4000'	**Slope:**	40 - 70%	**Aspect:**	East
Current Cover Type:	Mixed conifer	**Appropriate Cover Type:**	Ponderosa pine		
Habitat Type:	PSME/VACA, PSME/PHMA, PSME/CARU, ABGR/XETE, PSME/ARUV				
Soils Type:	Combest Gravely Silt Loam, Winkler Gravely Sandy Loam, Wildgen Gravely Loam, Tevis Gravely Loam, Winfall Gravely Loam, Winkler Gravely Loam				

Description of Existing Area: This area is comprised of stands in the west half of the southeast quarter section, the west half or the northeast quarter section, and the stands in the northwest quarter section of section 22, Township 20 North, Range 27 West. The unit is comprised of ten identified stands in the Stand Level Inventory. The overstory consists of Douglas-fir (55%), ponderosa pine (35%), and western larch (10%). Stand age averages 110 years, but scattered older trees remain as remnants of pre-1910 stands. DBH ranges from 10" to 24" in all species. Height of all tree species averages 45' to 90', with western larch occasionally reaching 100'. Overstory trees are evenly distributed and form a closed upper canopy layer. Regeneration is limited to scattered groupings of Douglas-fir and grand fir. Insect and disease activity is found in all species. The Douglas-fir is heavily affected by a variety of root diseases. Douglas-fir beetle (Dendroctonus pseudotsugae) is active and expanding rapidly through the Douglas-fir. Mountain pine beetle (Dendroctonus ponderosae) is present in some of the ponderosa pine. Dwarf mistletoe is present at very high occurrence in the Douglas-fir, with lesser occurrences in western larch. Large snags (>14" DBH) are common, generally found at 10 to 12 per acre. Surface fuel loading of down material ranges from 40 to 60 tons per acre.

Treatment Objectives:

- Promote the stand components of ponderosa pine and western larch into a traditionally appearing open stand configuration.
- Reduce occurrence of insect and disease activity within this stand.

Prescribed Treatment:

- Shelterwood Seed cutting.
- Spacing of retention trees at 47' X 47' spacing
- Reduce stocking in Douglas-fir and grand fir.
- Remove trees affected by insects, root rots, dwarf mistletoes, or other diseases.
- Retain all snags > 14" DBH, and all obvious large diameter disease free trees.
- Cut all non-merchantable decadent trees less than 6" DBH

Harvest Method:

- Skyline harvesting is applicable for this area.
- Ponderosa Pine, Western Larch along with individual selection trees marked to leave.

Hazard Reduction:

- FI Slashing after harvest.
- Burn landing piles following harvest activity
- Excavator pile and burn all slash in excess of retention requirements of 5 to 10 tons per acre on areas accessible to excavator.
- Jack pot burning areas inaccessible to equipment.

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Regeneration/Site Preparation:

- Spatial openings created by the proposed treatments should provide opportunities for establishment of natural regeneration.
- Excavator piling should provide exposed sites for the establishment of natural regeneration.
- Regeneration should be assessed five years after harvest, to determine success of appropriate species and encroachment of undesirable species.
- Spot planting in areas not regenerated by preferred species after five-year assessment.

Anticipated Future Treatment:

- The proposed treatment progresses the area towards characteristics of an open ponderosa pine stand.
- Stand conditions would be monitored regular intervals following the project period. Salvage or sanitation operations associated with insect or disease occurrences, extreme weather events, or other unexpected circumstances would be evaluated for action on a case-by-case basis
- The proposed treatment enters the area to establish future entries to remove the overstory

Attachment 4: Mitigation

MITIGATION

Roads: A transportation system minimizing road miles and meeting all BMPs has been designed by the DNRC. Roads constructed in conjunction with this project will total approximately 2.4 miles, and will remain in place following project activity. After activities have been completed the roads will be grass seeded and closed to use. Road drainage improvements would be implemented on approximately 6.3 miles of road to reduce the potential for sediment introduction from haul routes. Existing roads to be incorporated into the transportation system would be upgraded to meet all BMPs. Roads currently in place that do no meet BMP standards would be closed, upgraded, or obliterated during the construction phase of the project.

Wildlife: The following mitigation measures would be incorporated into the proposed project:

Flammulated Owl: Favor ponderosa pine retention and regeneration decisions and restrict public access to reduce potential loss of existing snags to firewood gathering. Harvest Unit and Timber stand prescriptions favor the retention of ponderosa pine and would maintain 480 acres to appropriate historic cover types, of which 406 acres are ponderosa pine type. Flammulated Owl habitat occurs on 390 acres. Year round road closure of the area would control losses of snags to firewood gatherers.

Pileated Woodpecker: Favor ponderosa pine and western larch in retention and regeneration decisions, and restrict public access to reduce potential loss of existing snags to firewood gathering. Mitigations identical with those listed under flammulated owl in preceding paragraph.

Big Game: In harvest areas within winter range, retain patches of dense vegetation when possible to provide some thermal cover/snow intercept capacity.

Retain connective corridors of heavy forest cover along draw bottoms and on the ridge line when possible to maintain travel routes, visual screening, and security for elk and deer.

Minimize number of roads (open and closed) and retain slash on old roads and skid trails to reduce the potential for foot and unauthorized motor vehicle traffic.

Retain some pockets of regeneration conifer trees for hiding cover, visual screening and paturition cover.

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

Tractor skidding should be limited to slopes less than 40%. 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%.

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

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.

Hydrology: Due to the lack of streams on the state section, it is unlikely that sediment delivery to streams would occur. In addition, all forestry Best Management Practices (BMPs) would apply to limit the potential for sediment delivery to dry draws and swales. This would further limit the potential for sediment introduction. All operations to repair ephemeral channels would also be done in the late summer season, in the no flow period.

Noxious Weeds: Roads would be seeded and spot treated with chemicals following construction and project completion. Logging equipment would be cleaned and inspected through the timber sale contract to avoid seed migration. Roads would be closed following the sale to avoid migration of weed seed into the area.

Visual Impacts/ Aesthetic Values: Activities would be visible in cutting treatment area 3 from the Town of Plains, portions of Hwy 200, as well as various properties and locations along River Road West and the Blackjack road. Visible impacts would be noticeable in the short term, but are not likely to have long term impacts. Use of skyline logging systems in treatment area 3 would help reduce visual impacts. Unit boundaries on all units as well as marking prescriptions would limit these impacts. Lands adjacent to state land will have visible fuel clearings. Visual screening would be retained along constructed roads to reduce impacts when possible.

Fuel Hazards: Harvest treatments would reduce ladder fuels and trees susceptible to fire. Slash would be treated either through logging system design or excavator piling to reduce the available fuel following harvest to 10-15 tons per acre. Jack pot burning would be used in treatment area 3 following timber harvest, and excavator piling.

Attachment 5: Consultants and References

Consultants and References

Individuals Consulted

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Special References

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