ENVIRONMENTAL ANALYSIS

FOR THE

BIG PRAIRIE TIMBER SALE

PREPARED BY:
SHAWN THOMAS, FOREST MANAGEMENT SUPERVISOR

MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

NORTHWESTERN LAND OFFICE
PLAINS UNIT

MARCH 2004

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KALISPELL – PLAINS UNIT

DNRC - NORTHWEST AREA

Memo

To: Larry Ballantyne, Plains Office Forest Program Supervisor

From: Bill Wright, Kalispell-Plains Unit Manager

Date: July 18, 2001

Re: Proposed Timber Sale –
Section 12, T23N, R27W and Section 36, T 24N, R27W

The primary objective of this proposed timber sale is to generate revenue for the Public School (C. S.) grant.

The secondary objectives for the proposed timber sale are:

1. To reduce the insect and disease activity on the tract of land.
2. Promote historic timber types found in the area.
3. Reduce the fire hazard associated with excessive fuel accumulation.

In planning and preparing this proposed timber sale, management direction of the State Forest Land Management Plan shall be closely followed. All applicable Streamside Management Zone (SMZ) rules and regulations and all Best Management Practices (BMP) guidelines shall be applied.

cc: Plains Cal File

CHECKLIST ENVIRONMENTAL ASSESSMENT

Project Name:	Big Prairie Timber Sale
Proposed Implementation Date:	May 2004
Proponent:	DNRC, Northwestern Land Office, Plains Unit
Location:	Sections 12 Township 23N Range 27W, and 36 Township 24N Range 27W
County:	Sanders

I. TYPE AND PURPOSE OF ACTION

The Department of Natural Resources and Conservation Proposes to sell 34,000 tons of timber in the Big Prairie/Semem Creek areas of the Thompson River. This action would produce revenue for the Common School (C.S.) Trust Grant. Activities proposed would maintain and improve forest health, reduce fuel loadings, and increase forest productivity beneficial to future Trust actions. No viable, proven, revenue generating alternatives were identified or proposed during project scoping, therefore only forest product removal and sale are analyzed in this EA checklist.

The proposal would include seven harvest units totaling 791 acres. New road construction of 1.01 miles, reconstruction and improvement of 6.9 miles, closing, abandoning and/or reclaiming 4.28 miles of road would be required. Income to the Trust from this project is estimated at $1,200,000.00.

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 and 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, DNRC 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. DNRC specialists and field foresters identified management issues and concerns. Issues and concerns have been resolved of mitigated through project design or would be included as specific contractual requirements of the project (see Attachment 2, Resource analysis; Attachment 3, Stand Prescriptions; Attachment 4, Mitigation; Attachment 5, Consultants and References).

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

None

3. ALTERNATIVES CONSIDERED:

Proposed Action: See description of the proposed action on page 7.

Action Alternatives: No additional action alternatives were identified or proposed during the scoping or analysis, therefore only forest product removal and sale are analyzed in this EA checklist. Recommended actions to reduce environmental effects would be incorporated into the proposed action.

No Action: The no-action alternative would propose no revenue-generating activities on these sections. This alternative would not produce revenue for the Common School (C.S.) Trust Grant. No timber harvesting would occur. There would be no road management or closure activities other than limited maintenance in the event of damage. No actions would change the current growth rates, stand conditions or fuel loadings of timber stands. No action would be taken to alter insect and disease activities.

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.

Soils issues are addressed in attachment 2. Measures to minimize impacts as recommended by a DNRC specialist have been included in the project design (See Attachment 2, Resource analysis, Water Resources / Soils Analysis; Attachment 4, Mitigation Measures). Through the project design, several segments of pre-existing road would be obliterated or closed to improve the stability of soils now present on the area. As detailed in the Soils analysis, cumulative effects would be controlled by limiting the area of adverse soils effects.

5. WATER QUALITY, QUANTITY AND DISTRIBUTION:

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

A DNRC hydrologist has reviewed the project area, transportation system, and harvest plan. Recommendations to minimize impacts have been incorporated into the project design (See Attachment 2, Resource analysis, Water Resources/ Soils Findings; Attachment 4, Mitigation Measures). As shown in the Hydrology analysis, cumulative effects to sediment delivery and water yield would be limited through BMP implementation.

6. AIR QUALITY:

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

The project area is located in Montana State Airshed 2; it is not within a Class 1 Airshed. Some particulate matter would be introduced into the Air shed from the burning of logging slash and broadcast burning as specified in the project plan. All burning would be conducted during times of adequate

ventilation within the existing rules and regulations, which serves to limit the cumulative effect of this and other burning projects in the airshed.

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.

Tree removal would cause changes in the vegetative structure of the project area. Silvicultural prescriptions have been developed to keep stands moving towards historical conditions, while maintaining good tree growth and vigor. The Action Alternative affects no old growth stands. No sensitive plants listed by the Montana Natural Heritage Program have been identified in the project area. (See Attachment 2, Resource analysis, Vegetation analysis and Attachment 3, Prescriptions.) The vegetation analysis and cover type maps indicates that cumulative effects to vegetation would be limited because there are no changes to cover type distribution across the Plains unit, and age class distribution would move only slightly towards a historic condition.

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

The Big Prairie/Semem Creek sale area is in big game habitat. (See attachment 2, Resource analysis, Wildlife Biologist Findings.) Cumulative effects to coarse filter habitat values and specific species are limited, with details shown in the Wildlife analysis.

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 Biologist Findings).

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

A DRNC archeologist has reviewed this project. Significant sites or artifacts were not identified during these reviews. (See Attachment 2, Resource analysis, Archeologist findings (email communication))

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

Portions of the project would be visible from the Thompson River road. Topography is flat, therefore minimizing visual impacts. Prescriptions are designed to mimic historical stand conditions and should not have an adverse visual impact on the area. (See attachment 4, Mitigation)

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

No effect

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.

The USFS/USDOT is currently doing a NEPA analysis on the "Thompson River Road" forest highway project. That project would involve lands within this project area.

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.

No effect

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. Improvements to big game habitat should provide increased recreational opportunities.

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.

No effect

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 ACM road, Thompson River County Rd, as well as Highway 2 and/or 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 March 2003, DNRC 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.

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.

This area is hunted frequently. Roads through the area that would be closed after the project only access the immediate area, closure of them would not affect the ability of people to recreate on these parcels. The DNRC has cabin site leases in the project area. None of the cabin sites would be directly involved in any of the proposed actions.

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.

No effect

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

No effect

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

No effect

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 compared recent sales to find a market value for stumpage. These sales have similar species, quality, average diameter, product mix, terrain, date of sale, distance from mills, road building and logging systems, terms of sale, or anything that could affect a buyer's willingness to pay for. The effect of the proposed project would generate an estimated return to the school trust of $1,200,000 in the Action Alternative. The No Action alternative does not generate any return to the school trust at this time.

EA Checklist Prepared By:	**Name:**	Shawn Thomas	**Date:**	2/26/2004
	Title:	Forest Management Supervisor		

V. FINDING

25. ALTERNATIVE SELECTED:

The Action Alternative as proposed meets the stated project objectives. It complies with all applicable environmental laws and DNRC 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.

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 (currently unidentified) revenue generating opportunities. Specific project design features and resource management specialist recommendations have been included to insure this project will fall within the acceptable limits of environmental change. Considering the content of this analysis I find there would be no significant impact to the physical or human environment resulting from the implementation of the Action Alternative.

27. NEED FOR FURTHER ENVIRONMENTAL ANALYSIS:

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

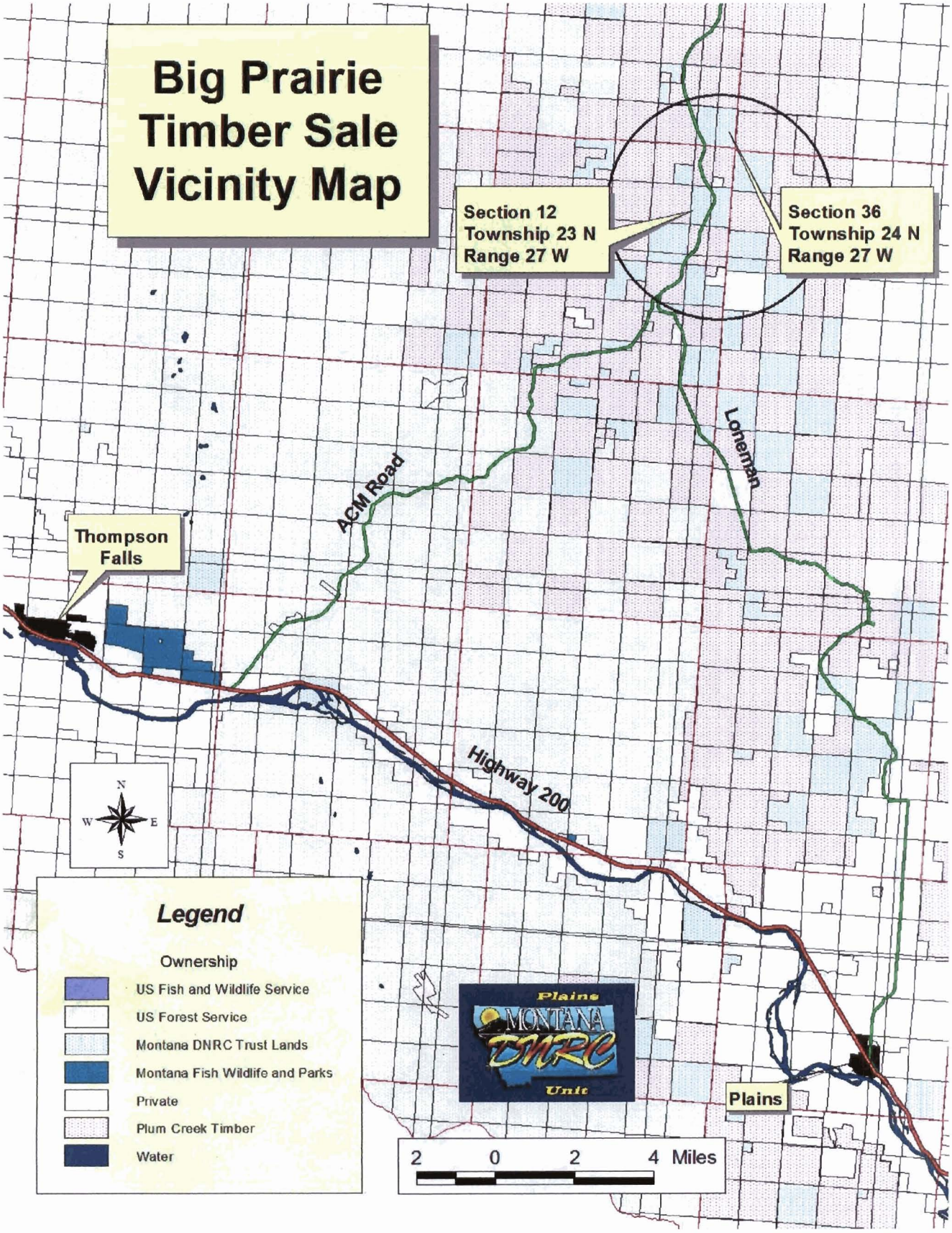
EA Checklist Approved By:	Name:	Larry Ballantyne		
	Title:	Plains Unit Resource Program Manager, MT DNRC		
Signature:	Larry Ballantyne		**Date:**	March 26, 2004

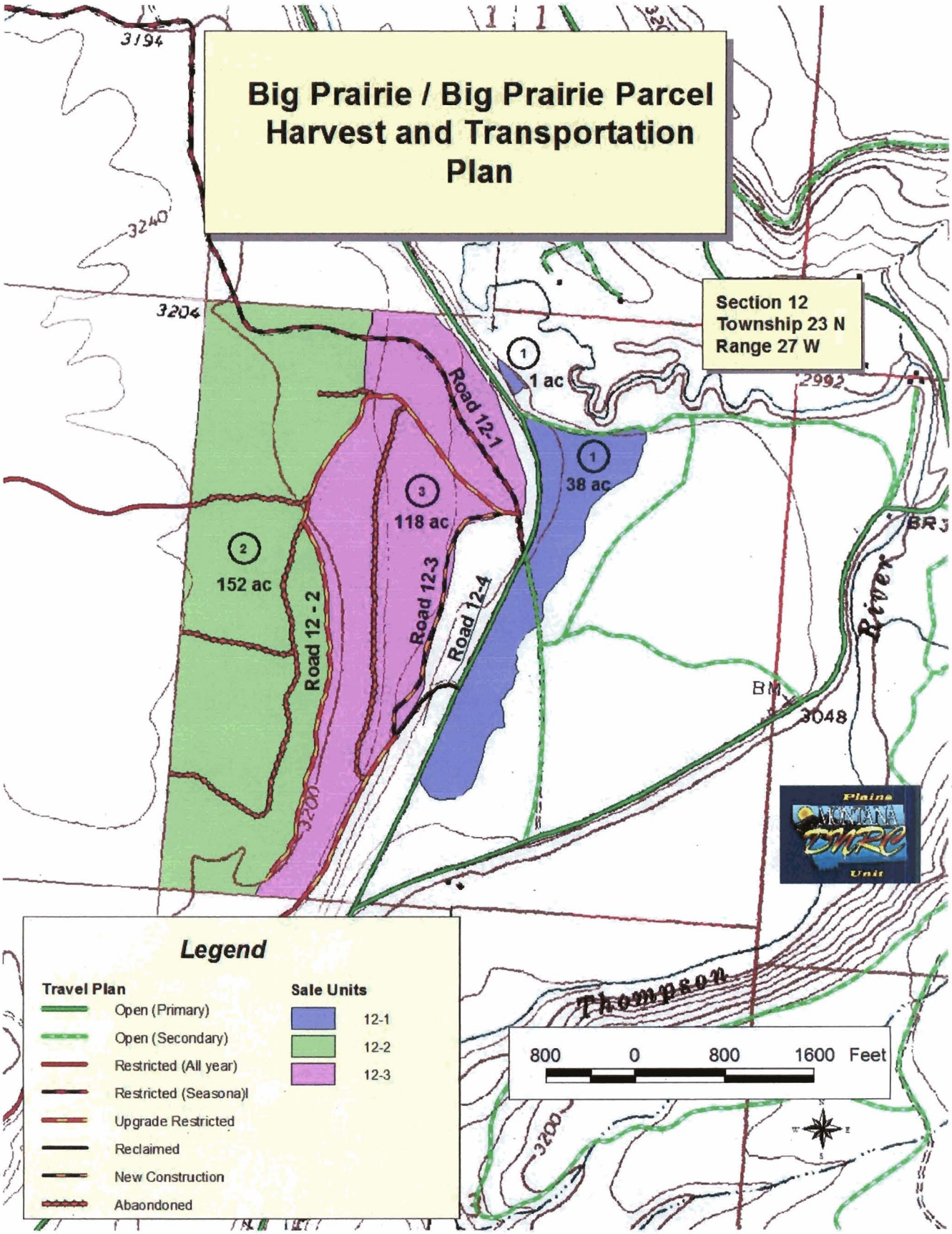
Attachment 1

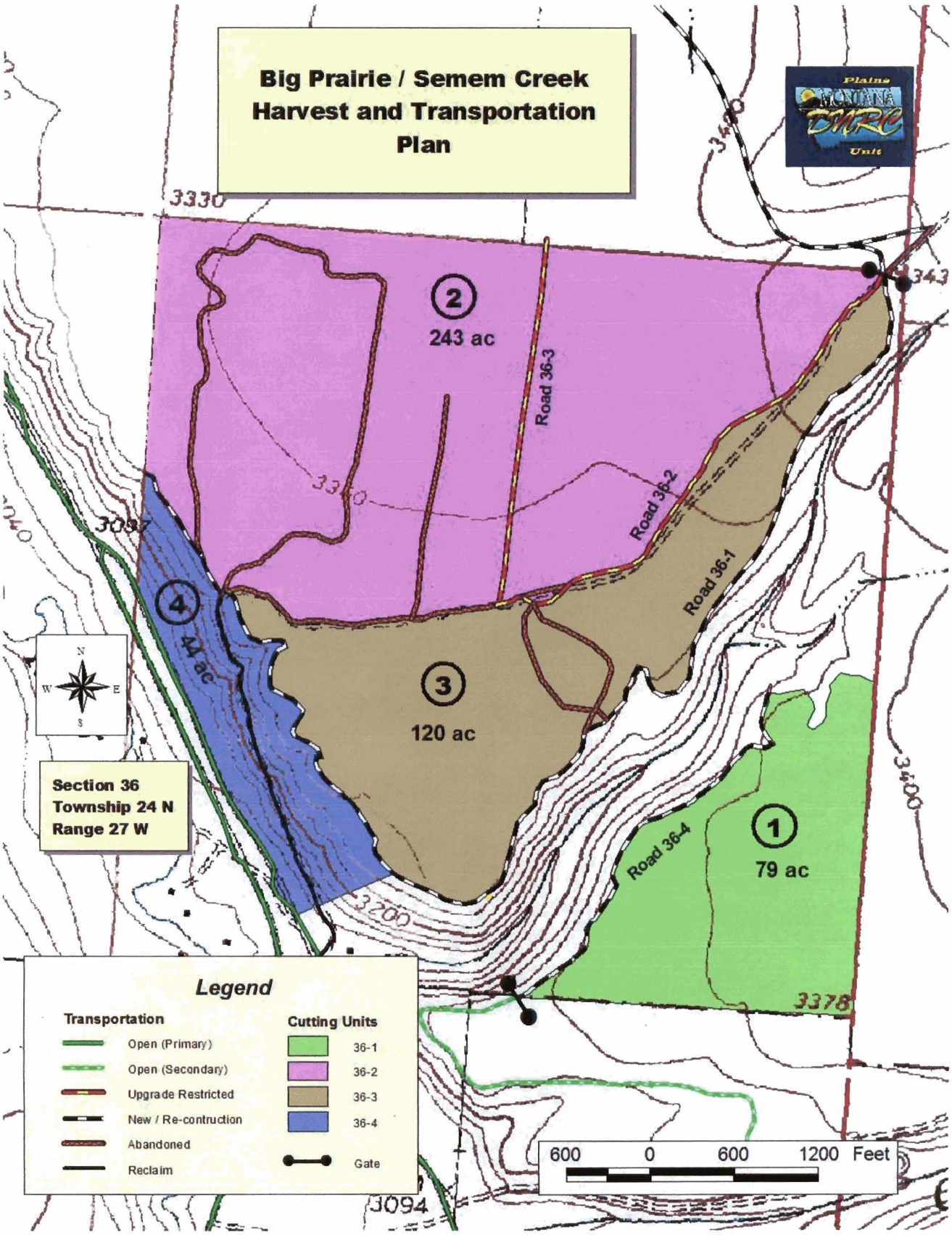
Sale and Access Maps

Cover Type and Stand Maps

Harvest Unit Table


Big Prairie Timber Sale Vicinity Map
Section 12 Township 23 N Range 27 W
Section 36 Township 24 N Range 27 W
ACM Road
Loneman
Thompson Falls
Highway 200
Plains
N
W
E
S
Legend
Ownership
US Fish and Wildlife Service
US Forest Service
Montana DNRC Trust Lands
Montana Fish Wildlife and Parks
Private
Plum Creek Timber
Water
Plains
MONTANA DNRC
Unit
2 0 2 4 Miles


Big Prairie / Big Prairie Parcel Harvest and Transportation Plan
Section 12
Township 23 N
Range 27 W
1 ac
38 ac
118 ac
152 ac
Road 12-1
Road 12-3
Road 12-4
Road 12 - 2
3194
3240
3204
3200
2993
BM
3048
River
Thompson
Legend
Travel Plan
Open (Primary)
Open (Secondary)
Restricted (All year)
Restricted (Seasona)l
Upgrade Restricted
Reclaimed
New Construction
Abaondoned
Sale Units
12-1
12-2
12-3
800 0 800 1600 Feet


Big Prairie / Semem Creek
Harvest and Transportation
Plan
Plains
Unit
3330
3340
3343
3400
3200
3094
3378
2
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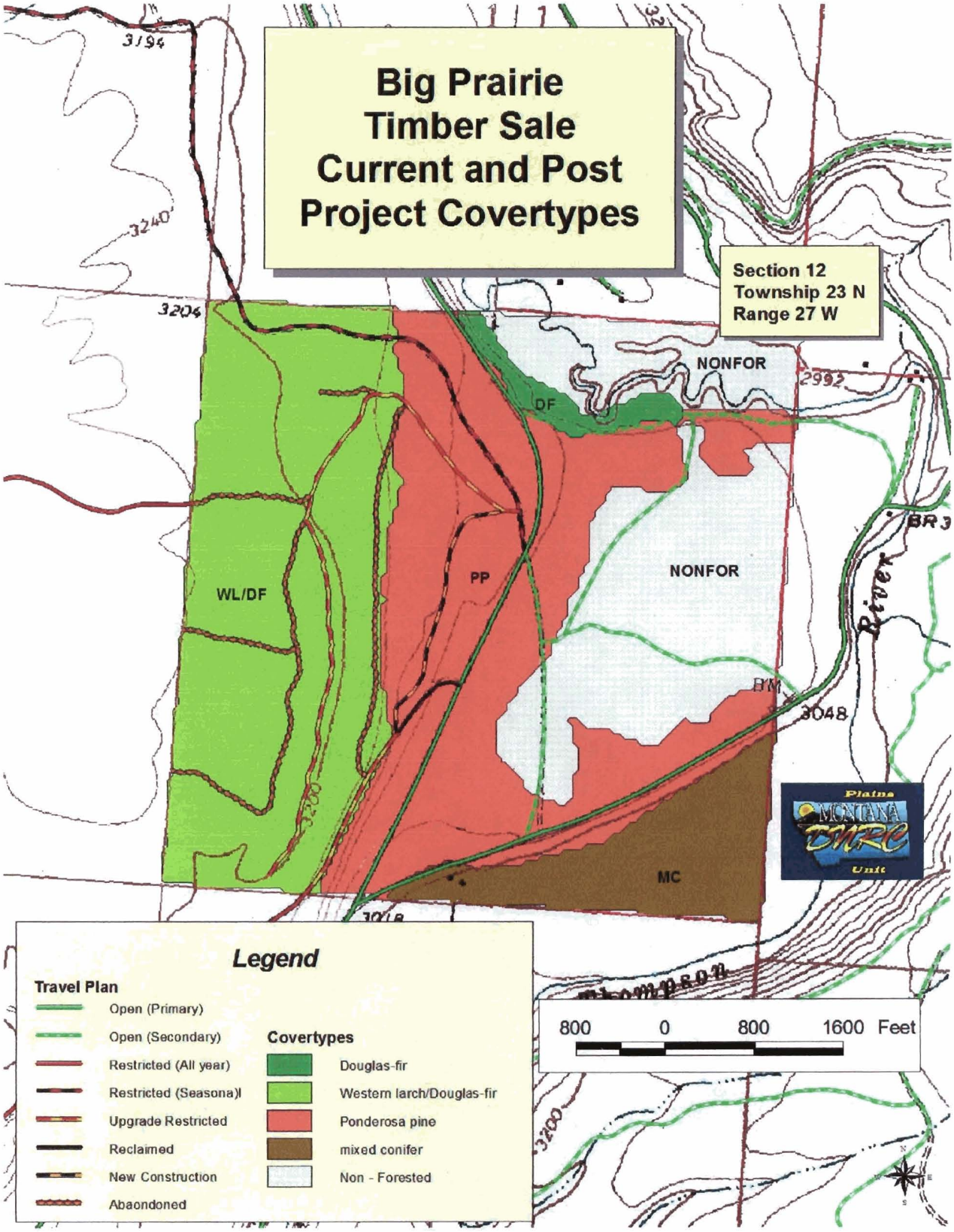
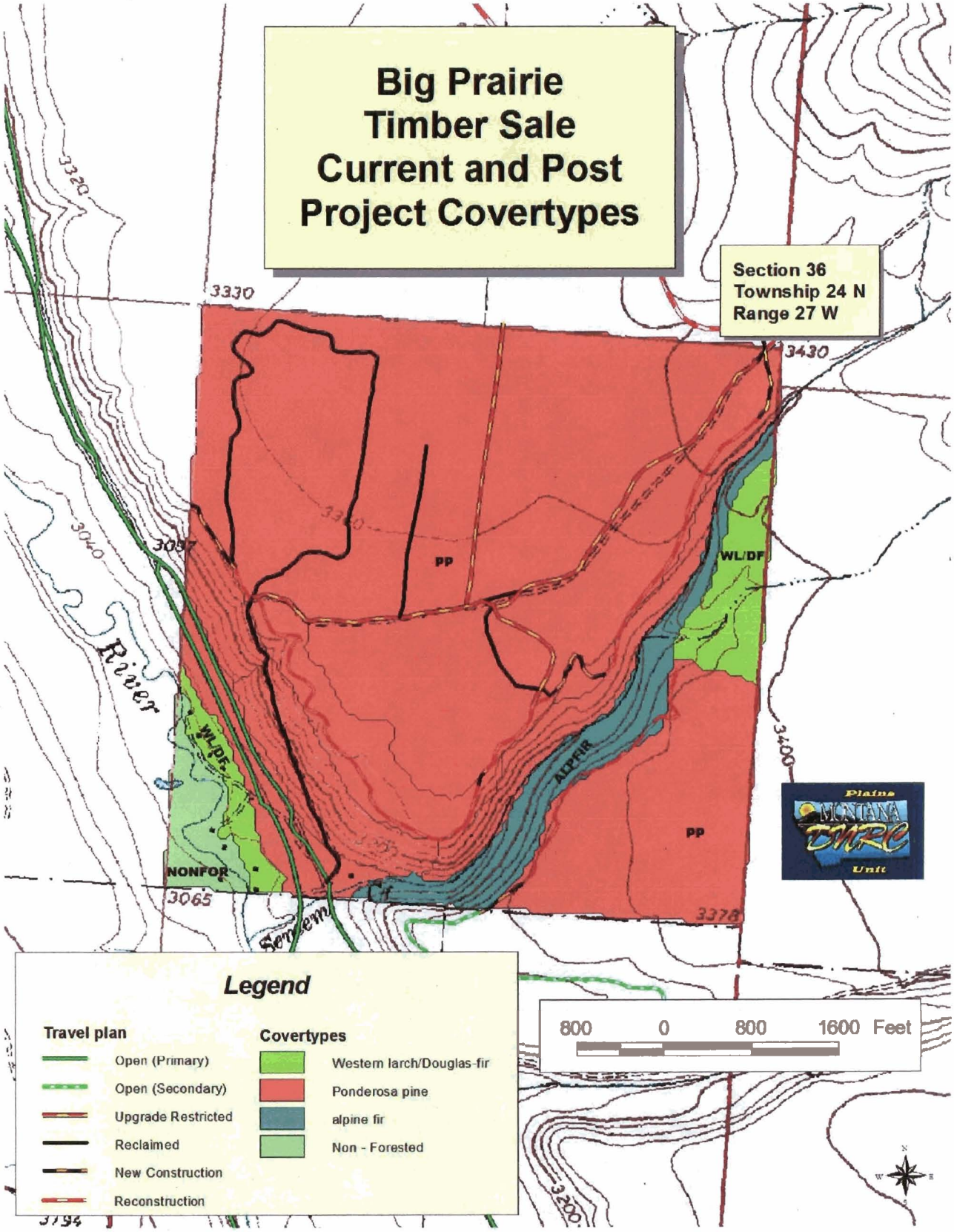
3
120 ac
4
44 ac
1
79 ac
Road 36-3
Road 36-2
Road 36-1
Road 36-4
N
W
E
S
Section 36
Township 24 N
Range 27 W
Legend
Transportation
Open (Primary)
Open (Secondary)
Upgrade Restricted
New / Re-contruction
Abandoned
Reclaim
Cutting Units
36-1
36-2
36-3
36-4
Gate
600 0 600 1200 Feet


Big Prairie
Timber Sale
Current and Post
Project Covertypes
Section 12
Township 23 N
Range 27 W
NONFOR
DF
PP
WL/DF
NONFOR
MC
3194
3240
3204
2992
3048
3200
River
Plains
MONTANA DNRC
Unit
Legend
Travel Plan
Open (Primary)
Open (Secondary)
Restricted (All year)
Restricted (Seasonal)
Upgrade Restricted
Reclaimed
New Construction
Abaondoned
Covertypes
Douglas-fir
Western larch/Douglas-fir
Ponderosa pine
mixed conifer
Non - Forested
800 0 800 1600 Feet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Timber Sale
Current and Post
Project Covertypes
Section 36
Township 24 N
Range 27 W
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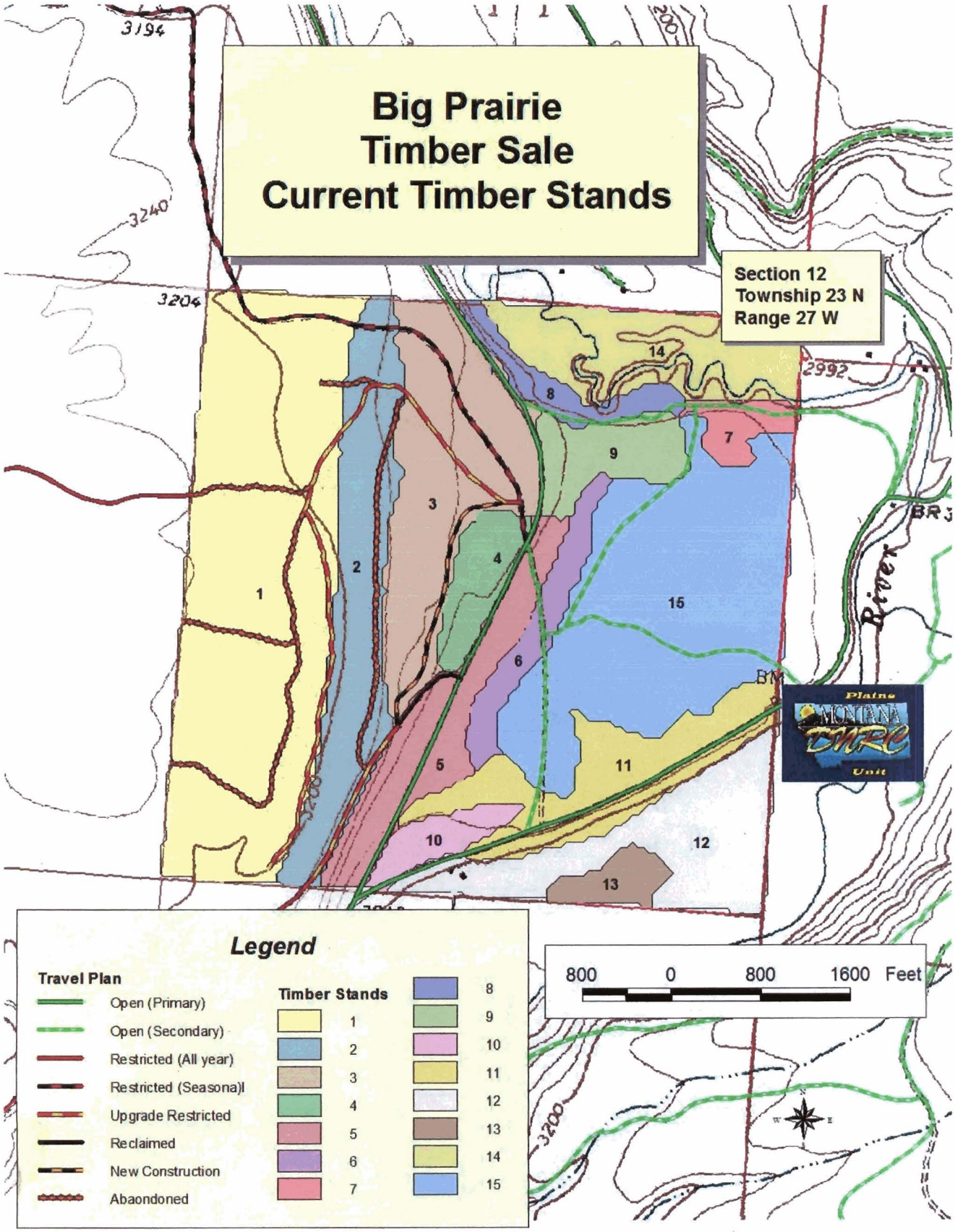
3430
3400
3040
3097
3065
3378
3200
3794
PP
WL/DF
ALPFIR
NONFOR
River
Legend
Travel plan
Open (Primary)
Open (Secondary)
Upgrade Restricted
Reclaimed
New Construction
Reconstruction
Covertypes
Western larch/Douglas-fir
Ponderosa pine
alpine fir
Non - Forested
800 0 800 1600 Feet


Big Prairie
Timber Sale
Current Timber Stands
Section 12
Township 23 N
Range 27 W
Legend
Travel Plan
Open (Primary)
Open (Secondary)
Restricted (All year)
Restricted (Seasonal)
Upgrade Restricted
Reclaimed
New Construction
Abaondoned
Timber Stands
1
2
3
4
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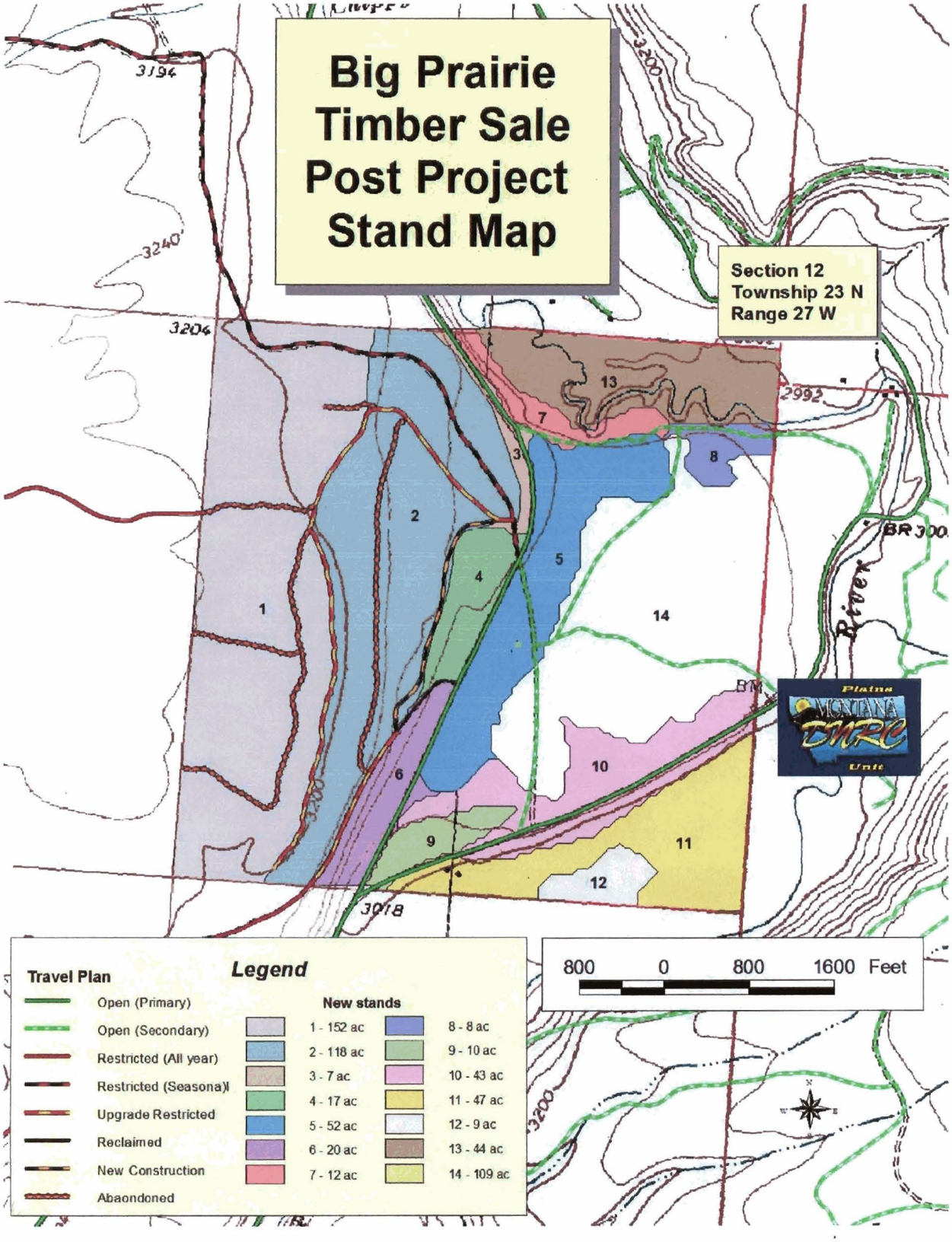
15
800 0 800 1600 Feet
Plains
MONTANA
DNRC
Unit
River


Big Prairie
Timber Sale
Post Project
Stand Map
Section 12
Township 23 N
Range 27 W
3194
3240
3204
3200
2992
BR 300
River
BM
Plains
MONTANA
DNRC
Unit
1
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3
4
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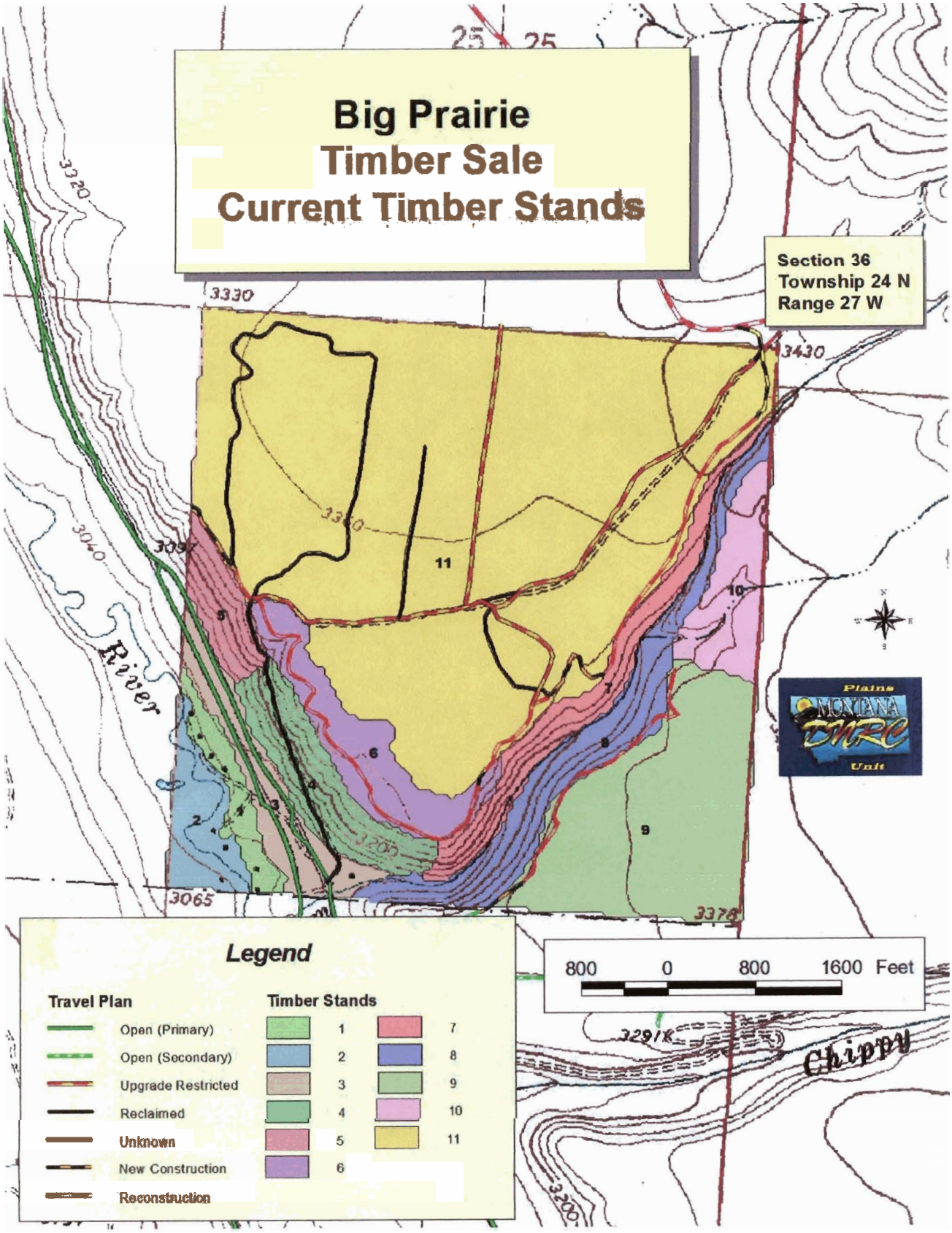
10
11
12
13
14
3018
Legend
Travel Plan
Open (Primary)
Open (Secondary)
Restricted (All year)
Restricted (Seasonal)
Upgrade Restricted
Reclaimed
New Construction
Abaondoned
New stands
1 - 152 ac
2 - 118 ac
3 - 7 ac
4 - 17 ac
5 - 52 ac
6 - 20 ac
7 - 12 ac
8 - 8 ac
9 - 10 ac
10 - 43 ac
11 - 47 ac
12 - 9 ac
13 - 44 ac
14 - 109 ac
800 0 800 1600 Feet


Big Prairie
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Current Timber Stands
Section 36
Township 24 N
Range 27 W
Plains
MONTANA DNRC
Unit
Legend
Travel Plan
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Open (Secondary)
Upgrade Restricted
Reclaimed
Unknown
New Construction
Reconstruction
Timber Stands
1
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3
4
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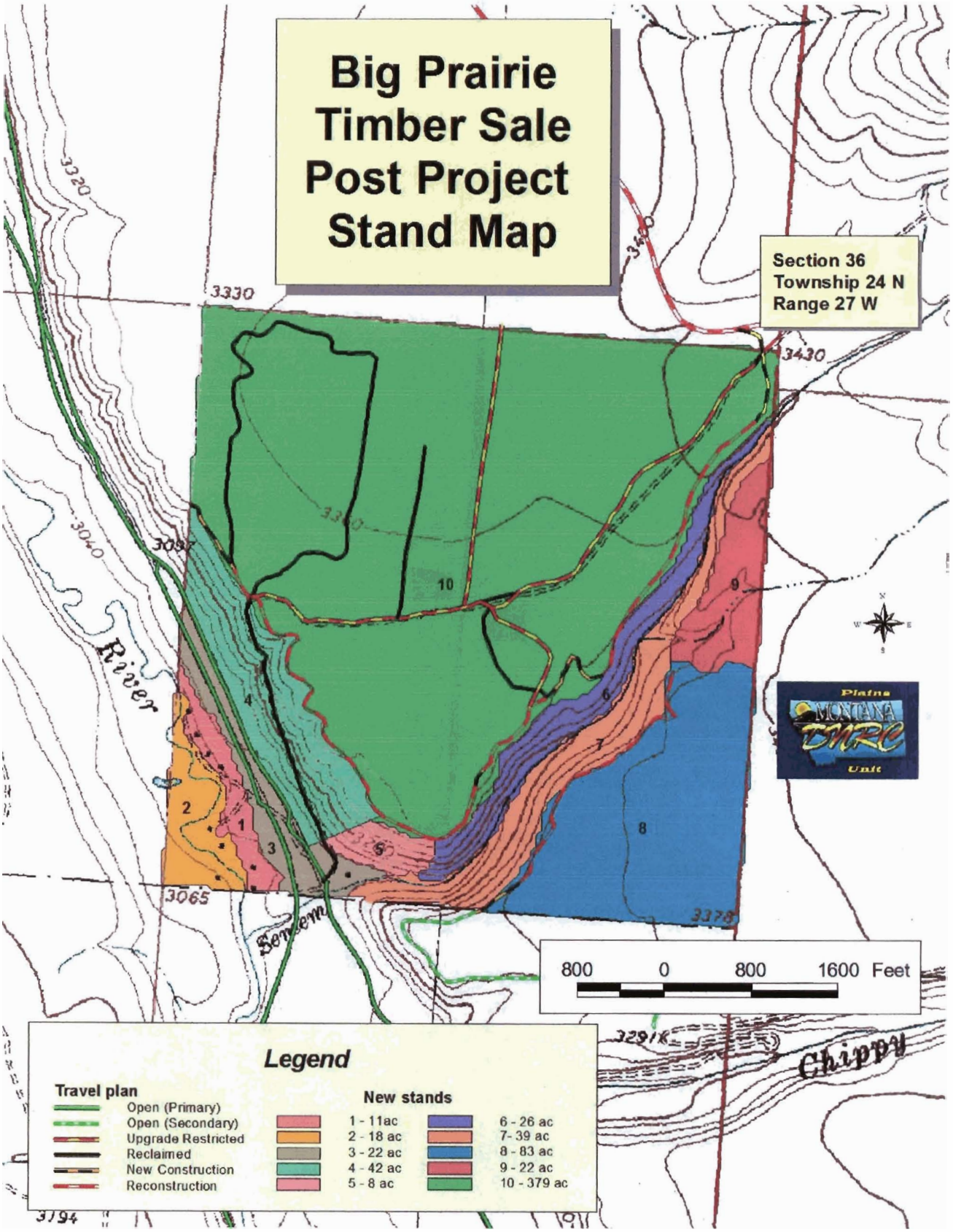
8
9
10
11
800 0 800 1600 Feet
Chippy
River


Big Prairie
Timber Sale
Post Project
Stand Map
Section 36
Township 24 N
Range 27 W
3320
3330
3340
3430
3040
3065
3378
3291K
River
Semem
Chippy
Plains
MONTANA
DNRC
Unit
800 0 800 1600 Feet
Legend
Travel plan
Open (Primary)
Open (Secondary)
Upgrade Restricted
Reclaimed
New Construction
Reconstruction
New stands
1 - 11ac
2 - 18 ac
3 - 22 ac
4 - 42 ac
5 - 8 ac
6 - 26 ac
7- 39 ac
8 - 83 ac
9 - 22 ac
10 - 379 ac

Attachment 2

Resource Analysis

Vegetation Analysis

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

- Concern regarding Old Growth timber in the area
- Concern regarding the large ponderosa pine trees in the vicinity of Big Prairie
- Concern regarding noxious weeds in the area
- Concern regarding the growth and vigor of the stands in question

Analysis Area
The analysis area for vegetation is the state sections (36 of T24N R27W and section 12 of T23N R27W) referred to as the Semem Creek and Big Prairie parcels, respectively. This analysis would adequately allow for the disclosure of existing conditions, direct, indirect, and cumulative impacts.

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

Existing Condition
Past and current events have changed the forest conditions on the proposed parcels involved in the project area from what would have been present historically according to Losensky's "Historical Vegetation of Montana" (1997). The area was historically characterized by frequent, low-intensity wildfires prior to the early 1900's. Since the early 1900's fire has been virtually excluded from the project area. Logging activities have occurred on all of the proposed area since the 1940's. Section records show the Big Prairie parcel has had two timber sales, removing 5,136 mbf in 1948-1950 and 730mbf in 1979. There has also been numerous small timber permits salvaging approximately 140 mbf of sawlogs between 1948 and 2002. The Semem Creek parcel has had one timber sale in 1948 that removed 6,500 mbf as well as numerous small timber permits totaling approximately 239 mbf between 1947 and 1990. See Attachment 3 "Prescriptions" for detailed descriptions of current vegetative conditions. The previous logging and fire suppression history of these parcels has led to stands that are of the appropriate timber types, but that have become overstocked and are not regenerating with appropriate species composition. Current and post harvest stand maps can be seen in Attachment 1, Maps.

All stands within the project area are beginning to show increases in fuel loading as advanced shade tolerant regeneration has become green ladder fuel. This type of fuel loading is occurring in parts of all stands within the project area, and totals over 30% of the acreage within the project area. There is also some mortality beginning to take hold

in both the overstocked understory and intermediate components of these stands. Overstory mortality due to bark beetles and other causes is also contributing to increased fuel loading. Older dead and down lodgepole pine is present in scattered areas throughout the project area. New mortality in approximately 2% of the overstory and 1% of the understory is a minor contributor to increased fuel loading.

There is a small component of noxious weeds present throughout the project area. Species include Spotted knapweed, Sulfur cinqefoil, and St. Johnswort. The noxious weeds are most prevalent along open roads and within stand openings.

Direct and Indirect Effects of Activities on Vegetation

No Action Alternative

No timber harvest or associated activities would occur under this alternative. Timber types would continue to advance towards climax conditions with shade tolerant Douglas-fir and grand fir continuing to thrive in the understory. Within the next 50 years, these species will have replaced the overstory Ponderosa pine and western larch. Growth and vigor of the trees present in the analysis area would continue to decline as competition for water and sunlight increases throughout time. Noxious weeds would continue to exist along the roads and move into the forested areas as natural disturbances prepare appropriate seedbeds. Because all roads and trails within the project area would remain open, there would be no control over illegal firewood removal.

Action Alternative

The proposed action alternative would harvest timber on approximately 791 acres. None of the proposed harvest areas are in old growth timber as defined by Green et al. The harvest would be focused on the removal of smaller, shade tolerant trees, along with those affected by or highly susceptible to insect and disease mortality. More detailed information for treatment by individual units can be obtained in Attachment 3, "Prescriptions". Obliteration of some access points as well as gated road closures would prevent the unauthorized removal of snags. Fuel loadings would be reduced by the removal of ladder fuels from the understory and intermediate components of these stands as well as crown spacing in the intermediate and overstory components. Growth and vigor of the remaining trees would increase because residual tree spacing would allow full light to crowns and more access to water. Noxious weeds would be monitored and addressed through an integrated pest management plan including chemical and biological control methods. Overall noxious weed infestations may increase slightly.

Cumulative Effects

No Action Alternative

Under this alternative, stand structure and species composition on State land across the Plains Unit are expected to continue the change towards more shade tolerant species. Fuel loading is also expected to increase.

Action Alternative

Across the Plains Unit, there would be no net change in the acres of appropriate cover types as no treatments proposed would alter the current type. The entire project area however, would be altered by increasing size class distribution and reducing stocking levels. This change would occur on 791 acres of the Plains unit total of 52,795. This results in a change to less than 1.5%.

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, issues were identified by the public regarding water quality. The following issue statements were expressed from internal and public 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 to streams and affect water quality.

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

Analysis Methods

Sediment Delivery

The methods applied to the project area to evaluate potential direct, indirect and cumulative effects include a site-specific inventory to look at potential sediment sources from haul routes. Roads and stream crossings 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 would 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* would be disclosed as a direct effect. The cumulative water yield increase as predicted to include each alternative would 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 area for water yield is the Semem Creek watershed. Additional harvest is proposed directly in the Thompson River Creek watershed, but due to the topography and the small scale of harvest proposed in relation to the watershed size the risk of potential impacts would be low. Therefore, water yield changes would be discussed qualitatively.

Cumulative Effects

The analysis for cumulative impacts, including sediment delivery and water yield, would be the Semem Creek watershed, which is a 4,064-acre watershed. This is an appropriate scale of analysis due to the size of the project versus the watershed size and the low potential for impacts. Additional harvest directly in the Thompson River watershed would be discussed qualitatively due to the small scale of harvest proposed in relation to the watershed size and the low risk of potential cumulative impacts.

Water Uses and Regulatory Framework

Water Quality Standards

This portion of the Clark Fork River basin, including the Thompson River 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

The Thompson River was listed as a water quality limited water body in the 1996 303(d) list. An assessment since 1996 has shown that the Thompson River fully meets all beneficial uses. Therefore the Thompson River is not listed in the 2002 303(d) list. 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 would 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 within and immediately downstream of the project area exist on Semem Creek and the Thompson River for stock watering, lawn and garden use, domestic water, industrial use and fire protection.

Existing Condition
The proposed Big Prairie/Semem Creek Timber Sale is located approximately 23 air miles northwest of Plains, Montana in Section 36 T24N, 27W and Section 12 T23N, R27W. The Big Prairie parcel (Section 12 T23N, R27W) is drained by the Thompson River and the Semem Creek parcel (Section 36 T24N, 27W) is partially within the Thompson River with the remaining portion within the Semem Creek watershed, a tributary of the Thompson River. Elevations in the project area range from 3000 feet in the Big Prairie parcel to 3400 feet in the Semem Creek parcel. Slopes within the parcels are generally less than 25% except for a small area in the Semem Creek parcel near the southwest corner and adjacent to Semem Creek. Annual precipitation is approximately 20 inches per year throughout both parcels.

The Semem Creek watershed is a 4,064-acre tributary to the Thompson River. Management of the drainage is mixed between US Forest Service (398 acres), Plum Creek Timber Company (3,293 acres), State of Montana (373 acres) and the remaining acreage owned by private non-industrial entities.

During field review, Semem Creek was inventoried for sediment sources in the main channel and in two first-order tributaries. Channel stability for Semem Creek and its tributaries was evaluated as good with no substantial sources of instream sediment.

The northeast corner of the Big Prairie parcel is crossed by the Thompson River, which is the only stream channel identified on this parcel. This portion of the Thompson River is considered to be a Rosgen type E6 channel (Butts, 1999). No instream sources of sediment were identified.

In addition to the in-stream sediment source inventories, roads within each section were inventoried for potential sediment sources. Due to the gentle grade of both sections and no stream crossings, sediment delivery potential to streams is limited, however the Semem Creek parcel has one road with approximately 10% grade and no drainage features installed. Although no evidence of delivery to streams from this road is visible, erosion has occurred in the wheel tracks.

Cumulative Effects
As required by ARM 36.11.423, a cumulative effects analysis for water yield has been completed. Timber harvest activities have been implemented on much of the land within the Semem Creek watershed, however stream inventory results indicate little or no

evidence of cumulative impacts from water yield increases. Water yield in the Semem Creek watershed was modeled using procedures described *Forest Hydrology, Part II* (Haupt et. al., 1976). The projected 2004 water yield increase is estimated at 11.6%. The threshold of concern is set at 15% after considering the watershed sensitivity; beneficial uses present and the acceptable level of risk as requied by ARM 36.11.424 (d)(iv).

Cumulative effects of water yield to the Thompson River were considered using data collecting during watershed inventories. According to the channel stability indicators and reassessment of beneficial uses by Montana Department of Environmental Quality, current cumulative impacts are acceptable to fully support all beneficial uses.

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 East 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 791 acres of timber harvest would be implemented in the Semem Creek and Thompson River watersheds. Associated activities include approximately:

1.01 miles of road construction,
3.25 miles of road reconstruction;
3.61 miles of drainage improvements;
4.28 miles of road reclaimation, and road abandonment.

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 791 acres of the state sections would be treated with a silviculture prescription. No timber harvest within streamside management zones (SMZ) or riparian management zones (RMZ) as described in ARM 36.11.403(85) 36.11.403(64), respectively. In addition, approximately 4.9 acres would be disturbed for road construction and 13 acres of existing roads and trails would be reclaimed or abandoned.

Due to the lack of streams on the Big Prairie parcel and gentle topography, 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.

Proposed timber harvest on the Semem Creek parcel is generally on gentle terrain with less than 10% slope except for *Unit 36-4*. With the gentle slopes and the soils present in Units 36-1, 36-2, and 36-3, it is unlikely that sediment would be routed to streams within the project area. Unit 36-4 would be located on slopes up to 65%. Since the closest point of this unit is greater than 400 feet from any perennial stream, two roads lie between the unit and the Thompson River, and the slope between the bottom of the unit and the Thompson River is less than 10%, it is unlikely that potential sediment generated from timber harvest would be routed to any waterbody.

Road drainage improvements (including reconstruction) would be implemented on approximately 6.9 miles of road to reduce the potential for sediment introduction from haul routes. While these roads are generally on terrain slopes less than 10% that limits sediment delivery potential, drainage improvements would further reduce the potential for sediment to be routed on roads.

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
Approximately 261 acres of timber harvest in the Semem Creek watershed would be implemented under this alternative. The timber harvest and road construction combined results in approximately 102 ECA in Semem Creek. Timber harvest and road construction activities would result in approximately a 1.0% increase in annual water yield for the Semem Creek watershed and would not likely result in measurable negative effects to instream sediment sources.

Approximately 530 acres of timber harvest would be implemented directly in the Thompson River watershed. The timber harvest and associated activities would result in approximately 291 ECA.

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 gentle topography of the proposed harvest units, the location of harvest units well away from streams and the harvest methods that would be employed 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 cumulative effects of sediment introduction into surface waterbodies would not likely occur.

Water Yield

No Action Alternative

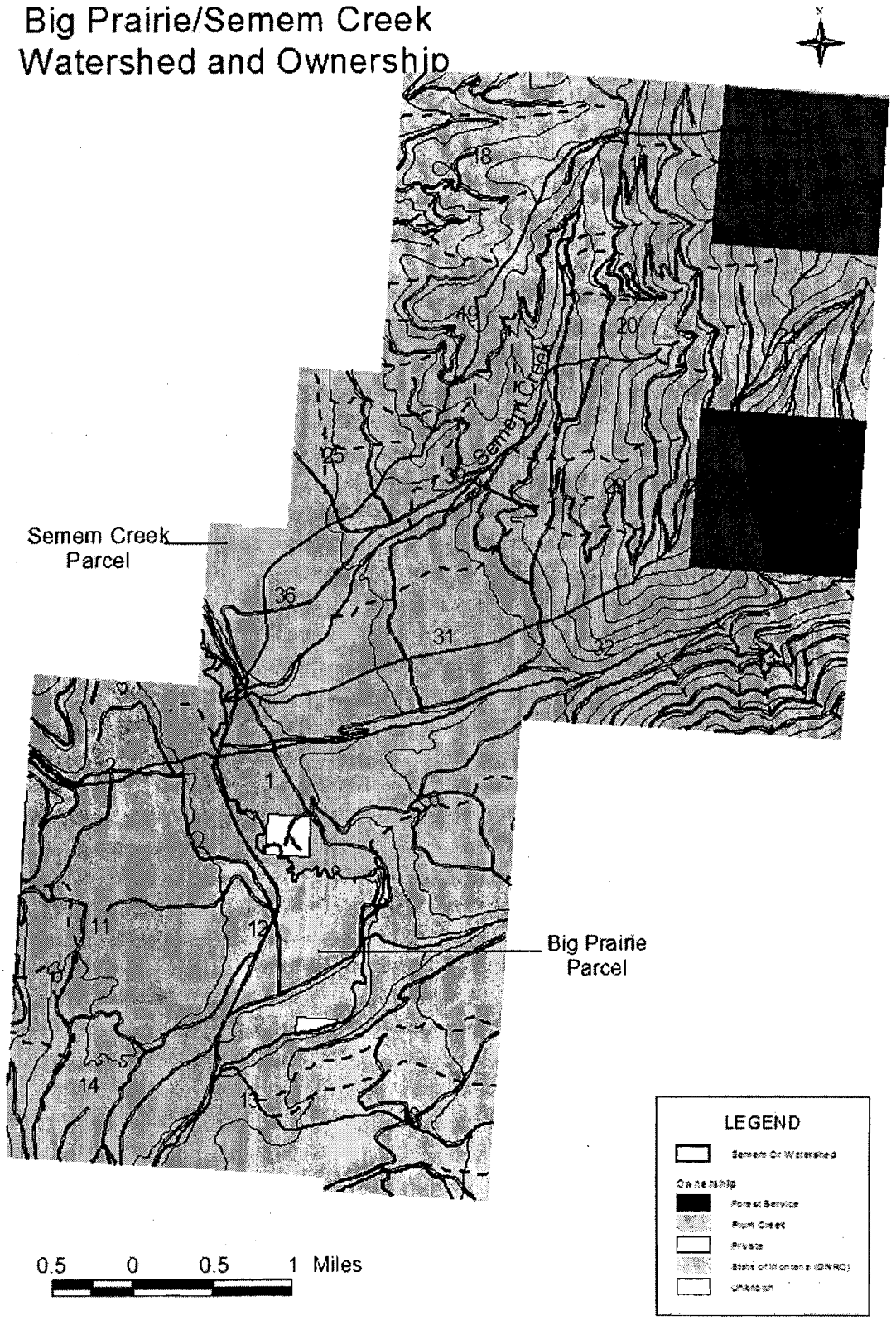
No timber harvest or road construction activities are proposed under this alternative; therefore no water yield increase would result from implementation of this alternative. Water yield would continue at or near the current level and would decline as past harvest units within the watershed regenerate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

Action Alternative

The cumulative annual water yield increase for Semem Creek from this alternative would be approximately 12.7% 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 15% annual water yield increase; this alternative would be within the recommended threshold and therefore would not likely result in adverse cumulative effects to beneficial uses.

Due to the size of the Thompson River in relation to the timber harvest activities in this alternative, it is unlikey that a measurable increase in water yield would occur. Adverse cumulative effects to channel stability and instream sediment sources would not likely result from the implementation of this alternative. Due to the limited increase expected, no further cumulative effects analysis on water yield was deemed appropriate.

Big Prairie/Semem Creek Watershed and Ownership



SOILS ANALYSIS

Introduction

This analysis is designed to disclose the existing condition of the soil resources and display the anticipated effects that may result from each alternative of this proposal. During the initial scoping, issues were developed by the public and internally regarding soil productivity. The following issue statement was expressed from these 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 sections (Section 36 T24N, 27W and Section 12 T23N, R27W) referred to as the Semem Creek and Big Prairie parcels, respectively. This analysis area would adequately allow for disclosure of existing conditions, direct, indirect and cumulative impacts.

Analysis Methods

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

Existing Conditions

Geology/Soils

Bedrock geology is mixed argillites and siltites that are well fractured. No especially unique or unstable geology was note in the project area. The soils in these two parcels vary in vegetation characteristics dependent upon slope, aspect and elevation.

Map unit **10** (See soils map, pp.49) consists of alluvial deposits and floodplain areas adjacent to streams and river. Terrain is typically of low relief with up to 10 % slopes and short steep banks. No timber harvest or associated activities are proposed in this landtype, therefore no further discussion is warranted.

Map unit **13** (See soils map, pp.49) is generally located on terraces above streams with slopes in the 0-10% range. These soils are well drained due to the very cobbly subsoils underlying gravelly sandy loam surface soils. Areas with lacustrine silts may be associated with this map unit in the southwest corner of the Big Prairie parcel. Because these soils are well drained, the season of operation is generally long with low to moderate potential for reduced productivity from compaction. Substantial soil displacement is generally limited due to the gentle slopes. Management implications include potential difficulty regenerating seedlings due to droughtiness. This unit is well suited to conventional tractor harvest methods.

Map unit **14**(See soils map, pp.49) is found on gently sloping terraces below mountainside slopes. Soils are generally deep and well-developed lacustrine silts over valley fill deposits with few coarse fragments, although rock outcrops may occur on short steep slope breaks. Volcanic ash surface soils are likely to occur in swales and low areas. Management implications include concerns for tree regeneration from grass competition and frost pockets. This map unit is well suited to conventional tractor harvest methods. Compaction can be severe if operated on during wet periods. Due to the lacustrine silts

and the limited coarse material in the upper soil layers, this unit has a shorter season of operation. Mitigation to reduce soil compaction and displacement include operating on dry, frozen or snow-covered conditions.

The map unit **30U** (See soils map, pp.49) 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. 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.

Map unit **60**(See soils map, pp.49) consists of steep mountain sideslopes which border on perennial streams. Slope shape is generally straight to slightly concave. Soils are well drained with low to moderate erosion potential due to the angular rock content. Management implications include concern over sediment delivery efficiency because of steep slopes. Rock outcrops and shallow bedrock may hinder road construction. This unit is not suited for conventional tractor harvest methods. Cable or helicopter yarding methods is recommended harvest methods.

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

1.01 miles of road construction,
3.25 miles of road reconstruction;
3.61 miles of drainage improvements;
4.28 miles of road reclaimation, and road abandonment.

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 unacceptable long-term impacts to soil productivity would be low.

Under the action alternative cable yarding is required on 42 acres of the 791 total harvest areas. The remaining 749 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	112
Cable[2]	0	4
Total (acres)	0	116
Total Harvest Acres	0	791
Percent Area Impacted	0	**14.6%**

[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 4.9 acres would be removed from production and converted to roads. Approximately 13 acres of existing roads and trails would be reclaimed and/or abandoned although it would take several years for the abandoned/reclaimed road and trail prisms to regenerate.

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.

Past auditing of BMPs has shown effectiveness of these practices ranging between 93 to 98% since 1992 on DNRC managed lands (DNRC, 2002).

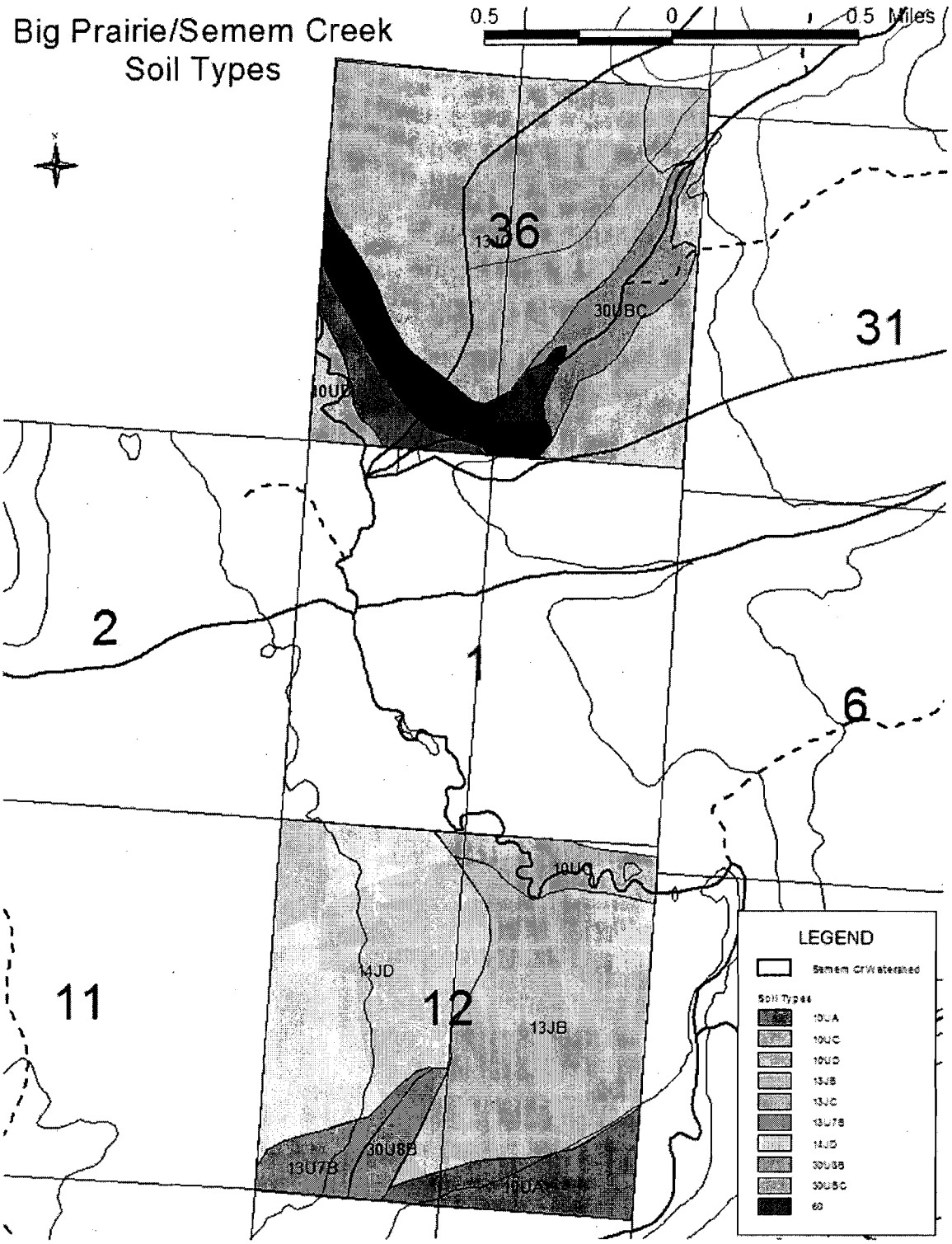
GENERAL MITIGATION MEASURES:
*Limit equipment operations to periods when soils are relatively dry, (less than 20%), frozen or snow covered to minimize soil compaction and rutting, and maintain drainage features. Check soil moisture conditions prior to equipment start-up.

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

*Tractor skidding should be limited to slopes less than 40%. 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 (ARM 36.11.410 and 36.11.414). 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.
Literature Cited:
DNRC, 2002. 2002 Forestry BMP Audit Report. Montana Department of Natural Resources and Conservation. Missoula, MT.


Big Prairie/Semem Creek
Soil Types
0.5
0
0.5 Miles
36
31
2
1
6
11
12
13JB
14JD
30UBC
30UBB
13U7B
LEGEND
Semem Cr Watershed
Soil Types

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.

Additional concerns were expressed by the public regarding woody debris recruitment, pool frequency, water temperature and dissolved oxygen levels. All of these fish habitat parameters are closely associated with woody debris recruitment and SMZ harvest. For instance, stream temperature would rely on shade to reduce solar heating of surface waters and dissolved oxygen is closely related to temperature in a stream environment. Pool frequency is tied to woody debris since pool formation is largely dependent upon woody debris recruitment. Since no harvesting in the SMZ is proposed for this timber sale, neither alternative would likely affect these parameters and therefore will not be further discussed.

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
During field review, no streams were identified in the Big Prairie parcel (Section 12 T23N, R27W) except for the Thompson River in the northeast corner of the section. The Semem Creek parcel (Section 36 T24N, 27W) as indicated by its name, has Semen Creek

running north to southwest through the parcel. In addition, the Thompson River cuts across the southwest corner of the section.

Information regarding existing fish populations in Semem Creek and the Thompson River near the project area is found on the Montana Rivers Information System (MRIS). According to this database, Semem Creek likely contains eastern brook trout, rainbow trout and westslope cutthroat trout although no surveys have been completed to verify the information. The Thompson River within the vicinity of the project area commonly has eastern brook trout, rainbow trout, mountain whitefish and slimy sculpins. Other species found in the Thompson River near the project area with lower abundance estimates include brown trout, bull trout (primarily migrating), largescale sucker, longnose dace, longnose sucker and westslope cutthroat trout. No genetic sampling has occurred to determine if the westslope cutthroat trout are pure strain but considering the presence and abundance of rainbow trout hybridized stock are likely.

Sediment delivery
As described the *Hydrology Analysis*, stream stability for Semem Creek and the Thompson River in the vicinity of the project area is considered good. No substantial sources of in-stream sediment were identified on either stream. Some small raw banks were identified at outcurves on the Thompson River within the Big Prairie parcel by Uncle Buds during stream inventories.

During the sediment source inventory, potential sediment sources to streams were explored on the proposed haul roads in both sections. No direct sediment sources were identified.

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 East 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 791 acres of timber harvest would be implemented in the Semem Creek and Thompson River watersheds. Associated activities include approximately:

1.01 miles of road construction,

3.25 miles of road reconstruction;
3.61 miles of drainage improvements;
4.28 miles of road reclamation, and road abandonment.

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, fish habitat and water quality would be dictated by natural events and future actions.

Action Alternative

Sediment Delivery

Approximately 791 acres of the state section would be treated with a silviculture prescription in the Semem Creek and Thompson River watershed. In addition, approximately 4.9 acres of would be disturbed for road construction.

No harvest or associated activities would occur near any perennial streams. The closest harvest to the Thompson River would be located well over 400 feet away. Harvest adjacent to Semem Creek would be at least 150 feet away on slopes less than 10%. With the location of harvest units away from perennial streams, the potential for sediment delivery to streams from harvest units is very low.

Road drainage improvements would be implemented on approximately 6.86 miles of road (including reconstruction) to reduce the potential for erosion from haul routes. Due to the location of roads on gentle slopes, the potential for sediment introduction to streams is very low.

The Thompson River would not likely show a measurable increase in water yield from the implementation of this alternative as described in the Hydrology Analysis. Water yield increases in the Semem Creek watershed would remain below the threshold of concern for unacceptable channel scour and subsequent sediment in channel 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 impacts to water quality and beneficial uses, including cold-water fisheries, would result from the harvesting and road construction.

Cumulative Effects

No Action Alternative

No timber harvest or road construction is associated with this alternative.

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 occur or result in negative cumulative effects to water quality and fish habitat.

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.

Wildlife Analysis

INTRODUCTION

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

In this section the discussions will focus on 2 areas of different scale. The first will be the "project area", which consists of section 12 (Big Prairie) in T23N R27W and section 36 (Semem Creek) in T24N, R27W. The second scale or the "analysis area" relates to the surrounding landscape for assessing cumulative effects (Figure W-1). The scale of this analysis area varies according to the species being discussed, but generally approximates the size of the home range of the discussed species. In the cumulative effects analysis area, prior and reasonably foreseeable future State actions, and existing conditions on adjacent ownerships were considered and discussed. Species were dismissed from further analysis if habitat did not exist in the project area or would not be modified by any alternative.

To assess the existing condition of the proposed project area and surrounding landscape, a variety of techniques were used. Field visits, scientific literature, SLI data, aerial photographs, Montana Natural Heritage Program data, and consultations with other professionals provided information for the following discussion and effects analysis. Specialized methodologies are discussed under the species in which they occur.

During the initial scooping the following issues were expressed regarding the effects of the proposed project:

- Timber harvesting activities may affect Threatened, Endangered, and sensitive wildlife species.
- Timber harvesting activities may affect diversity of wildlife species.
- Timber harvesting activities may affect habitat fragmentation.
- Timber harvesting activities may affect ungulate habitat.

EXISTING CONDITION

COARSE-FILTER ASSESSMENT

Overview

Of the 108 mammal species known for the state, 65 are suspected or known to occur in Sanders County (Foresman 2001). The majority of terrestrial vertebrates that were present at the time of European settlement likely still occur in the Thompson River drainage. This includes the large carnivores often displaced by human disturbance, such as grizzly bears (*Ursus arctos*) and gray wolves (*Canus lupus*). Eight amphibian and nine reptile species have also been documented in Sanders County (Maxell et al 2003). Terrestrial species that rely on special habitat elements, such as white bark pine (*Pinus albicaulis*), western white pine (*Pinus monticola*), or burned areas, may not be present or occur in lower abundance due to the decline of these elements across the landscape.

Wildlife in the Thompson River drainage benefits from the mosaic of land ownership that is present within the drainage. On parcels managed by the Lolo National Forest, the forests are relatively undisturbed and benefit species relying on mature forests. Elsewhere, private industrial forests have been intensively harvested, benefiting wildlife species that use early seral stages either exclusively or seasonally.

Human activity, generally camping, fishing, and hunting, ranges from high along the Thompson River and main artery roads to low or moderate along the higher elevations. Dispersed and locally concentrated recreation combined with timber harvesting, are the primary human activities that, directly and indirectly, affect wildlife.

Timber Harvesting

Timber-harvesting activities have occurred within the Thompson River drainage for several decades. Early timber harvesting concentrated mainly on large seral tree species, such as western white pine, western larch *(Larix occidentalis)*, and ponderosa pine (*Pinus ponderosa*). Harvesting more recently has focused on these species as well as Douglas-fir *(Pseudotsuga menziesii)*, grand fir *(Abies grandis)*, and lodgepole pine (*Pinus contorta*). Snag retention and recruitment have been recently considered when managing on state and USFS parcels, but private management has not placed a large emphasis on these habitat attributes.

Other Timber Harvest Projects Under Contract

State timber sale projects in progress in the Thompson River drainage include:

The Richard's Peak Timber Sale Project, located in Sections 4 and 16, T24N, R27W, is 3 miles northwest of the proposed Big Prairie/Semem Creek Timber Sale Project. This project would harvest 408 acres of mixed conifers, lodgepole pine, and subalpine fir. Expected impacts to wildlife include reductions in pileated woodpecker habitat and big game hiding cover.

The Fishtrap Timber Sale Project is 2 miles west of the proposed Big Prairie/Semem Creek Timber Sale Project area in Section 16, T23N, R27W. This project harvested approximately 362 acres. Expected impacts to wildlife include reductions in pileated

woodpecker habitat and big game thermal and hiding cover. This project should be completed in the spring of 2004.

Influence of Fire

Historically, wildfire was the primary disturbance factor shaping the stands in the proposed project area and substantial portions of the forested communities in this area (Losensky 1997). Forested patches on the landscape were likely a mosaic of stands that established following a number of disturbances of varied type, intensity, and magnitude. Frequent fire return intervals (5-25 years) reduced encroaching Douglas-fir and maintained western larch and ponderosa pine stands in more open, park-like conditions with fire-resistant mature trees and small patches of even-aged regeneration. Reduction in natural fire frequency and severity through fire suppression in the last 100 years has led to denser stands with a higher proportion of stagnated shade-tolerant tree species, like Douglas-fir.

Fire-associated species such as the black-backed woodpecker (*Picoides arcticus*) are probably less abundant on the landscape currently than would typically have been expected under natural fire regimes, and species preferring dense coniferous in-growth of shade tolerant tree species (such as Douglas-fir and grand fir) under mature forest canopy likely benefited. Shrub amounts and distribution important for many wildlife species have also been influenced by fire-suppression activities during the past half-century. However, the effects of the departure from historic shrub conditions are unclear because past logging has created favorable conditions for shrub growth in some instances.

Stand-Age and Covertype Characteristics

The proposed project area currently contains 1026 acres of mature stands (100 to 149 years old) and 92 acres of old stands (more than 150 years old), with overstory canopy closure of at least 40 percent. Currently these stands are largely ponderosa pine, western larch/Douglas-fir, and mixed-conifer cover types. The Plains unit has fewer acres in the seedling/sapling class (0 to 39 years old) and old stands (150+ years) and more acres in the intermediate age classes (40-99 years old and 100-149 years old) than were historically present. Modern fire suppression has led to an increase in shade-tolerant mixed-conifer stands, while the amount of ponderosa pine and western larch/Douglas-fir types has been reduced. Mature and old stands are essential habitat for wildlife species associated with the late seral stages of forest-stand development for all or some life requirements. A partial list of these species includes pileated woodpeckers (*Dryocopus pileatus)*, American marten (*Martes americana*), brown creepers (*Certhia americana)*, and winter wren (*Troglodytes troglodytes*).

Patch Characteristics and Connectivity

Wildlife species that require connectivity of forest habitat types between patches or those species that are dependent upon interior forest conditions can be sensitive to the amount and spatial configuration of appropriate habitats. Therefore, patch size and juxtaposition can influence habitat quality and population dynamics for some species. Some species are adapted to thrive near patch edges, while others are adversely affected by the presence of edge or the presence of other animals that prosper in edge habitats. Connectivity under historical fire regimes (Losensky 1997) likely remained relatively

high as fire differentially burned various habitats across the landscape. Connectivity within the Thompson River drainage has largely been altered with ongoing timber harvesting; streamside management retention buffers do not provide adequate cover for a myriad of species requiring forested travel corridors across the landscape. Large patches of similar aged forests do, however, exist within the Thompson River drainage providing movement corridors for some wildlife species as these stands develop. The network of open roads through the valley has reduced some of the landscape-level connectivity. Historically, patch sizes within the Thompson River drainage were likely rather large following mixed-severity and stand-replacing fires.

COARSE FILTER ENVIRONMENTAL EFFECTS

Direct and Indirect Effects

- Direct and Indirect Effects of No-Action Alternative A

  Under No-Action Alternative A, forest conditions would continue to move toward denser stands of shade-tolerant tree species with high canopy cover. No immediate changes are anticipated in the patch size, shape, or connectivity. Over time, shade-intolerant tree species in the proposed units would die, and dense shade-tolerant species in the midstory would prevent replacement of shade-intolerant species. A stagnated, dense stand of Douglas-fir and grand fir would likely result. Under this alternative, no changes in diversity of wildlife species are expected; wildlife favoring dense stands of shade-tolerant tree species would benefit, while those requiring conditions likely found under natural disturbance regimes would continue to be underrepresented. Habitat for forested interior species and old-stand – associated species, such as the American marten, northern goshawk, and pileated woodpecker, would likely improve with this alternative, however western larch and ponderosa pine (preferred snag species) would decline in abundance over time

- Direct and Indirect Effects of Action Alternative B

  Under Action Alternative B, approximately 791 acres of forest canopy would be opened up to varying degrees. Additionally, shade-intolerant trees would be preferentially retained, while shade-tolerant Douglas-fir and grand-fir would be removed in harvest units along with some lodgepole pine. These conditions would lead to more-open stands of mature ponderosa pine and western larch. Based on silvicultural prescriptions, the regeneration of shade-intolerant trees would be expected. Proposed treatments would reduce ponderosa pine encroaching upon the natural grassland in the Big Prairie section, maintaining this opening. The more open stands expected under this alternative could interrupt movement by species requiring extensive, connected forested habitats, however appreciable use of the state sections by these species is not presently expected. A slight increase in edge habitats is likely under this alternative, which would benefit those species using these habitats, while negatively impacting those that require forested interior habitats. The expected open, stands of mature shade-intolerant species on approximately 791 acres would emulate historic fire events and move the

Plains unit closer to perceived historical conditions (Losensky 1997). This change would likely reduce habitats for species associated with old stands, such as American marten and pileated woodpeckers, which benefited from the increasing stand ages due to modern fire suppression. In general, under this alternative habitat conditions would improve for species adapted to more open forest condition, while declining for species that that prefer dense, mature forest conditions.

Cumulative Effects

- Cumulative Effects of No-Action Alternative A

Under this alternative, the existing habitats within the proposed project area would continue to provide habitat for wildlife species requiring denser stands with an increasingly closed canopy. Stands on adjacent private ownership are largely younger stands, while stands on adjacent state ownership are a mosaic of age classes that are skewed toward the mature classes. Adjacent harvested stands emulated stand-replacing and mixed severity fire regimes, providing earlier seral habitats. Edge habitats between these earlier harvested stands and the state parcels would continue to exist. This alternative would cause neither changes in the amount of fragmentation nor changes in patch size and configuration. Habitats for forested interior and old-stand-associated species would still be largely absent from the analysis area.

- Cumulative Effects of Action Alternative B

This alternative would open stands up and decrease the amount of mature habitat in the analysis area. Edge habitats exist to a degree along the boundaries of state parcels and around the natural grassland. The proposed harvest would blend with adjacent, recently harvested parcels, increasing patch size of younger stands within the analysis area. Some wildlife species would benefit from this increase in edge and juxtaposition of different cover types, while, for other species, disturbance would limit available habitat. Under this alternative, no changes in diversity of wildlife species are expected. Within the analysis area, those species benefiting from edge habitats and earlier seral stage habitats have benefited at the expense of those species requiring contiguous stands of mature timber; the proposed activities associated with this alternative will be additive to past activities increasing amounts of edge habitats and early seral habitats, which were likely more typical on these sites under average historic conditions. Landscape connectivity has largely been compromised within the analysis area, and no appreciable change is expected with this alternative. A reduction in amount of forested cover may interrupt movement by species requiring contiguous forests, but since these species are not expected to appreciably use the state sections presently, the effects would be minor. Although, the reduction of approximately 791 acres of potential habitat for old-stand-associated species would be additive to the past losses of most of the habitat within the analysis area, it is unlikely that the state sections alone could sustain populations of any of these species alone in the analysis area.

Special Habitats

Approximately 1.2 miles of perennial streams are within the proposed project area. In western Montana, 85% of all bird species use riparian areas, which comprise 1% of the land. Half of those bird species, or 40-45% of all birds, are restricted to riparian areas for breeding purposes (Mosconi and Hutto, 1982). A mosaic of deciduous shrub lands exists along the Thompson River within the proposed project area. In addition to permanent water such as lakes, rivers, and other riparian areas, vernal pools and other seasonal wetlands are important for many of Montana's amphibians. Vernal pools and other seasonal wetlands were not encountered during field visits. No avalanche chutes, rock outcrops, or cliffs exist in the project or analysis areas.

Direct and Indirect Effects

- Direct and Indirect Effects of No-Action Alternative A on Special Habitats

  The riparian plant communities along approximately 1.2 miles of perennial streams and 0.25 miles of intermittent streams within the proposed project area would not be affected by this alternative. Streamside areas would continue to persist and move toward more shade-tolerant conifer species, such as grand fir and Engelmann spruce (*Picea engelmannii*). Deciduous wet shrub lands associated with the Thompson River would remain unaffected. Therefore, the wildlife species presently using these riparian areas and other special habitats would not be affected under this alternative.

- Direct and Indirect Effects of Action Alternative B on Special Habitats

  Proposed harvest units would avoid riparian areas, protecting the riparian plant communities. Within the proposed project area, approximately 106 acres of the unharvested forest riparian buffers would continue to move toward the more shade-tolerant conifer species (grand fir and Engelmann spruce). Deciduous wet shrub lands along riparian corridors would not be affected by this alternative. Therefore, the wildlife species associated with these riparian areas would not be affected under this alternative.

Cumulative Effects

Since this project would not affect riparian communities and other special habitats, no cumulative effects would be expected for either alternative.

FINE-FILTER ASSESSMENT

In the fine-filter analysis, individual species that are recognized to be of special concern are evaluated. These species are addressed below and include Federally "threatened" or "endangered" species, species listed as "sensitive" by DNRC, and species managed as "big game" by DFWP.

Threatened and Endangered Species

In northwestern Montana, the bald eagle, grizzly bear, gray wolf, and Canada lynx are classified as "Threatened" under the Endangered Species Act of 1973. No terrestrial species listed as "Endangered" under the Endangered Species Act are found in northwestern Montana.

- **Bald eagle *(Haliaeetus leucocephalus)***

Issue: *There is concern that timber harvesting could reduce bald eagle nesting and perching habitats and/or disturb nesting bald eagles.*

Existing Environment

Strategies to protect the bald eagle are outlined in the Pacific States Bald Eagle Recovery Plan (United States Fish and Wildlife Service [USFWS] 1986) and the Montana Bald Eagle Management Plan (Montana Bald Eagle Working Group 1994). Management direction involves identifying and protecting nesting, feeding, perching, roosting, and wintering/migration areas (USFWS 1986, Montana Bald Eagle Working Group 1994).

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

No eagle nests are located in the proposed project area. The nearest bald eagle nest occurs approximately 13 air miles east on Upper Dry Fork Reservoir. The Thompson River runs through the southeastern corner of the Big Prairie section and the southwestern corner of the Semem section. Bald eagles have been documented along the Thompson River, however not within the vicinity of the project area. Occasional use of the proposed project area by foraging bald eagles might occur, especially during the winter when eagles are more dependent upon big game carrion. Overall, habitats found within the state parcel and surrounding vicinity have low to moderate inherent values for bald eagles. No localized or cumulative effects that would positively or negatively influence bald eagles would be expected to occur as a result of either alternative. Therefore, this species will not be considered further in this analysis.

Mitigation Measure Included:

- Cease all operations and consult with a DNRC biologist for further mitigations should an eagle nest be observed within 1 mile of any project-related activities.

- **Grizzly bear (*Ursus arctos*)**

Issue: There is concern that timber harvesting and associated activities could displace grizzly bears from important habitats and/or reduce hiding cover and visual screening, reducing security for grizzly bears.

Existing Environment

Grizzly bears are wide-ranging mammals that use forested upland habitats. Preferred grizzly bear habitats are meadows, riparian zones, avalanche chutes, subalpine forests, and big game winter ranges, all of which provide seasonal food sources. The proposed project area is approximately 5 miles east of the Mt. Headley Bear Management Unit in the Cabinet/Yaak Recovery Zone (USFWS 1993), and there have been no documented observations of grizzly bears in the general vicinity of the proposed project area (D. Wrobleski, USFS, pers. comm. September 2003). Grizzly bears could, however, show up in the proposed project area at any time. The proposed project area presently has approximately 4.6 miles (Semem Creek section 1.94 miles/sq. mile, Big Prairie section 2.62 miles/sq. mile) of open roads bisecting the 2 sections.

Managing human access is a major factor in management for grizzly bear habitat. DNRC is committed to designing projects to result in no net increase in amount of area with an open-road density of 1 mile per square mile (ARM 36.11.433). Extensive grizzly bear use of the proposed project area is unlikely given the elevated levels of human disturbance and vehicular traffic coupled with marginal grizzly bear habitat values that exist.

Cumulative effects were analyzed using a combination of field evaluations and aerial photograph interpretation on a 165,000-acre polygon adjacent to the Mount Headley Bear Management Unit that was similar in size to that BMU. The analysis area is largely privately managed (116,000 acres) with some USFS (28,000 acres) and DNRC (21,000 acres) managed parcels. Factors considered within this analysis area include level of human disturbance, availability of hiding cover, and miles of open roads.

Direct and Indirect Effects

- Direct and Indirect Effects of No-Action Alternative A on Grizzly Bears

  No direct effects to grizzly bears would be expected. Risk of disturbance to grizzly bears using the proposed project area for any type of life requirement would be lowest under this alternative. Foraging opportunities may decline due to the lack of diversity in habitat such as forest edge and younger age-class stands. No changes in open-road densities or hiding cover are anticipated.

- Direct and Indirect Effects of Action Alternative B on Grizzly Bears

  This project may affect grizzly bears directly through increased road traffic, noise, and human activity, and indirectly by altering the amount of hiding cover and forage resources, should they occur in the area. Under this alternative,

long-term open road densities (simple linear calculation) would decrease from 1.94 miles/sq. mile to 0.34 miles/sq. mile on the Semem Creek section and from 2.62 miles/sq. mile to 1.40 miles/sq. mile on the Big Prairie section under this alternative. These declines would benefit grizzly bears should they start using the proposed project area. Hiding cover will decline within the proposed harvest units in the short-term, but would improve with time as shrub and tree regeneration proceeds. Again extensive grizzly bear use of the state sections is unlikely, so the effects to grizzly bears is expected to be minor.

Cumulative Effects

- Cumulative Effects of No-Action Alternative A on Grizzly Bears

  Since no effects to grizzly bears were anticipated, then no cumulative effects are expected. Motorized access to the area, security cover, and hiding cover would all remain unchanged. Very little permanent development exists within the analysis area, and outside of timber harvesting and dispersed recreation, levels of human disturbance are relatively low and are expected continue at these levels. In the long term, forest succession would continue and may reduce food sources, but may increase the amount of hiding cover.

- Cumulative Effects of Action Alternative B on Grizzly Bears

  Since the effects to grizzly bears were minor, cumulative effects are also expected to be minor. The increased use of road systems during all of the proposed and active projects, including those on private industrial lands, may temporarily increase human disturbance to grizzly bears within the Thompson River drainage, should they occur there. Long-term open-road densities would decrease in the vicinity of the proposed project, however within the scale of the analysis area this decline of 1.41 miles/sq. mile would be negligible. Little permanent human development exists within the analysis area, and no changes in the amount of development are anticipated under this alternative. Reductions in hiding cover would be additive to the reductions due to past timber harvesting in the analysis area; however, considerable hiding cover exists within the analysis area. Early successional stages of vegetation occurring in harvest units would provide foraging opportunities that do not exist in some mature stands.

Mitigation Measures Included:

- Close open roads as well as skid trails generated during proposed activities to reduce the potential for unauthorized motor vehicle use.
- Using a combination of topography, group retention, and roadside vegetation buffers, reduce views into harvest units along open roads.
- Retain hiding cover along the prominent riparian areas within the proposed project area.

➢ **Gray Wolf (*Canus lupus*)**

Issue: There is concern that timber harvesting could displace gray wolves from important habitat, particularly denning and rendezvous sites and/or alter prey availability.

Existing Environment

The Northern Rocky Mountain Wolf Recovery Plan defines 3 recovery areas for the gray wolf (USFWS 1987). The proposed project area falls within the Northwest Montana Wolf Recovery Area.

The wolf is a wide-ranging species whose habitat contains adequate vulnerable prey and minimal human disturbance. Primary prey species in northwestern Montana are white-tailed deer (*Odocoileus virginianus*), elk (*Cervus elaphus*), moose (*Alces alces*), and mule deer (*Odocoileus hemionus*). The distribution of wolves is strongly associated with the white-tailed deer winter range.

Typically, wolves in Montana den in late April. Wolves are most vulnerable to human disturbance at den and rendezvous sites. Wolves choose elevated areas in gentle terrain near a water source (valley bottoms), close to meadows or other openings, and near big game wintering areas for dens and rendezvous sites. Many of these attributes are found within the proposed project area.

Another important component of wolf habitat is secure habitat away from open roads. Roads can increase mortality risk due to automobile collisions or illegal harvesting. The county road, a major private road (ACM road), and several smaller spur roads provide access to the area. Other roads in the project area are restricted for administrative use by gates or berms.

Wolves have been documented in the vicinity of the proposed project area. The Fishtrap pack has used lands managed by DNRC, USFS, and Plum Creek Timber Company in and around the proposed project area (T. Meier, USFWS, personal communication, March 2003). Reproduction in the Fishtrap pack was documented in 2002 (USFWS et al. 2003). Additionally, the Lonepine pack has also been located within the vicinity of the proposed project area in the recent past (T. Meier, USFWS, personal communication, March 2003). Wolves likely use the vicinity of the proposed project area for hunting, breeding, and other life requirements.

Cumulative effects were analyzed using field evaluation and aerial photograph interpretation on the 284,000-acre polygon that the Fishtrap pack used in 2002. Within this area, extensive winter ranges exist, as well as numerous meadows and other openings near water and in gentle terrain. The analysis area is largely split between private and public ownership with approximately 148,000 acres managed privately, 114,000 acres managed by the USFS, and 22,000 acres managed by DNRC. Factors considered within this analysis area include level of human disturbance and prey availability.

Direct and Indirect Effects

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

Disturbance to wolves would not increase. Forest canopy closure would continue to decrease big game forage, while slightly improving thermal cover in the area. No changes in white-tailed deer habitat are expected during the short-term therefore no changes in wolf prey are anticipated. Wolf use of the proposed project area would be expected to continue at current levels.

- Direct and Indirect Effects of Action Alternative B on Gray Wolves

  Wolves using the area could be disturbed by proposed harvesting activities. After harvesting activities, wolf use of the proposed project area would likely revert to preharvest levels. In the short term, the proposed harvest units are expected to lead to a decrease in winter thermal cover and an increase in big game forage. The reduction in winter thermal cover could result in local decreases in abundance during the winter months, which could alter wolf use of the proposed project area.

Cumulative Effects

- Cumulative Effects of No-Action Alternative A on Gray Wolves

  Under this alternative, white-tailed deer winter range would not be affected, and substantive change in white-tailed deer population, distribution, or habitat use is not anticipated. Levels of human disturbance are expected to remain similar to present levels. Shifts in white-tailed deer use within the pack cumulative effects area associated with timber harvesting may alter the availability of wolf prey, but appreciable changes are not anticipated. Within the pack cumulative effects area, the state Land Board has approved the Richard's Peak timber sale also in T24N R27W and anticipated activities could disrupt wolf activity in the pack analysis area. The DNRC is also proposing the North Meadows timber sale in T25N R27W to the north of the Richard's Peak project.

- Cumulative Effects of Action Alternative B on Gray Wolves

  Since the expected effects of this project on wolves would be minor, cumulative effects would also be minor. Reductions in cover associated with the proposed project might cause slight decreases in use by deer and elk within the proposed project area, however no appreciable changes are expected within the analysis area. Within the pack cumulative effects area, the state Land Board has approved the Richard's Peak timber sale also in T24N R27W and DNRC is proposing the North Meadows timber sale in T25N R27W. Temporal alteration of habitat for deer and wolves caused by proposed activities would be additive to the effects of these other sales and ongoing timber harvesting on adjacent Plum Creek Timber Company lands. These reductions in cover should still only be minor to the Fishtrap wolf pack due to low- to moderate-human-disturbance levels experienced in this vicinity. Human-disturbance levels are expected to revert to levels similar to current levels after the proposed harvesting is completed. Since appreciable changes in neither human disturbance nor wolf prey populations are expected, no substantive change in wolf use within the analysis area would be expected.

Mitigation Measures Included

- Suspend operations and temporarily restrict use of roads within a 1-mile radius of any known active wolf den.
- Suspend operations and consult a DNRC biologist if a suspected rendezvous site is observed within 0.5 mile of any ongoing project activities.
- Close unnecessary roads and skid trails after the proposed activities to reduce the potential for motor vehicle disturbance.
- Use a combination of topography, group retention, and roadside vegetation to reduce views into harvest units along open roads.

➢ **Canada Lynx (*Lynx canadensis*):**

Issue: *There is concern that timber harvesting could remove lynx habitat and/or prevent lynx movement through the area.*

Existing Environment

Canada lynx are associated with subalpine fir forests generally between 4,000 to 7,000 feet in elevation in western Montana (Ruediger et al. 2000). The proposed project area ranges from approximately 3,000 to 3,400 feet in elevation and is dominated by Douglas-fir/western larch and ponderosa pine cover types. Primary lynx habitats are subalpine-fir types with abundant coarse woody debris for denning; however, lynx will use a mix of species compositions (subalpine fir [*Abies lasiocarpa*], lodgepole pine, Douglas-fir, grand fir, and western larch). Lynx generally forage in young coniferous forests with plentiful snowshoe hares. Mature, densely forested cover facilitates movement and provides habitats for red squirrels, which are an alternative prey source for lynx.

The proposed project area exists below elevations where lynx are typically documented and contains neither subalpine fir nor younger areas for foraging. Since neither alternative is expected to affect Canada lynx, this species will not be considered further in the analysis.

Sensitive Species

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

A search of the Montana Natural Heritage Database documented no sensitive animal species occurrence records in the proposed project area or within 1 mile. TABLE W-1 shows how each sensitive species was either included in the following analysis or was removed from further analysis due to habitat availability.

TABLE W-1 – LISTED SENSITIVE SPECIES FOR THE NWLO SHOWING THE STATUS OF THESE SPECIES IN RELATION TO THIS PROPOSED PROJECT

SPECIES	DETERMINATION – BASIS
Black-backed woodpecker	No further analysis conducted – No recently (less than 5 years) burned areas are in the project area.
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 suitable lake habitats occur within the project area.
Fisher	**Included** – Potential fisher denning habitat occurs in the proposed project area.
Flammulated owl	**Included** – Suitable dry ponderosa pine habitats occur within the project area.
Harlequin duck	No further analysis conducted – No suitable high-gradient stream or river habitats occur in the project area.
Northern bog lemming	No further analysis conducted – No suitable sphagnum bogs or fens occur in the project area.
Peregrine falcon	No further analysis conducted – No suitable cliffs/rock outcrops occur in the project area.
Pileated woodpecker	**Included** – Western larch/Douglas-fir, and limited Ponderosa pine habitats occur in the project area.
Townsend's big-eared bat	No further analysis conducted – No suitable caves or mine tunnels occur in the project area.

Sensitive species assessed:

- **Fisher *(Martes pennanti)***

Issue: *There is concern that timber harvesting could remove fisher habitat and/or introduce disturbance that would be detrimental to fishers.*

Existing Environment

The fisher is a medium-sized mammal belonging to the weasel family that uses mature and late-successional habitats. Forest-management considerations for fisher involve providing for resting and denning habitats near riparian areas while maintaining travel corridors. Fishers are generalist predators and use a variety of habitat types, but are disproportionately found in stands with dense canopies. In the Rocky Mountains, fishers appear to prefer late-successional coniferous forests for resting sites and tend to use areas within 150 feet of water more than their availability on the landscape (Jones 1991). 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 (Jones 1991). Modeling the above conditions using SLI data generated an estimate of fisher resting and denning habitat (Heinemeyer and Jones 1994).

The proposed project area ranges from 3,200 to 3,400 feet in elevation, with one perennial stream (Semem Creek) and the Thompson River. No appreciable fisher habitat was identified within the Big Prairie section and approximately 39.5 acres of mature, riparian forest along the 1.2 miles of Semem Creek in the Semem Creek section were identified as potential fisher foraging habitat. Uplands are largely warm, dry ponderosa pine western larch/Douglas-fir types, which are not typically suitable fisher habitats.

Trapping is a significant source of fisher mortality. Fishers are easily caught in traps set for martens, bobcats, and coyotes (Powell and Zielinski 1994), and trapping density is generally tied to road density. Currently, open roads traverse much of the project area, however the only source of potential human disturbance and trapping pressure within this potential foraging area in the riparian buffer is the county road where it crosses the creek near the south section line. Otherwise this riparian area is free of roads; human disturbance and potential trapping mortality are expected to be fairly low within this portion of the section.

Cumulative effects were analyzed on surrounding 13 sections (approx 8,401 acres), including lands managed by DNRC and the Plum Creek Timber Company (Figure W-1), using field evaluations and aerial photograph interpretation. Factors considered within the analysis area include the level of human disturbance and harvesting and connectivity along riparian habitats.

Direct and Indirect Effects

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

  No effects to fishers would be expected under this alternative. Little change to the stands providing fisher foraging habitat would be expected. Habitats that are conducive to fisher travel may improve due to increased tree growth and canopy closure; however, foraging opportunities may gradually decline with the reduction in habitat diversity components such as edge and younger age-class stands. Human disturbance and potential trapping mortality risk would expect to remain similar to current levels.

- Direct and Indirect Effects of Action Alternative B on Fishers

  Under this action alternative, riparian habitats along the perennial stream in the proposed project area would largely be unaffected. Along Semem Creek, approximately 106 acres of mature forest exist that are not being proposed for treatment. Harvesting would remove approximately 0.5 acre of the 39.5 acres of potential fisher foraging habitat within the Semem Creek section. Fisher resting habitat might also be slightly reduced due to the proposed overstory removal on the uplands adjacent to the riparian areas; but, again, most of the harvesting would avoid habitats typically preferred by fishers.

Cumulative Effects

- Cumulative Effects of No-Action Alternative A on Fishers

  Under No-Action Alternative A, fisher foraging and resting habitats would be retained. Suitable fisher habitat appears limited within the analysis area based. Uplands within the analysis area are largely drier ponderosa pine and western larch/Douglas-fir types that are not typical fisher habitats. Furthermore, extensive areas within the analysis area have been harvested in the last 30 years, reducing the potential of fisher use. Landscape connectivity within riparian areas is limited, and although forested corridors exists, many are likely too small to facilitate appreciable fisher movement. Road access within the analysis area would not be changed after implementation of this alternative; therefore, fisher vulnerability to trapping would remain unchanged.

- Cumulative Effects of Action Alternative B on Fishers

  Under this alternative, a limited amount of fisher foraging habitats (0.5 acres) would be harvested within the proposed units. This loss is additive to the loss from harvesting within riparian areas elsewhere in the analysis area. Landscape connectivity within the analysis area is limited and appreciable fisher movement would still be unlikely given levels of harvest along riparian areas. Human disturbance and potential trapping mortality will remain relatively unchanged since no appreciable changes in access to fisher habitats within the analysis area will be realized with the road closures.

Mitigation Measures Included:

- Close roads and skid trails opened with the proposed activities to reduce the potential for unauthorized motor vehicle use.
- Retain vegetated buffers along streams to provide potential fisher resting and foraging habitats.

➢ **Pileated Woodpecker *(Dryocopus pileatus)*:**

Issue: *There is concern that timber harvesting could reduce quality and quantity of pileated woodpecker nesting and feeding habitat.*

Existing Environment

Pileated woodpeckers excavate the largest cavities of any woodpecker. The cavities are frequently used in subsequent years by many other species of birds and mammals. Preferred nest trees are western larch, ponderosa pine, black cottonwood, and quaking aspen, usually 20 inches dbh and larger. Pileated woodpeckers primarily eat insects, mainly carpenter ants, which inhabit stumps, snags, and large downed logs. Nesting habitat for pileated woodpeckers consists of mature stands below 5,000 feet in elevation with 100 to 125 square feet per acre of basal area and a relatively closed canopy (Aney and McClelland 1985). 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. The density of pileated

woodpeckers is positively correlated with the amount of dead and/or dying wood in a landscape (McClelland 1979).

Past timber harvesting and firewood gathering has likely reduced existing habitat quality for pileated woodpeckers in the analysis area. Large live and dead trees are likely less common than would occur naturally due to these past activities. Some large western larch and ponderosa pine exist within the proposed project area. Douglas-fir and some grand fir exist in the project area and are likely used for foraging.

Modeling the above conditions using SLI data generated an estimate of pileated woodpecker habitat. In the proposed project area, potential pileated woodpecker nesting habitat exists on approximately 394 acres. This habitat is split into 3 areas within the proposed project area. The first area is along Semem Creek (40 acres). The second is in the southeast corner of the Big Prairie section along the Thompson River (47 acres). The final section of potential nesting habitat exists largely to the west of the ACM road in the Big Prairie section (307 acres). Younger-aged stands might provide feeding or lower quality nesting habitat. During field visits, many feeding sites and 1 to 3 variably spaced snags (12+ in dbh) per acre were observed in the proposed project area.

Cumulative effects were analyzed on the surrounding 13 sections (Figure W-1) using a combination of field evaluation and aerial photograph interpretation. Factors considered within the analysis area included the degree of harvesting and the amount of continuous forest within the analysis area.

Direct and Indirect Effects

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

  No direct impacts are anticipated under No-Action Alternative A. Shade-intolerant trees would continue to grow and die over time, providing nesting and foraging habitat. As these trees die, replacement shade-intolerant trees would be underrepresented in the stand unless other disturbances influence the stands, allowing for their regeneration. Therefore, a reduction in suitable nesting trees is likely over time. Pileated woodpeckers typically do not nest in Douglas-fir or grand fir; however, they will forage on the boles of Douglas-fir. Under this alternative, stands once dominated by ponderosa pine and western larch would continue to be converted through succession to Douglas-fir and grand fir, and mixed-conifer stands. Thus, habitat sustainability and quality for pileated woodpeckers would gradually increase through time, and then decline. Generally, the proposed project area might support a pair of pileated woodpeckers under this alternative.

- Direct and Indirect Effects of Action Alternative B on Pileated Woodpeckers

  Pileated woodpeckers tend to be tolerant of human activities (Bull and Jackson 1995), but could be temporarily displaced by the proposed harvesting and road-building activities. Elements of the forest structure important for

nesting pileated woodpeckers would be retained, including snags, coarse woody debris, numerous leave trees, and snag recruits. Realistically, however, some snags are likely to be removed due to safety and/or logistical concerns, which further impacts pileated woodpeckers now and into the future. Of the 394 acres of pileated woodpecker nesting habitat in the proposed project area, 270 acres are proposed for treatment (in Units 12-1, 12-2, and 12-3). Within these units, the majority of the midstory and some of the overstory would be removed. This could reduce pileated nesting use in this area. After the proposed harvesting, much of the 791 harvested acres within the proposed project area would be too open to be considered pileated woodpecker habitat. The silvicultural prescriptions would retain healthy ponderosa pine and western larch and promote regeneration of these same species. Retention and recruitment of western larch and ponderosa pine would benefit pileated woodpeckers in the future by providing nesting, roosting, and foraging habitats, however the proposed project area alone is not expected to be capable of supporting a pair of pileated woodpeckers in the near-term.

Cumulative Effects

- Cumulative Effects of No-Action Alternative A on Pileated Woodpeckers

  Under this alternative, western larch and ponderosa pine trees would continue to grow and die over time in the proposed project area, providing nesting and foraging habitats. Through time, conversion of stands to shade-tolerant species would reduce nesting substrates for pileated woodpeckers. DNRC manages an additional approximately 2,294 acres in the analysis area that exhibit a variety of stand conditions. Many of the state sections within the cumulative effects area are presently in mature ponderosa pine and western larch/ Douglas-fir cover types that provide habitat for pileated woodpeckers. There are also portions of the cumulative effects analysis area that have been harvested recently and do not possess qualities that make them highly suitable for pileated woodpecker nesting or foraging. Approximately 53 acres on an adjacent state parcel were clear-cut and are not suitable pileated woodpecker habitats presently nor are they expected to be suitable in the near future. There are also approximately 350 acres of younger stands of lodgepole pine on adjacent state parcels that are not highly suitable pileated woodpecker habitat, however retention of mature ponderosa pine in this unit could provide some habitat now and into the future. Elsewhere in the cumulative effects area, Plum Creek Timber Company manages roughly 6,000 acres, which has largely been harvested in the recent past. On these parcels limited pileated woodpecker habitat exists, however perhaps the seedtrees retained in some units could provide nesting substrates for pileated woodpecker in the long term (70+ years). It is possible that under this alternative, that the analysis area could support 1-2 pairs of pileated woodpeckers.

- Cumulative Effects of Action Alternative B on Pileated Woodpeckers

Under this alternative, reductions in pileated woodpecker habitat are expected. Existing snags, coarse woody debris, and suitable nesting trees would be retained within the proposed project area. Within the proposed project area, canopy closure on 791 acres proposed for harvesting would largely be too open for appreciable pileated woodpecker use and roughly 270 acres of pileated nesting habitat would not be suitable for nesting after the proposed project. Recently harvested stands on adjacent state managed parcels reduced pileated woodpecker habitats in the analysis area; the reduction in pileated nesting habitat associated with this proposed project would be additive to the losses associated with timber harvesting that has occurred on approximately 403 acres of state managed lands and the extensive timber harvesting that has occurred on adjacent private timberlands. However, within the analysis area, 360 acres of pileated woodpecker nesting habitat would persist on state managed parcels. Succession within other portions of the state sections within the analysis area could lead to the development of pileated woodpecker nesting habitat over a couple of decades. Pileated foraging habitat exists across a larger portion with nearly 1,800 acres of potential foraging habitats on state parcels within the analysis area after the proposed treatment. Foraging habitat on much of the adjacent 6,000 acres of private timberlands has largely been reduced through recent harvesting. The loss of pileated woodpecker nesting and foraging habitats from the proposed harvesting would be additive to habitat loss associated with past harvesting both on DNRC lands and adjacent private timberlands. Under this alternative, the proposed harvesting would likely reduce the carrying capacity of the analysis area to a maximum of a pair of pileated woodpeckers, but long-term habitat quality is expected to improve, as is long-term use.

Mitigation Measures Included:

- Favor western larch and ponderosa pine in retention and regeneration decisions.
- Reduce motorized access to reduce potential loss of existing snags to firewood gathering.
- Manage for snags, snag recruits, and coarse woody debris according to ARM 36.11.411,36.11.413, and 36.11.414, particularly favoring western larch, ponderosa pine, and black cottonwood

➢ **Flammulated Owl *(Otus flammeolus)*:**

Issue: *There is concern that timber harvesting could alter quality and quantity of flammulated owl nesting and foraging habitats.*

Existing Environment

Flammulated owls are tiny, migratory, insectivorous forest owls that inhabit old, open stands of warm-dry ponderosa pine and cool-dry Douglas-fir forests in the western United States and are secondary cavity nesters. They usually nest in cavities excavated by pileated woodpeckers or northern flickers in 12-25" dbh aspen, ponderosa pine, or Douglas-fir.

Much of the proposed project area consists of ponderosa pine, western larch, and Douglas-fir. Sizeable snags (>14" dbh) occur throughout the state parcel at densities

of 1 to 3 snags per acre. Presently, suitable nesting trees occur in the state parcel. Trees inflicted by mistletoe and denser stands of regenerating ponderosa pine and Douglas-fir could serve as roost sites for flammulated owls. However, the stands within the proposed project area have become dense due to modern fire suppression and highly suitable habitat for flammulated owls is limited to approximately 60 acres along the fringes of the natural grassland on the Big Prairie section.

Cumulative effects were analyzed using a combination of field evaluation and aerial photograph interpretation for on the surrounding 13 sections (Figure W-1). Factors considered within the analysis area included the amount of open, mature stands of ponderosa pine and amount of dense, mixed conifer stands.

Direct and Indirect Effects

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

  Under the No Action Alternative, no changes to the existing conditions on DNRC ownership are expected during the next decade. In the long term, stands once dominated by ponderosa pine would continue to be converted to Douglas-fir stands through succession, become densely stocked, and exist at high risk to insects, disease and stand-replacement fire. Thus, habitat sustainability and quality for flammulated owls would continue to decline. Much of the proposed project area is densely forested with few openings, therefore these areas are poor quality flammulated owl habitat, and only approximately 60 acres of suitable habitat exists within the Big Prairie section.

- Direct and Indirect Effects of Action Alternative B on Flammulated Owls

  Flammulated owls are tolerant of human disturbance (McCallum 1994), however the elevated disturbance levels associated with harvesting could negatively impact flammulated owls should they be using existing habitat during the nesting period. Proposed timber harvest would open the canopy while favoring ponderosa pine and western larch. Proposed treatments would retain all snags exceeding 14" dbh that are not safety or operational concerns. The more open stand conditions, the retention of fire adapted tree species, and the maintenance of snags would move the proposed project area toward historical conditions, which is preferred flammulated owl habitat. After implementation, most of the stands on the 791 acres included in this alternative would be more open with an increasing percentage of ponderosa pine, which would result in moderate positive benefits to flammulated owls.

Cumulative Effects

- Cumulative Effects of No-Action Alternative A on Flammulated Owls

  Under this alternative, flammulated owl habitat would continue to decline in quality within the state parcel over the long term. Adjacent state parcels have also become increasingly dense and with a larger proportion of shade-tolerant species. Commercial harvesting on adjacent, private timberlands has occurred in recent years, largely limiting potential flammulated owl habitat. These

stands could gradually develop into flammulated owl habitat if the seed trees are allowed to continue to grow and mature as the developing stand matures.

- Cumulative Effects of Action Alternative B on Flammulated Owls

  Under this alternative, habitat would be enhanced through a reduction in encroaching Douglas-fir while increasing spacing between mature ponderosa pine. However, the enhanced habitat would not likely affect flammulated owl populations appreciably as habitat is somewhat limited throughout the larger analysis area. Habitats on adjacent, private parcels could gradually improve if the seed trees and retention trees are allowed to continue to grow and mature as the newly established stands mature, however it is unlikely that management objectives for these parcels include open stands of large ponderosa pine.

Mitigation Measures Included:

- Favor ponderosa pine in retention and regeneration decisions.
- Restrict public access to reduce potential loss of existing snags to firewood gathering.
- Manage for large-sized snags and snag recruits according to ARM 36.11.411, particularly favoring ponderosa pine

Big Game

➢ **Big Game Winter Range:**

Issue: *There is concern that timber harvesting activities associated with this proposed project could reduce cover important for the survival of wintering elk, white-tailed deer, and mule deer.*

Existing Environment

Winter ranges enable big game survival by minimizing the effects of severe winter weather conditions, which can be limiting for populations. Winter ranges tend to be relatively small areas that support large numbers of big game, which are widely distributed during the remainder of the year. Winter ranges suitable for buffering the effects of severe winter conditions have adequate midstory and overstory to reduce wind velocity and intercept snow, while moderating ambient temperatures. Besides providing a moderated climate, the snow-intercept capacity effectively lowers snow depths, which enables big game movement and access to forage. Snow depths differentially affect big game; deer are most affected, followed by elk, then moose. Typically if winter range habitats are provided for white-tailed deer, winter requirements for mule deer, elk, and moose will be met.

DFWP identified both state sections in the proposed project area in their entirety (1,291 acres) as white-tailed deer winter range. The state parcels are part of a larger white-tailed deer winter range that covers approximately 41,700 acres along the Thompson River. Within the project area, DFWP also mapped 754 acres of elk winter range covering all of the Big Prairie section and the southeastern corner of the

Semem Creek section. The elk winter range on the state sections are part of a 264,300 acre winter range that extends south along the Thompson River to the Clark Fork River and downstream on the Clark Fork River. Moose winter range was mapped across the Big Prairie section and almost the entire Semem Creek section. The moose winter range in the project area is part of a larger contiguous 2-million acre moose winter range that extends to the north and west through much of northwestern Montana.

Winter snow depths and suitable microclimates influence deer and elk distribution and use within the Thompson River drainage and the proposed project area. Mature Douglas-fir and ponderosa pine in the proposed project area are providing attributes facilitating use by wintering big game. Proximity to open roads likely limits the quality of the winter ranges. Evidence of summer use by deer and elk was noted throughout the proposed project area during field visits.

Cumulative effects were analyzed on the contiguous 41,700-acre white-tailed deer winter range (Figure W-2) using a combination of aerial photograph and field evaluation. Factors considered within the analysis area include acres of winter range harvested and level of human disturbance and development.

Direct and Indirect Effects

- Direct and Indirect Effects of No-Action Alternative A on Big Game Winter Range

  Under this alternative, big game thermal cover in the proposed project area would not be altered in the near term. Existing stands on 791 acres would continue to provide thermal cover for deer, elk and moose. In the longer-term, continued succession would start to reduce forage production while increasing thermal cover. Areas in and around the various natural grasslands would continue to provide some big game forage.

- Direct and Indirect Effects of Action Alternative B on Big Game Winter Range

  Proposed harvesting operations could cause appreciable displacement of big game if conducted during the winter months. This action alternative would reduce thermal cover for deer and elk. Canopy cover would be removed from the 791 acres of white-tailed deer winter range and from 378 acres of elk winter range in the proposed project area. These reductions represent a net loss of roughly 61% and 50% of the white-tailed deer and elk winter ranges in the proposed project area, respectively. Timber harvesting under this alternative would the wintering capacity within the proposed project area, which could influence survival of deer that normally inhabit this area. Proposed road closures associated with this alternative could reduce human disturbance within the winter range, however, this reduction will not appreciably alter human disturbance levels within the proposed project area. Timber harvesting is not expected to prevent big game movement through the area during normal winters.

Cumulative Effects

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

  Under this alternative, no changes are anticipated in availability of stands that provide thermal cover and snow intercept properties. Stands within the proposed project area would continue providing some thermal cover and snow intercept for big game. The continued maturation of existing stands would further reduce forage production within the forested portions of the winter range while improving the thermal cover and snow intercept properties. In the recent past (30 years), extensive amounts of the winter range have been harvested, which has likely reduced the carrying capacity of the overall winter range to a degree. Despite these losses, healthy populations of deer and elk exist within the analysis area. Very little permanent development exists within the analysis area, and outside of timber harvesting and dispersed recreation, levels of human disturbance are relatively low and are expected continue at these levels. Continued use of the winter range by big game is expected.

- Cumulative Effects of Action Alternative B on Big Game Winter Range

  Under this alternative, thermal cover would be removed from 791 acres. Considerable harvesting has already occurred elsewhere in the winter range. Big game winter range was reduced by approximately 200 acres while roughly 100 acres were retained with the Fishtrap timber sale. Considerable harvest has also occurred on lands managed by Plum Creek Timber Company within the winter range. The proposed reduction in thermal cover would be additive to these other reductions in thermal cover and snow intercept. No appreciable change is anticipated in the level of human disturbance to the winter range, unless operations are conducted during the winter months, and then these effects are expected to be minor.

Mitigation Measures Included:

- Retain patches of dense vegetation and/or clumps of leave trees in harvest units within winter range when possible to provide some thermal cover/snow intercept capacity.
- Close roads and skid trails opened with the proposed activities to reduce the potential for disturbance from unauthorized motor vehicle traffic.

➢ **Elk Security:**

Issue: *There is concern that timber harvesting activities associated with this proposed project could have adverse effects on elk and other big game security.*

Existing Environment

The proposed project area falls within hunting district 122. The hunting district falls within the Salish Elk Management Unit (EMU), which covers approximately 3,800 square-miles (DFWP 1992). High road densities facilitate extensive hunter access.

Timber harvesting can increase elk vulnerability by changing the size, structure, juxtaposition, and accessibility of areas that provide security during hunting season (Hillis et al. 1991). As visibility and accessibility increase within forested landscapes, elk and deer have a greater probability of being observed and, subsequently, harvested by hunters. Because the female segments of the elk and deer populations are normally regulated carefully during hunting seasons, primary concerns are related to a substantial reduction of the male segment and subsequent decrease in hunter opportunity. The presence of fewer males at the beginning of the hunting season reduces the odds of any given hunter to see or harvest such an animal throughout the remainder of the season.

Dense forest patches (≥ 250 acres) at least ½ mile from an open road that would provide elk (and subsequently deer) security (Hillis et al. 1991) during the general rifle season are not present on the state parcels. It is expected that when elk security is substantially compromised, effects to deer can also be expected (albeit to a lesser degree than for elk). As with elk, the greatest effects on deer security to occur would be expected to be within the male segment of the populations. Use of the proposed project area by deer and elk in the summer was documented during field visits.

Cumulative effects to elk security were analyzed on hunting district 122 (456,000 acres) using a combination of field evaluation and aerial photograph interpretation. Factors considered within the analysis area include amount of recently harvested areas and amount of elk security habitat in the district.

Direct and Indirect Effects

- Direct and Indirect Effects of No-Action Alternative A on Elk Security

  Under this alternative, no changes in elk security cover are expected. Elk security would still not be present in the proposed project area. Timber stands would continue advancing to climax plant species. No alterations in cover would occur that would increase elk vulnerability during the elk hunting season. No changes are anticipated in disturbance and potential mortality due to hunting.

- Direct and Indirect Effects of Action Alternative B on Elk Security

  Under this action alternative, by definition, elk security cover would not develop despite closing the main road system in the Semem Creek section. The proposed closure would cause approximately 230 acres in the northeast corner of this parcel to be further than ½ mile from an open road, however this parcel alone would not be large enough to serve as elk security habitat. Additionally, the proposed reductions in mature trees would also eliminate this parcel from being considered as security cover. The proposed road closures would reduce hunter accessibility and enhance big game survival. The retention trees and areas of advanced regeneration within the proposed units would further contribute to elk and deer hiding cover.

Cumulative Effects

- Cumulative Effects of No-Action Alternative A on Elk Security

  Under this alternative, no changes are anticipated in elk security cover, big game hiding cover, or hunter accessibility. Over time, recently harvested stands will mature and hiding cover would improve, but this would likely only offset the reductions associated with ongoing harvesting activities. Temporal shifts in security cover at the hunting district can be expected as successional stages change, but long-term changes are not expected.

- Cumulative Effects of Action Alternative B on Elk Security

  Under this alternative, negligible impacts to big game survival are anticipated. A slight long-term increase in elk security cover and slight decrease in hunter accessibility are expected with the proposed road closures. Overall these changes would have negligible effects at the hunting district level. Likewise negligible short-term reductions in hiding cover are also expected. Elsewhere in the hunting district, hiding cover is being reduced with the following active state timber projects: Richard's Peak (282 acres), West Lynch (675 acres), and Fishtrap Creek (362 acres). The state is also proposing the North Meadows and the Mudd Creek projects within this hunting district. Continued harvesting and associated decreases in hiding cover within the hunting district should be offset by increases in hiding cover resulting from advances in vegetation succession. In general, negligible impacts to big game security at the hunting district are expected with this alternative.

Mitigation Measures Included:

- Close roads and skid trails opened with the proposed activities to reduce the potential for disturbance from unauthorized motor vehicle traffic.
- Reduce views into harvest units by using a combination of topography, group retention, and roadside-vegetation buffers.
- Retain corridors connecting forested habitats to aide movement.

Literature Cited:

Aney, W. and R. McClelland. 1985. Pileated woodpecker habitat relationships (revised). Pages 10-17 *in* Warren, N. eds. 1990. Old growth habitats and associated wildlife species in the Northern Rocky Mountains. USFS, Northern Region, Wildlife Habitat Relationships Program R1-90-42. 47pp.

Bull, E. L. and J. A. Jackson. 1995. Pileated woodpecker: *Dryocopus pileatus*. American Ornithologists' Union. Washington DC. 24pp.

DFWP. 1992. Montana Elk Management Plan. Montana Dept. Fish, Wildlife, and Parks. Wildlife Division. Helena, Montana. 170pp.

Foresman, K. R. 2001 The wild mammals of Montana. Special Publication No. 12. The American Society of Mammalogists. Lawrence, Kansas. 278pp.

Heinemeyer, K. S. and J. L. Jones. 1994. Fisher biology and management in the western United States: A literature review and adaptive management strategy. USDA Forest Service, Northern Region, Missoula, Montana. 108pp.

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

Jones, J.L. 1991. Habitat use of fisher in north-central Idaho. M.S. Thesis, University of Idaho, Moscow, Idaho. 147 pp.

Losensky, B. J. 1997. Historical vegetation of Montana. DNRC Report, Missoula, Montana. 100pp.

Maxell, B. A., J.K Werner, P. Hendricks, D.L. Flath. 2003. Herptetology in Montana: a history, status summary, checklists, dichotomous keys, accounts for native, potentially native, and exotic species, and indexed bibliography. Northwest Fauna Number 5. Society for Northwestern Vertebrate Biology. Olympia, Washington. 138pp.

McClelland, B.R. 1979. The pileated woodpecker in forests of the northern Rocky Mountains. Pages 283-299 in J. G. Dickson, R. N. Conner, R. R. Fleet, J C. Kroll, and J. A. Jackson, eds. The role of insectivorous birds in forest ecosystems. Academic Press, New York, New York.

McCallum, D. A. 1994. Review of technical knowledge: flammulated owls. Pages 14-46 *in* G. D. Hayward and J. Verner, tech eds. Flammulated, boreal, and great gray owls in the United States: a technical conservation assessment. USDA Forest Service Gen. Tech. Rep. RM-253. Fort Collins, Colorado.

Montana Bald Eagle Working Group. 1994. Montana Bald Eagle management plan. USDI Bureau of Land Management. Billings, Montana. 61pp.

Mosconi, S. L. and R. L. Hutto. 1982. The effect of grazing on the land birds of a western Montana riparian habitat. Pages 221-233 *in* L. Nelson and J. M. Peek, eds. Proceedings of the wildlife-livestock relationships symposium. Forest, Wildlife, and Range Experiment Station, University of Idaho, Moscow Idaho.

Powell, R. A. and W. J. Zielinski. 1994. Fisher. Pages 38-73 in Ruggiero, L. F., K. B. Aubry, S. W. Buskirk, L. J. Lyon, and W. J. Zielinski, tech eds. The scientific basis for conserving forest carnivores: American marten, fisher, lynx, and wolverine in the western United States. USDA Forest Service Gen. Tech. Rep. RM-254. Fort Collins, Colorado.

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

USFWS. 1986. Recovery Plan for the Pacific Bald Eagle. USFWS. Portland Oregon. 160pp.

USFWS. 1987. Northern Rocky Mountain Wolf Recovery Plan. USFWS. Denver, Colorado. 119pp.

USFWS. 1993. Grizzly Bear Recovery Plan. Missoula, Montana. 181pp.

USFWS, Nez Perce Tribe, National Park Service, and USDA Wildlife Services. 2003. Rocky Mountain Wolf Recovery 2002 Annual Report. T. Meier, ed. USFWS, Ecological Services, 100 N Park, Suite 320, Helena Montana. 64pp.

FIGURE W-1—ANALYSIS AREA FOR PROPOSED PROJECT AREA INCLUDING PROPOSED HARVEST UNITS.

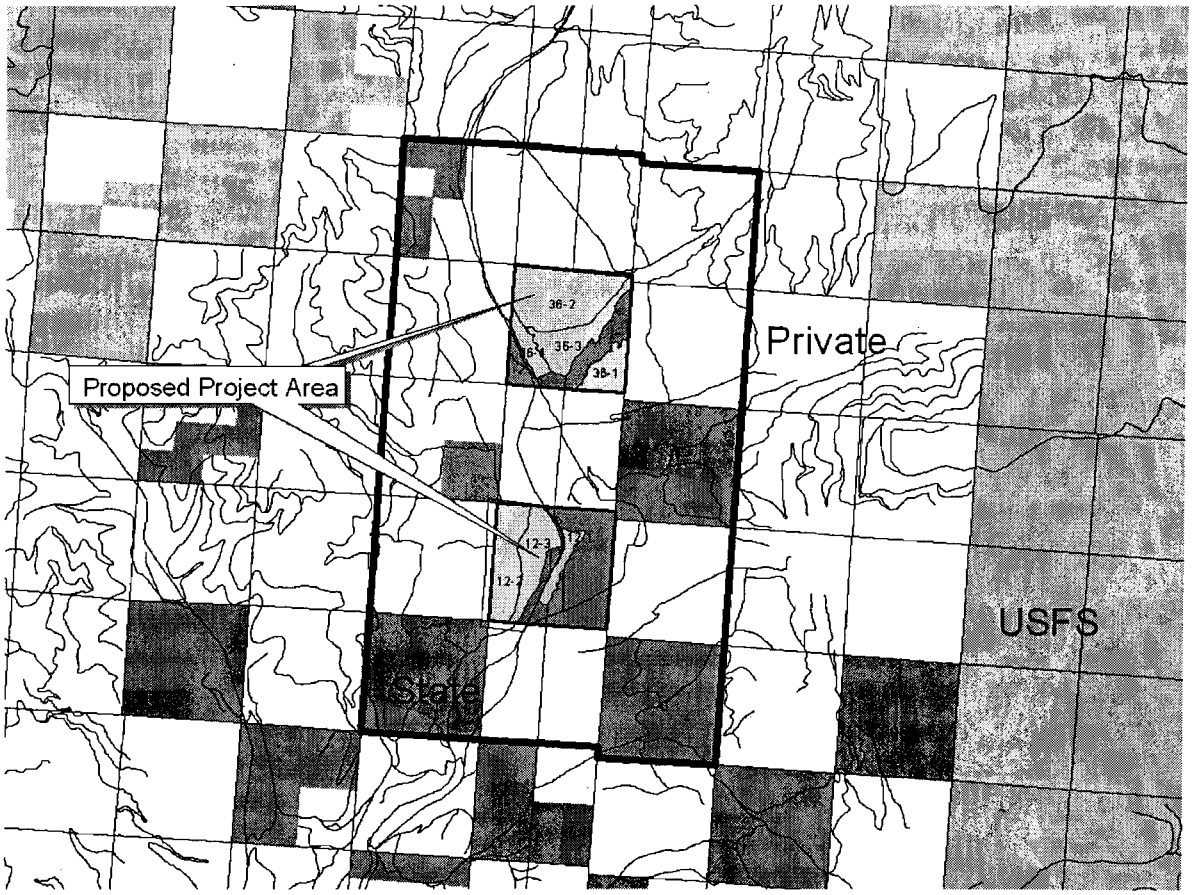
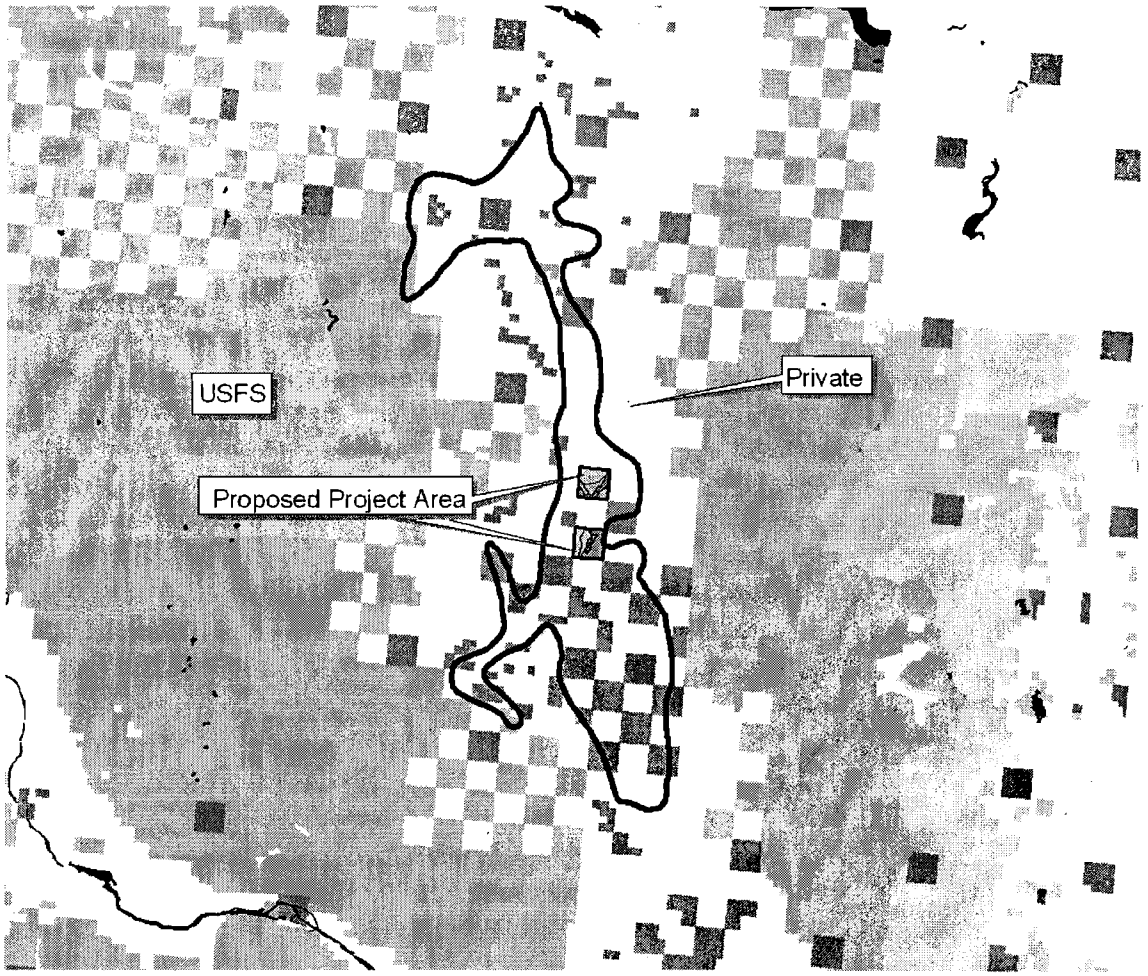


FIGURE W-2 ELK WINTER RANGE IN RELATION TO THE PROPOSED PROJECT AREA AND STILLWATER STATE FOREST



From: Rennie, Patrick
Sent: Monday, October 06, 2003 2:58 PM
To: Thomas, Shawn
Subject: RE: Big Prairie Timber sale

Hi Shawn:

Earlier this summer I consulted with the Montana State Historic Preservation Officer and reviewed the project area maps as we are required to do under the Montana State Antiquities Act. No cultural resources have been identified in the project area and the terrain is sufficiently steep (for archaeological applications) that the likelihood of encountering unidentified cultural resources is low. No additional archaeological investigative work is therefore recommended before the timber sale proceeds.

This note should be adequate for your sale file and EA write up. If you need more information let me know.

Patrick Rennie
DNRC Archaeologist

-----Original Message-----
From: Thomas, Shawn
Sent: Monday, October 06, 2003 1:01 PM
To: Rennie, Patrick
Subject: Big Prairie Timber sale

I am beginning to put together the draft EA for the Big Prairie timber sale located in sections 12 of 23N 27W and 36 of 24N 27W. I have been told that you initially communicated to us that there weren't going to be any significant cultural issues here, but I don't have a formal letter to that effect in the sale file at this time. Do I need anything from your office for my EA?

Thanks
SPT
Shawn Thomas
Forest Management Supervisor
Plains Unit, DNRC

Attachment 3

Prescriptions

Proposed Big Prairie/Semem Creek Timber Sale Harvest Unit Prescriptions

Harvest Unit: 12-1 **Harvest Unit Acres:** 39

Elevation: 3200' **Slope:** 0% **Aspect:** Flat

Habitat Type: PSME/ARUV; PSME/SYAL

Current Cover Type: ponderosa pine
Appropriate Cover Type: ponderosa pine

Soil Type: Deep, well drained gravelly loam covered by a thin layer (0-1") of duff and organic matter.

Description of Existing Stand: the ACM road bounds these units to the west and a grassland prairie to the east. The topography is flat. The existing stand is of a multi-storied structure composed of an overstory of larger diameter Douglas-fir (40%), ponderosa pine (40%), and western larch (20%). Overstory age averages 100, ranging from 80 to 185 years. Trees over 150 years old are present in trace amounts only, less than one per acre. Overstory DBH averages 20", with a range of 10-28 in the Douglas-fir and ponderosa pine. Overstory height averages 100 feet. There is also a major intermediate component in this stand. The majority of the intermediate stand is in ponderosa pine and Douglas-fir. The ponderosa pine (70%) ranges in DBH from 4-8" averaging 7". The Douglas-fir (20%) ranges in DBH from 6-12", averaging 8". There is also some lodgepole pine present (10%) in the 5-7" DBH range, averaging 6", and is quite suppressed and showing no significant diameter or height growth. The intermediate component of the stand averages 60' in height. Crown ratios in both the overstory and intermediate levels are generally good, averaging 50% ranging from 20-75%. Overstory trees are regularly distributed, though widely spaced. The intermediate stand forms a partially closed canopy layer. There is some evidence of Douglas-fir bark beetle and mountain pine beetle present. There is a good component of advanced regeneration consisting mostly of Douglas-fir (90%) and some lodgepole and ponderosa pine. The regenerated Douglas-fir is mostly healthy, but the ponderosa pine is very suppressed and of poor form.

Treatment Objectives:

- Remove unhealthy trees, as well as those with poor vigor, from the overstory to promote long-term forest health.
- Thin intermediate component of stand to enhance growth characteristics.
- Create small openings in the canopy around ponderosa pine regeneration to promote a productive third age class in the stand.
- Space out clumps of existing overstocked regeneration to promote future growth.

Prescribed Treatment:

- Selective thinning, spacing out healthy trees with good crown and bark characteristics on a variable spacing of 30-35 feet (leaving 35-50 TPA). Favor leaving ponderosa pine and western larch, then Douglas-fir in that order. Remove all merchantable lodgepole pine.
- Retain at least two snags per acre >14" DBH
- During or immediately after harvest, precommercially thin existing regeneration to a 14-foot spacing, favoring ponderosa pine, western larch and Douglas-fir in that order.

Harvest Method:

- Tractor logging with conventional, mechanical, or cut-to-length operations are applicable to this unit.
- Trees marked to cut. Lodgepole, Grand Fir would be species designated.

Hazard Reduction:

- Burn landing piles after harvest activity.
- Lop and/or crush slash in unit to a depth of 18" or less.

Regeneration/Site Preparation:

- Natural regeneration in already well established. Prescription is designed to enhance and maintain that component of the stand.

Anticipated Future Treatments:

- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire, or other unanticipated circumstances on a case-by-case basis.
- The next commercial entry to this stand would be planned for approximately 15-20 years.

Proposed Big Prairie/Semem Creek Timber Sale Harvest Unit Prescriptions

Harvest Unit: 12-2 **Harvest Unit Acres:** 152

Elevation: 3220' **Slope:** 0-20% **Aspect:** East

Habitat Type: ABGR/CLUN

Current Cover Type: Douglas-fir/western larch
Appropriate Cover Type: Douglas-fir/western larch

Soil Type: Deep, poorly drained silt-loam with a moderate (1-2") layer of duff and organic matter.

Description of Existing Stand: This unit is located on the west side of section 12, bordered by Plum Creek Timber Company land to the west and unit 12-3 to the east. The topography is flat to gently rolling with a slight easterly aspect. This mixed conifer stand consists of larger diameter Douglas-fir (70%), grand fir (20%), western larch (10%), as well as trace amount of lodgepole pine. Overstory age averages 110 years and ranges from 75-150. Trees exceeding 120 years are only present in trace amounts, less than 3 per acre. The overstory DBH averages 16", with a range of 12-21" in the western larch and Douglas-fir. The overstory height averages 100 feet. The grand fir component averages 16" with a range of 12-18". This unit also has an intermediate component consisting of mostly Douglas-fir (90%) ranging in diameter from 6-10" and averaging 9". There is also some lodgepole pine (10%) in the intermediate level. It ranges from 5-12" DBH, averaging 8". The intermediate component averages 55 feet in height. The lodgepole pine shows little to no significant diameter or height growth. Crown ratios in both the intermediate part of the stand as well as the overstory are good averaging 50% and ranging from 30-75%. However, crown condition and form in some of the overstory is poor. The overstory Douglas-fir is showing a moderate amount of mortality due to Armallaria root rot and Douglas-fir bark beetle. Regeneration present in the understory consists of suppressed grand fir (80%) and poorly formed non-growing Douglas-fir (20%).

Treatment Objectives:

- Create a regenerating stand of western larch and Douglas-fir.
- Harvest suppressed and poorly formed intermediate age class trees.
- Create growing space for healthy, growing, intermediate Douglas-fir and western larch.
- Harvest mature and over-mature overstory trees.
- Harvest all merchantable lodgepole pine and grand fir.

Prescribed Treatment:

- Regeneration harvest, leaving an average of 20 western larch and Douglas-fir per acre of varying diameters, heights, and age classes. (Average spacing of 45').
- Slash all suppressed, and poorly formed non-merchantable trees.
- Retain at least two snags over 14" DBH per acre. At least two large diameter obvious cull grand fir per acre would be left where present for future snag recruitment.

Harvest Method:

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

Hazard Reduction:

- Pile and burn at landings following harvest.
- Excavator pile slash in excess of retention requirements, and burn piles.

Regeneration/Site Preparation:

- While piling slash with excavator, scarify 30% of ground to expose bare mineral soil for western larch natural regeneration.
- Monitor success of natural regeneration, by conduction a regeneration survey three years after harvest and slash treatment activities are complete. If necessary, order seedlings for out planting two years later.

Anticipated Future Treatments:

- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire, or other unanticipated circumstances on a case-by-case basis.
- This stand would be evaluated in approximately 15 years to determine needs for further harvest activities; possible overstory removal as well as commercial or precommercial thinning opportunities

Proposed Big Prairie/Semem Creek Timber Sale Harvest Unit Prescriptions

Harvest Unit: 12-3 **Harvest Unit Acres:** 118

Elevation: 3200' **Slope:** 5-20% **Aspect:** Flat to Southeasterly

Habitat Type: PSME/SYAL

Current Cover Type: ponderosa pine
Appropriate Cover Type: ponderosa pine

Soil Type: Deep, poorly drained silt-loam with a moderate (1-2") layer of duff and organic matter

Description of Existing Stand: This unit is located to the west of road 12-C and to the east of unit 12-2. The topography is flat to gently rolling with a slight east to southeasterly aspect. This stand is a ponderosa pine cover type with a heavy ingrowth of Douglas-fir and lodgepole pine. The overstory consists of larger diameter Douglas-fir (50%), ponderosa pine (40%) and western larch (10%), ranging from 10-25" DBH and averaging 15". Overstory trees average 90 feet in height. The age of the stand ranges from 120 to 185 years and averages 130 years old. Trees exceeding 150 years are only present in trace amounts less than 2 per acre. There is an intermediate component consisting of ponderosa pine (50%), Douglas-fir (40%), and lodgepole pine (10%) ranging in diameter from 5-13" DBH and averaging 9". The intermediate component averages 60 feet in height and 80 years of age. Crown ratios in both the intermediate part of the stand as well as the overstory are good averaging 60% and ranging from 30-75%. Regeneration is well established in parts of the stand and is healthy, especially in openings created from past logging activities. Most of the regeneration to date is Douglas-fir. There is evidence of both mountain pine beetle as well as Douglas-fir bark beetle working in the stand, causing some mortality.

Treatment Objectives:

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

Prescribed Treatment:

- Selective thinning, spacing out healthy trees with good crown and bark characteristics on a variable spacing of 40-45 feet (leaving 20-30 TPA). Favor leaving ponderosa pine and western larch, then Douglas-fir in that order. Remove all merchantable lodgepole pine and grand fir.

- Create openings of 150' on at least two sides of existing clumps or isolated individual ponderosa pine overstory trees in areas where Douglas-fir is the predominant overstory species.
- Retain at least two snags per acre >14" DBH
- Precommercially thin existing regeneration to a 14-foot spacing, favoring ponderosa pine, western larch and Douglas-fir in that order.

Harvest Method:

- Tractor logging with conventional, mechanical, or cut-to-length operations are applicable to this unit.
- Trees marked to cut. Lodgepole and Grand Fir would be species designated.

Hazard Reduction:

- Pile and burn at landings following harvest.
- Slash would be lopped and/or trampled to a depth of 18" or less. In openings where ponderosa pine regeneration is a primary goal, slash would be spot piled and burned.

Regeneration/Site Preparation:

- Precommercially thin healthy regeneration to promote future growth and vigor.
- In openings where ponderosa pine regeneration is a primary goal, 30% of ground would be excavator scarified while piling and burned.
- Monitor success of natural regeneration and plant seedlings if necessary.

Anticipated Future Treatments:

- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire, or other unanticipated circumstances on a case-by-case basis.
- This stand would be evaluated for regeneration and possible pre-commercial thinning opportunities as the stand progresses in age.

Proposed Big Prairie/Semem Creek Timber Sale Harvest Unit Prescriptions

Harvest Unit: 36-1 **Harvest Unit Acres:** 79

Elevation: 3200' **Slope:** 0-10% **Aspect:** Flat to Northwesterly

Habitat Type: PSME/VACA

Current Cover Type: Douglas-fir/western larch
Appropriate Cover Type: ponderosa pine

Soil Type: Deep, poorly drained silt-loam with a moderate (1-2") layer of duff and organic matter.

Description of Existing Stand: This unit is located in the southeast corner of section 36. It is bordered by Plum Creek land to the south and to the east, and by the Semem creek SMZ to the northwest. The existing stand is composed of a scattered overstory consisting mostly of Douglas-fir (60%) and western larch (35%) with a minor amount of ponderosa pine (5%) also present. Overstory age averages 150 years, ranging from 85 to 200. Trees over 170 years old are present in a minor amount, averaging three per acre. Overstory DBH averages 16" and ranges from 12-24". Overstory height averages 95 feet. There is a healthy and vigorous intermediate component of this stand primarily made up of Douglas-fir (90%) and a minor amount of western larch (10%). The average age of the intermediate trees is 90 years, ranging from 70 to 180. The Douglas-fir averages 10" DBH, ranging from 6 to 12". The western larch averages 9" DBH, ranging from 8-12". The intermediate component of the stand averages 65 feet in height. Crown ratios in both the overstory and the intermediate component are good, averaging 60% and ranging from 40-90%. The intermediate stand forms a closed canopy layer underneath the scattered open overstory canopy. There is some evidence of mountain pine beetle working in the stand causing a minor amount of mortality. There is good Douglas-fir regeneration present, but very little ponderosa pine or western larch.

Treatment Objectives:

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

Prescribed Treatment:

- Selective thinning, spacing out healthy trees with good crown and bark characteristics on a variable spacing of 30-40 feet (leaving 27-50 TPA). Favor leaving ponderosa pine and western larch, then Douglas-fir in that order. Remove all merchantable lodgepole pine.
- Create openings of 150' on at least two sides of existing clumps or isolated individual ponderosa pine overstory trees in areas where Douglas-fir is the predominant overstory species.
- Retain at least two snags per acre >14" DBH.

Harvest Method:

- Tractor logging with conventional, mechanical, or cut-to-length operations are applicable to this unit.
- Trees would be marked to cut. Lodgepole and grand fir would be species designated.

Hazard Reduction:

- Pile and burn at landings following harvest.
- Slash would be lopped and/or trampled to a depth of 18" or less. In openings where ponderosa pine and western larch regeneration is a primary goal, slash may be spot piled and burned.

Regeneration/Site Preparation:

- Precommercially thin healthy regeneration to promote future growth and vigor.
- In openings where ponderosa pine regeneration is a primary goal, 30% of ground would be excavator scarified while piling and burned.
- Monitor success of natural regeneration and plant seedlings if necessary.

Anticipated Future Treatments:

- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire, or other unanticipated circumstances on a case-by-case basis.
- This stand would be evaluated for adequate natural regeneration or planting needs as well as possible pre-commercial thinning as the stand progresses in age.

Proposed Big Prairie/Semem Creek Timber Sale Harvest Unit Prescriptions

Harvest Unit: 36-2,36-3 **Harvest Unit Acres:** 361

Elevation: 3300' **Slope:** 0-% **Aspect:** Flat
Habitat Type: PSME/VACA

Current Cover Type: Douglas-fir
Appropriate Cover Type: ponderosa pine

Soil Type: Deep, poorly drained silt-loam with a moderate (2-4") layer of duff and organic matter.

Description of Existing Stand: These units are one stand that has been split into two units along an existing road for administrative purposes. They are located in to the northwest of the Semem creek SMZ and are bordered by Plum Creek to the north and west. The topography is flat. The existing stand is a multi-storied structure composed of mostly Douglas-fir (55%) and ponderosa pine (35%), with a minor component of western larch (10%). Overstory age averages 150 years ranging from 130-180 years. Trees over 170 years old are present in a minor amount, averaging two per acre. Overstory DBH averages 16", ranging from 12 to 23". Overstory height averages 100'. This stand has a strong intermediate component of mostly Douglas-fir (65%) and ponderosa pine (25%), with a minor component of lodgepole pine (10%). The average age of the intermediate component is 95 years, ranging from 80-100. The intermediate component has a range in DBH from 5 to 13", and averages 10". There is a third age class present that consists of advanced regeneration comprised mostly of Douglas-fir and lodgepole pine. Crown ratios in all age classes are good, averaging 50% and ranging from 25-80%. The overstory canopy structure varies from open to closed. The intermediate trees form a tightly closed canopy structure in the places where the overstory is more open, and are partially closed elsewhere. In its current state, the intermediate component is overstocked and exhibiting significant slowdowns in diameter growth. There is evidence of a building mountain pine beetle population beginning to attack the lodgepole and causing a moderate amount of mortality to occur.

Treatment Objectives:

- To promote healthy ponderosa pine and western larch in the overstory.
- Thin intermediate and understory components of stand to enhance growth characteristics and reduce fuel loadings.
- Create openings of 150' on at least two sides of existing clumps or isolated individual ponderosa pine and western larch overstory trees in areas where Douglas-fir is the predominant overstory species to facilitate natural regeneration of those species.

Prescribed Treatment:

- Selective thinning, spacing out healthy trees with good crown and bark characteristics on a variable spacing of 30-40 feet (leaving 27-50 TPA). Favor leaving ponderosa pine and western larch, then Douglas-fir in that order. Remove all merchantable lodgepole pine.
- Create openings of 150' on at least two sides of existing clumps or isolated individual ponderosa pine and western larch overstory trees in areas where Douglas-fir is the predominant overstory species.
- Retain at least two snags per acre >14" DBH.

Harvest Method:

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

Hazard Reduction:

- Pile and burn at landings following harvest.
- Slash all DF <4" DBH
- Slash would be lopped and/or trampled to a depth of 18" or less. In openings where ponderosa pine and western larch regeneration is a primary goal, slash may be spot piled and burned.

Regeneration/Site Preparation:

- In openings where ponderosa pine regeneration is a primary goal, 30% of ground would be excavator scarified while piling and burned.
- Monitor success of natural regeneration and plant seedlings if necessary.

Anticipated Future Treatments:

- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire, or other unanticipated circumstances on a case-by-case basis.
- This stand would be evaluated for regeneration and possible pre-commercial thinning opportunities as the stand progresses in age.
- Another commercial thinning opportunity would be pursued here in approximately twenty years.

Proposed Big Prairie/Semem Creek Timber Sale Harvest Unit Prescriptions

Harvest Unit: 36-4 **Harvest Unit Acres:** 42

Elevation: 3200' **Slope:** 65% **Aspect:** Southwest
Habitat Type: PSME/SYAL

Current Cover Type: Douglas-fir
Appropriate Cover Type: ponderosa pine

Soil Type: Deep, well drained gravelly-loam with a minor (01") layer of duff and organic matter.

Description of Existing Stand: This unit is located in the southwest part of section 36 and is bounded by Plum Creek lands to the north, the Thompson river county road to the southwest and units 36-3,36-3 to the northeast. The topography is moderately steep and consistent throughout. The existing stand is of a two-storied structure consisting of an overstory of Douglas-fir (60%) and ponderosa pine (40%). Overstory age averages 160 years, ranging from 150 to 175 years. Trees over 170 years are present in trace amounts only, averaging less than one per acre. The overstory DBH averages 18", ranging from 10-25". Overstory height averages 100 feet, ranging from 80-105. There is a strong intermediate component to this stand as well, consisting of mostly Douglas-fir (80%) and ponderosa pine (20%). The intermediate component averages 10" DBH, ranging from 4-14". Crown ratios in both canopy levels are good averaging over 50% and ranging from 25-75%. There is evidence of both Douglas-fir bark beetle and mountain pine beetle populations building in both levels of the stand causing significant mortality. Regeneration consists of Douglas-fir and ponderosa pine, and generally appears healthy.

Treatment Objectives:

- To promote healthy ponderosa pine and western larch in the overstory.
- Thin intermediate and understory components of stand to enhance growth characteristics and reduce fuel loading.

Prescribed Treatment:

- Selective thinning, spacing out healthy trees with good crown and bark characteristics on a variable spacing of 30-40 feet (leaving 27-50 TPA). Favor leaving ponderosa pine and western larch, then Douglas-fir in that order. Remove all merchantable lodgepole pine and grand fir.
- Retain at least two snags per acre >14" DBH.

Harvest Method:

- Line skidding operations are applicable to this unit.
- Trees marked to leave.

Hazard Reduction:

- Pile and burn at landings following harvest.
- Lop slash in unit to a depth of 18" or less.

Regeneration/Site Preparation:

- Regeneration is not a primary objective for this stand. Treatment would leave stand adequately stocked.
- In areas where openings occur in canopy larger than one acre, inter-planting may occur. These areas would be monitored for natural regeneration two years after harvest completion, and if necessary, seedlings would be ordered.

Anticipated Future Treatments:

- Stand conditions would be monitored for future salvage opportunities related to insect and disease outbreaks, severe weather events, fire, or other unanticipated circumstances on a case-by-case basis.
- This stand would be evaluated for regeneration as the stand progresses in age.
- Another commercial entry to this stand would be planned for in 20-30 years.

Attachment 4

Mitigations

Mitigation Measures

Roads: A transportation system minimizing road miles and meeting all BMP's has been designed by DNRC. Roads constructed in association with this project total 0.55 miles, and would remain in place following the completion of the project. After activities have been completed the roads would be grass seeded and closed to use. There would be reconstruction and improvement totaling 1.6 miles, involving improving road surface drainage and opening roads for safe hauling traffic. There would be 2.4 miles of road that would be permanently closed or reclaimed. Upon completion of roadwork, all haul roads would meet Best Management Practices (BMP's) standards.

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

Bald Eagle: Cease all operations and consult with a DNRC biologist for further mitigations should an eagle nest be observed within 1 mile of any project-related activities. *This Measure would be specified in the Timber Sale Contract and would be monitored by the Forest Officer.*

Grizzly Bear: Close open roads as well as skid trails generated during proposed activities to reduce the potential for unauthorized motor vehicle use. Using a combination of topography, group retention, and roadside vegetation buffers, reduce views into harvest units along open roads. Retain hiding cover along the prominent riparian areas within the proposed project area. *Contract specifications would require gates and/or earthen barriers to be constructed on all new roads in addition to the abandonment of current roads that would no longer be necessary for access to these parcels. To meet these requirements, a DNRC Forest officer would monitor skid trail and corridor location and placement. Abandoned roads would be scarified and slash shall be placed in them to make vehicular travel unlikely.*

Gray Wolf: Suspend operations and temporarily restrict use of roads within a 1-mile radius of any known active wolf den. Suspend operations and consult a DNRC biologist if a suspected rendezvous site is observed within 0.5 mile of any ongoing project activities. Close unnecessary roads and skid trails after the proposed activities to reduce the potential for motor vehicle disturbance. *These items would be specified in the Timber Sale Contract and monitored by the Forest officer.* Use a combination of topography, group retention, and roadside vegetation to reduce views into harvest units along open roads. *Same mitigation requirements as listed above under "Grizzly Bear".*

Fisher: Close roads and skid trails opened with the proposed activities to reduce the potential for unauthorized motor vehicle use. Retain vegetated buffers along streams to provide potential fisher resting and foraging habitats. *All opened roads would be closed by contract specifications as listed above in "Grizzly Bear".*

Pileated Woodpecker: Favor western larch and ponderosa pine in retention and regeneration decisions. *Harvest unit and stand prescriptions accomplish this.* Reduce motorized access to reduce potential loss of existing snags to firewood gathering. *Access would be controlled as above in "Grizzly Bear".* Manage for snags, snag recruits, and

coarse woody debris according to ARM 36.11.411,36.11.413, and 36.11.414, particularly favoring western larch, ponderosa pine, and black cottonwood. *Contract provisions would be in place to accomplish this.*
Flammulated Owl: Favor ponderosa pine in retention and regeneration decisions. Restrict public access to reduce potential loss of existing snags to firewood gathering. Manage for large-sized snags and snag recruits according to ARM 36.11.411, particularly favoring ponderosa pine. *Mitigations identical to those above under "Pileated Woodpecker."*

Big Game Winter Range: Retain patches of dense vegetation and/or clumps of leave trees in harvest units within winter range when possible to provide some thermal cover/snow intercept capacity. *Harvest unit and stand prescriptions accomplish this.* Close roads and skid trails opened with the proposed activities to reduce the potential for disturbance from unauthorized motor vehicle traffic. *Same mitigation requirements as listed above under "Grizzly Bear".*

Elk Security: Close roads and skid trails opened with the proposed activities to reduce the potential for disturbance from unauthorized motor vehicle traffic. Reduce views into harvest units by using a combination of topography, group retention, and roadside-vegetation buffers. Retain corridors connecting forested habitats to aide movement. *Same mitigation requirements as listed above under "Grizzly Bear".*

Soils: Limit equipment operations to periods when soils are relatively dry, (less than 20% soil moisture content), frozen or snow covered to minimize soil compaction and rutting, and maintain drainage features. Check soil moisture conditions prior to equipment start-up. On ground skidding units, the logger and sale administrator would agree to a general skidding plan prior to equipment operations. Skid trail planning would identify which main trails to use, and what additional trails are needed. Trails that do not comply with BMPs (i.e. draw bottom trails) would not be used and would be closed with additional drainage installed where needed or grass seeded to stabilize the site and control erosion. Tractor skidding would 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 (ARM 36.11.410 and 36.11.414). On commercial thin units where whole tree harvesting is used implement one of the following mitigations for nutrient cycling; 1) use in woods processing equipment that leaves slash on site, 2) for whole tree harvest, return skid slash and evenly distribute within the harvest area, or 3) cut off tops from every third bundle of logs so that tops are dispersed as skidding progresses. *These measures would be specified in the Timber Sale Contract and would be monitored by the Forest Officer.*

Hydrology: Due to the lack of streams in any of the proposed harvest units, it is unlikely that sediment delivery to streams would occur. In addition, all forestry Best Management

Practices (BMP's) would apply to limit the potential for sediment delivery to dry draws and swales. This would further limit the potential for sediment introduction.

Noxious Weeds: Roads and skid trail approaches would be seeded and spot treated with chemicals following construction and project completion. Off-Road 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. Post harvest, the area would be managed under the Plains Unit's integrated weed management program. Biological, mechanical and chemical methods would be used to control noxious weeds.

Old Growth: There are no old Growth areas identified in any of the proposed harvest units.

Large Ponderosa pine: A concern was brought up regarding large diameter Ponderosa Pine in the vicinity of Big Prairie. Silvicultural prescriptions were formulated to maintain and improve the component of large Ponderosa pine in the sale area. Overall objectives of the proposed treatment are directed at promoting that component into the future.

Stand Growth and Vigor: A concern was brought up regarding the growth and vigor potential of the stands in this project area. Silvicultural prescriptions are designed to maintain and improve stand growth and vigor, while maintaining DNRC's commitments to managing for a biologically diverse landscape.

Visual Impacts/Aesthetic Values: Activities in units 12-1 and 36-4 would be visible from the Thompson River county road, and the ACM road. The selective harvest prescriptions proposed for those units would alter the appearance of those stands. The end result should still be aesthetically acceptable for most people, as the resulting stands would still be denser and contain larger trees than does most of the surrounding ownership. Use of skyline yarding systems in unit 36-4 would help reduce visual impacts.

Attachment 5

Preparers, Consultants, and References

Preparers

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Consultants

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Special References

- **Forestry Best Management Practices, Montana Department of Natural Resources and Conservation.**

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

- **Losensky, B. John 1997. Historical Vegetation of Montana.**

- **State Forest Land Management Plan, Montana Department of Natural Resources and Conservation, 1996.**