DRAFT ENVIRONMENTAL ANALYSIS

FOR THE

West Prairie Salvage Timber Sale

PREPARED BY

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MEMORANDUM

To: *Dave Olsen, Forest Management Supervisor, Plains Unit*

From: *Larry Ballantyne, Plains Unit Resource Program Manager*

Date: *March 31, 2010*

RE: *West Prairie Salvage Timber Sale Objectives*

Primary Objective

The primary objective of the West Prairie Salvage Timber Sale is to generate income for the Public Building (PB) trust. The land parcel involved in this proposed project is located in Section 2 T23N, R27W. This project would provide an estimated 1 MMBF of merchantable timber toward the Northwestern Land Office s FY 2011 timber sale program targeted volume goal.

Secondary Objectives

Minimize losses in timber quality and available volume resulting from deteriorating stand conditions in the defined project area as well as surrounding forested land.

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

Reduce fire hazard and associated risks of loss to State of Montana and privately owned lands in the area.

Management Directives

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

CHECKLIST ENVIRONMENTAL ASSESSMENT

Project Name:	West Prairie Salvage
Proposed Implementation Date:	August 1, 2010
Proponent:	Department of Natural Resources and Conservation, Northwest Land Office, Plains Unit
Location:	Section 2, Township 23N, Range 27W
County:	Sanders

I. TYPE AND PURPOSE OF ACTION

The Department of Natural Resource and Conservation is proposing a timber harvest that would produce approximately 8,000 tons (1 MMBF) of timber in the Thompson River Drainage. The parcel is located in Section 2, Township 23 North, Range 27 West and is approximately 23 air miles from Plains, MT. The proposed action would produce estimated revenue of $190,000 for the Capital Buildings Trust (PB) and an additional $45,000 in Forest Improvement fees. The activities proposed would maintain and improve forest health, reduce fuel loading, and increase forest productivity beneficial to future actions. (See Attachment 1, Area Maps, and Project Plan)

The one unit of approximately 98 acres is proposed. The project requires no new road construction and about 0.5 miles of reconditioning of an existing spur road. The spur road, which is closed by an earthen berm, would be reclosed post harvest in the same manner.

Lands involved in this proposed project area are held by the State of Montana in trust for the support for specific beneficiary institutions such as the Public Buildings Trust Grant, and other state institutions (Enabling Act of February 22, 1889: 1972 Montana Constitution, Article 1 Section 11). The Board of Land Commissioners and the Department of Natural Resources and Conservation are required, by law, to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run for these beneficiary institutions (Section 77-1-202, MCA). In March 2003, the Montana Department of Natural Resources and Conservation adopted Administrative rules for Forest Management (ARM 36.11.401 through 456). 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. List number of individuals contacted, number of responses received, and newspapers in which notices were placed and for how long. Briefly summarize issues received from the public.

Public involvement has been solicited through the *Valley Press* and *Sanders County Ledger* newspaper advertisements as well as letters sent to the adjacent land owners and other known interest groups and organizations. Four letters supporting the project were received. Hydrological, soils, wildlife, and vegetative concerns were identified by DNRC specialists and field foresters for the effects of the Action and No Action Alternatives. Issues and concerns have been resolved or mitigated through project design or would be included as specific contractual requirements of the project. Recommendations to minimize the direct, indirect, and cumulative impacts have been incorporated in the project design (See Attachment 1, Project Area Maps, pg. 12; Attachment 2, Resource Analysis, pg. 18; Attachment 3, Prescriptions, pg. 54; Attachment 4, Mitigation, pg. 58; Attachment 5, Consultants and References, pg. 61).

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

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

Montana Department of Environmental Quality (DEQ)

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

Montana/Idaho Airshed Group

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

A Temporary Road Use Permit will be acquired from Plum Creek Timber Company to use the ACM road as a haul route.

3. ALTERNATIVE DEVELOPMENT:

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

Action Alternative: The action alternative is described in Section 1, Type and Purpose of Action. There were no other actions identified during the scoping or analysis so the timber harvest and sale are analyzed in this EA checklist. Recommended actions to reduce environmental effects would be incorporated into the proposed action.

No Action Alternative: Under this alternative, no activities will be implemented. There would be no timber removed or no road improvements. This alternative would cause the stand density to continue to increase and the overall stand health to decline. The stand would continue to move toward a shade tolerant stand and the fuel loading will continue to increase. The No Action Alternative would not generate revenue for the Capital Buildings (PB) Trust.

III. IMPACTS ON THE PHYSICAL ENVIRONMENT

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

4. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE:

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

A DNRC soils scientist has reviewed the project area, transportation system and harvest plan. Recommendations to minimize direct, indirect, and cumulative impacts have been incorporated in the project design. (See Attachment 1, Project Area Maps, pg. 12; Attachment 2, Resource Analysis, Soils Analysis, pg. 26; Attachment 3, Prescriptions, pg. 54; Attachment 4, Mitigations, pg. 58) As detailed in the Soils Analysis, no substantial direct, indirect or cumulative impacts to soils resources are expected to result from the implementation of the Action Alternative.

5. WATER QUALITY, QUANTITY AND DISTRIBUTION:
Identify important surface or groundwater resources. Consider the potential for violation of ambient water quality standards, drinking water maximum contaminant levels, or degradation of water quality. Identify direct, indirect, and cumulative effects to water resources.

Recommendations from DNRC specialists to minimize direct, indirect, and cumulative impacts have been incorporated in the project design (See Attachment 2, Resource Analysis, Hydrology Analysis, pg. 22; Attachment 4, Mitigations, pg. 58). As detailed in the Hydrology Analysis, no substantial direct, indirect or cumulative impacts to water quality or downstream beneficial uses are expected to result from the implementation of the Action Alternative.

6. AIR QUALITY:
What pollutants or particulate would be produced (i.e. particulate matter from road use or harvesting, slash pile burning, prescribed burning, etc)? Identify the Airshed and Impact Zone (if any) according to the Montana/Idaho Airshed Group. Identify direct, indirect, and cumulative effects to air quality.

The project is located in Montana State Airshed 2; it is not within a Class 1 Airshed. Some particulate matter may be introduced into the Airshed from the burning of logging slash. Impacts are expected to be minor and temporary with slash burning to be conducted when conditions favor good to excellent smoke dispersion. All burning would be conducted during times of adequate ventilation within the existing rules and regulations. Thus direct, indirect, and cumulative effects to air quality are expected to be minimal.

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

Through the recommended silvicultural prescriptions, the stand would return to the desired future condition for the site. This will be accomplished by removing the diseased, insect infested and non-desirable species.

The stand is not old growth as defined by Green et al. There are no sensitive plants present according to the Montana Natural Heritage Program.

The direct, indirect, and cumulative effects will be minimized in the project design (See Attachment 1, Area Maps and Project Plan, pg. 12; Attachment 2, Resource Analysis, Vegetation Analysis, pg. 19; Attachment 3, Prescriptions, pg. 54; Attachment 4, Mitigation, pg. 58; Attachment 5, Consultants and References, pg. 61).

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

A DNRC wildlife biologist 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, Wildlife Analysis, pg. 31; Attachment 4, Mitigation, pg. 58)

9. UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES:
Consider any federally listed threatened or endangered species or habitat identified in the project area. Determine effects to wetlands. Consider Sensitive Species or Species of special concern. Identify direct, indirect, and cumulative effects to these species and their habitat.

A DNRC wildlife biologist 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, Wildlife Analysis, pg. 31; Attachment 4, Mitigation, pg. 58)

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

A DNRC archeologist has reviewed this project. No significant sites or artifacts were identified. (See Attachment 2, Resource Analysis, Archeologist Analysis pg. 53)

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

Due to the scope and nature of this project, long lasting negative visual effects are not expected. The parcel is located away from the main Thompson River road and is not visible from the main road. There will be a buffer along the Big Prairie Creek road the passes through the parcel. The buffer will be 66 feet along either side of the road and the tree spacing would be consistent with a shelterwood harvest.

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

No direct, indirect, or cumulative impacts would be expected under either alternative.

13. OTHER ENVIRONMENTAL DOCUMENTS PERTINENT TO THE AREA:
List other studies, plans or projects on this tract. Determine cumulative impacts likely to occur as a result of current private, state or federal actions in the analysis area, and from future proposed state actions in the analysis area that are under MEPA review (scoped) or permitting review by any state agency.

Environmental Assessment for the Little Thompson Thinning Timber Sale, 2010. Proposed activities included: timber harvest, thinning, and existing road improvement.
Environmental Assessment for Big Prairie Timber Sale, 2004.
Environmental Assessment for Big Prairie Creek Timber Sale, 1992.

IV. IMPACTS ON THE HUMAN POPULATION

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

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

There are no uncommon human health and safety concerns associated with this project.

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

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

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

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

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

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

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

Log trucks hauling to the purchasing mill would result in a temporary increase in traffic on the ACM road along Thompson River. Hauling would also create a temporarily increase the traffic on Highway 200 or Highway 2 depending on the purchaser. This increase is a normal contributor to the activities of the local community and would not be considered a new or increased source.

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

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

Our premise is that the best way to produce long term income for the trust is to manage intensively for healthy and biologically diverse forests. Our understanding is that a diverse forest is a stable forest that will produce the most reliable and highest long term revenue stream… In the foreseeable future, timber management will continue to be our primary source of revenue and our primary tool for achieving biodiversity objectives.

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

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

The road that runs through the parcel is a seasonal closure and will remain in that status after the project so there should be no effects on hunting or other recreational activities that occur in the area. There are no wilderness areas that are accessed through this tract. The road use is expected to remain the same after the project.

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

There will be no measurable effects on the density and distribution of population and housing due to this project. The relatively small size of this sale and the fact that people already are employed in this occupation in the region will not cause any effect due to the project.

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

No direct, indirect, or cumulative impacts related to social structures and mores would be expected under either alternative.

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

No direct, indirect, or cumulative impacts related to cultural uniqueness and diversity would be expected under either alternative.

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

Costs, revenues and estimates of return are estimates intended for relative comparison of alternatives. They are not intended to be used as absolute estimates of return. The estimated stumpage is based on comparable sales analysis. This method compares recent sales to find market value for stumpage. These sales have similar species, quality, average diameter, product mix, terrain, date of sale, distance from mills, road building and logging systems, terms of sale, or anything that could affect a buyer's willingness to pay for timber. The effect of the proposed project would produce an estimated return to the Capital Buildings (PB) Trust of $190,000.00 and $45,000.00 in Forest Improvement fees under the alternative action. The no-action alternative would not produce revenue for the Capital Buildings (PB) Trust.

EA Checklist Prepared By:	Name: Tyrell Colombo Title: Intern Forester	Date: 1/20/2010

V. FINDING

25. ALTERNATIVE SELECTED:

Type Response here

26. SIGNIFICANCE OF POTENTIAL IMPACTS:

27. NEED FOR FURTHER ENVIRONMENTAL ANALYSIS:

☐ EIS ☐ More Detailed EA ☐ No Further Analysis

EA Checklist Approved By:	Name: Title:
Signature:	Date:

Attachment I

Project Area Maps

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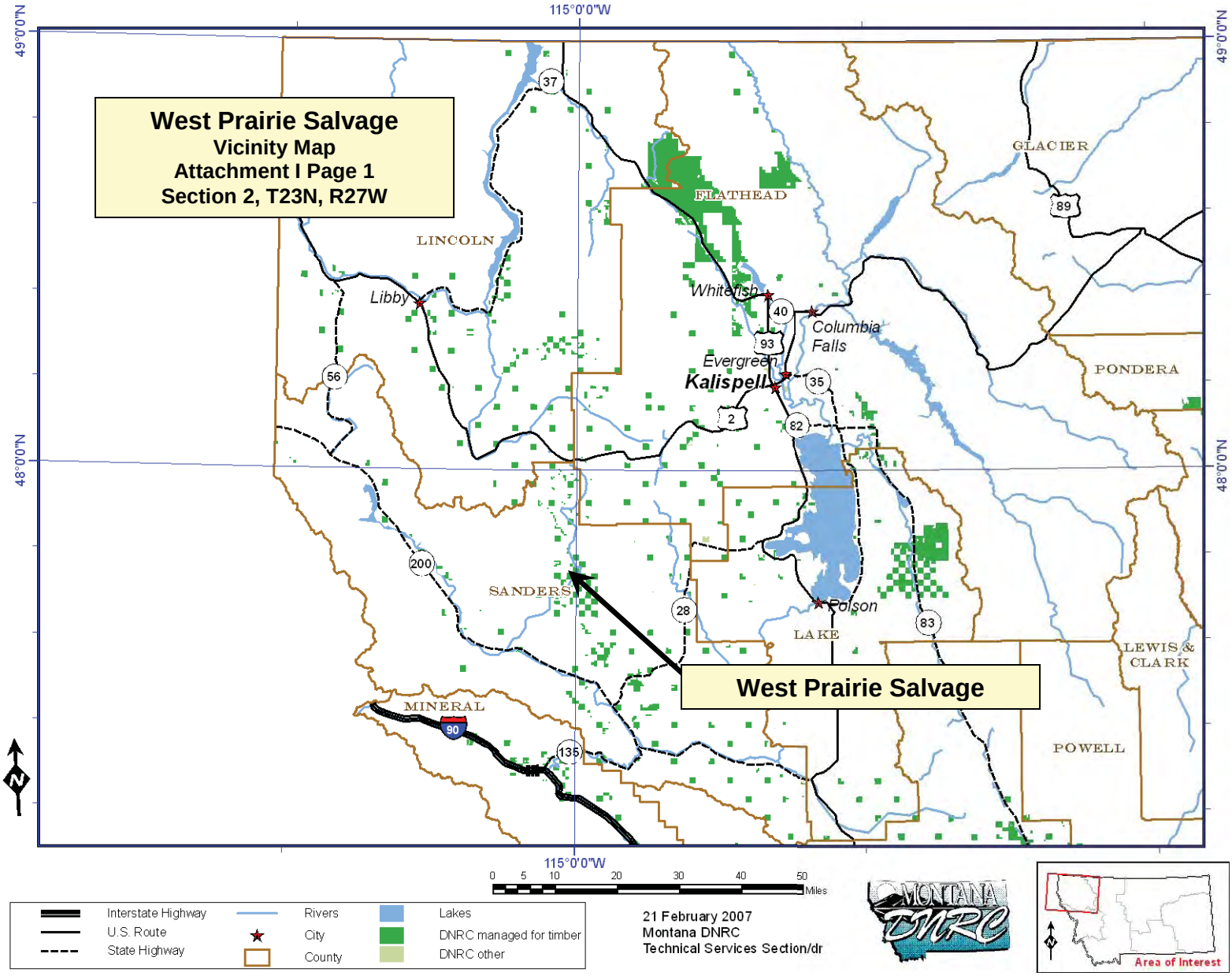
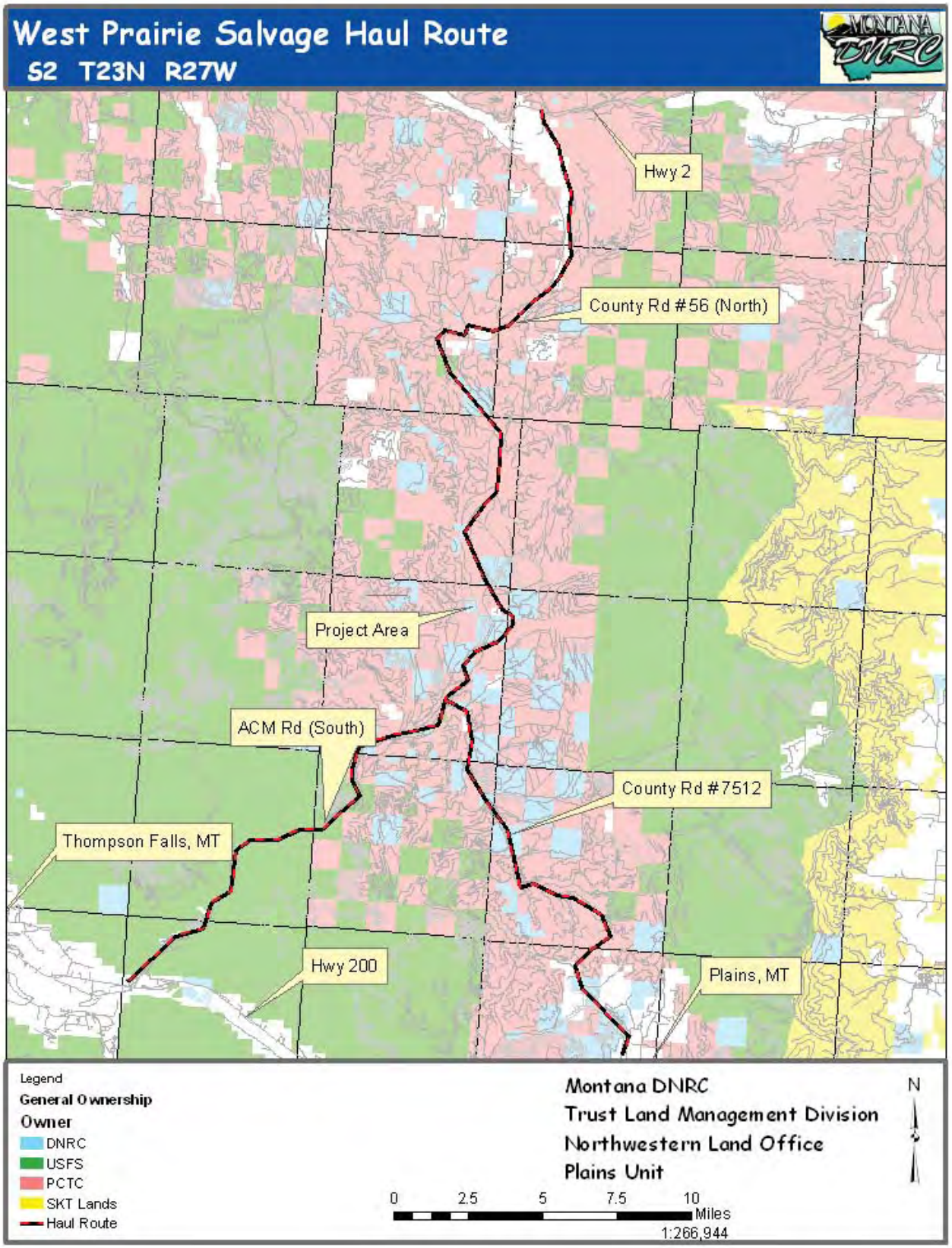
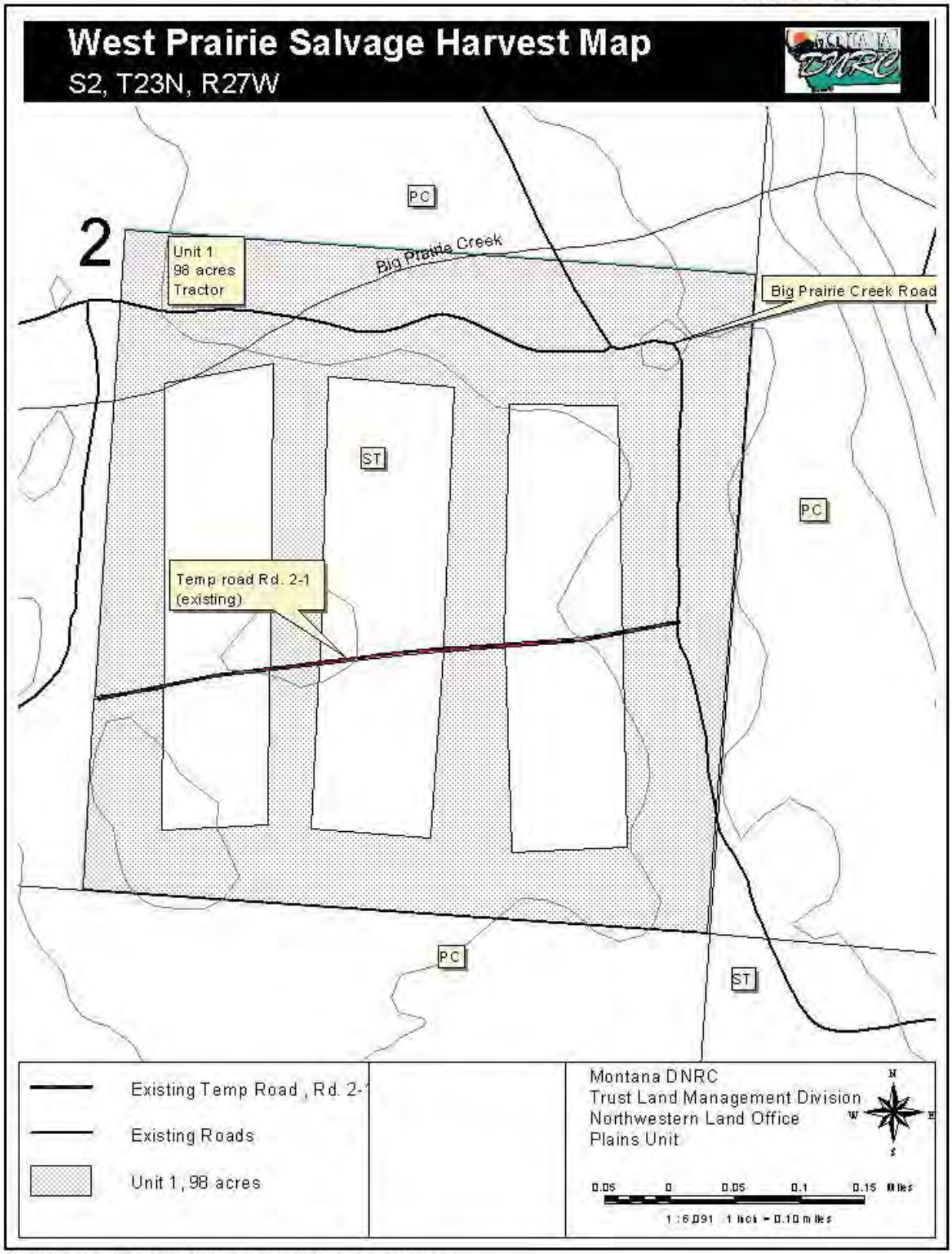
- **Vicinity Map**…….....12
- **Haul Route Map**.....13
- **Harvest Map**……..…….....14
- **Current Cover Type Map**…….....15
- **Desired Future Conditions Map**…….……...16


West Prairie Salvage
Vicinity Map
Attachment I Page 1
Section 2, T23N, R27W
115°0'0"W
49°0'0"N
48°0'0"N
LINCOLN
FLATHEAD
GLACIER
PONDERA
SANDERS
LAKE
LEWIS & CLARK
MINERAL
POWELL
Libby
Whitefish
Columbia Falls
Evergreen
Kalispell
Polson
West Prairie Salvage
37
40
93
35
82
2
56
200
28
83
135
90
89
Miles
Interstate Highway
U.S. Route
State Highway
Rivers
City
County
Lakes
DNRC managed for timber
DNRC other
21 February 2007
Montana DNRC
Technical Services Section/dr
Area of Interest


West Prairie Salvage Haul Route
S2 T23N R27W
Hwy 2
County Rd #56 (North)
Project Area
ACM Rd (South)
County Rd #7512
Thompson Falls, MT
Hwy 200
Plains, MT
Legend
General Ownership
Owner
DNRC
USFS
PCTC
SKT Lands
Haul Route
Montana DNRC
Trust Land Management Division
Northwestern Land Office
Plains Unit
N
0 2.5 5 7.5 10
Miles
1:266,944

Attachment A

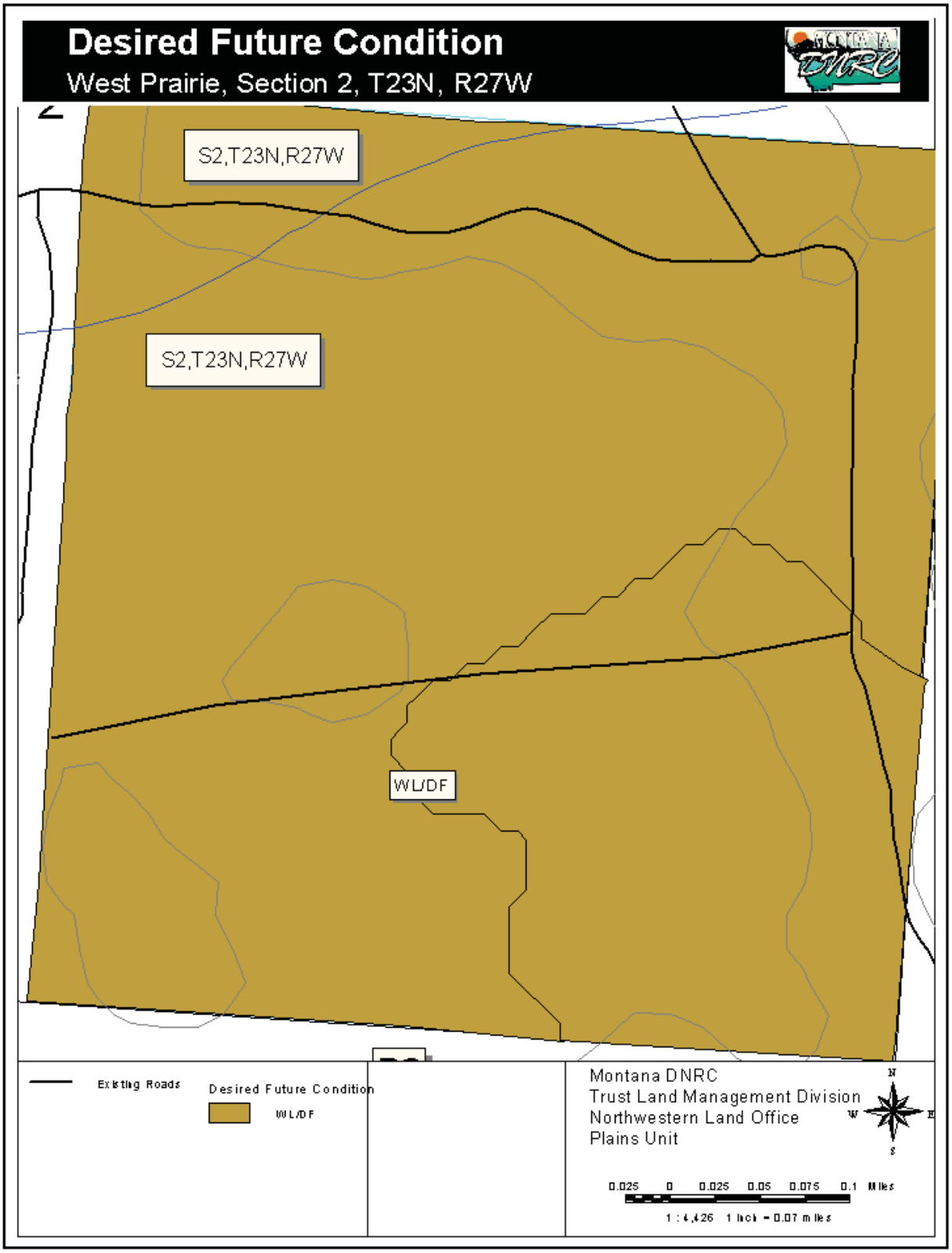


Plot date: January 13, 2010 c:\gis\daues\west prairie salvage\projectmap.apr

Attachment A

Plot date: January 26, 2010 c:\gis\daues\cigar mittsalvage\cigarsalvage.apr

Attachment A



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Attachment II

Resource Analysis

Page #

- **Vegetation Analysis**……...18
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- **Archeologist Analysis**……...52

VEGETATION ANALYSIS

INTRODUCTION

This analysis is used to look at the existing conditions of the vegetation in the proposed area and determine the possible effects that could result from the alternatives of the project. During the initial scoping, issues were developed by the public and internally regarding vegetative concerns. The following concerns were expressed from these comments regarding proposed timber harvesting and related activities:

- Forest Health: There are concerns that endemic populations of diseases and insects are increasing on the site and have the potential to reach epidemic proportions or reduce productivity.

- Fire Ecology: There is concern that the exclusion of fire from the site has changed stand compositions, and age classes from what would have historically occurred in the area. There is also concern that forest fuels have accumulated to a point that would leave this area predisposed to a catastrophic fire event.

- Site Productivity: There are concerns with the canopy closure and the increased competition between trees which will decrease the productivity of the trees. The increase in competition will also stress the trees which will increase the trees susceptibility for disease and insect outbreaks.

- Concern regarding impacts to threatened, endangered and sensitive plant and animal species (TES).

ANALYSIS AREA

The area that the vegetation was analyzed was located in the Southeast ¼, Section 2, Township 23 North, Range 27 West. This quarter section is located along Big Prairie Creek. This analysis will adequately allow for the disclosure of existing conditions, direct, indirect, and cumulative impacts that are considered at the scale of the Plains Unit.

ANALYSIS METHOD

The Plains Unit typically prepares two to four timber sales per year. Each 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 CONDITIONS

Past and current events have changed the forest conditions on the proposed 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 the fires have become less frequent due to fire suppression. Section records indicate logging activity in this area began in the late 1940's with a

timber sale that produced about 1,300 mbf. The next large timber harvest came in 1992 in which about 620 mbf and 340 tons of pulp were removed. In this sale there were 20 acre strips that were clear-cut in the middle of the section and regeneration has started to grow in the openings. There were a few small timber harvests that occurred in 1961, 1984, and 1989. There were also some Christmas tree permits that were sold between 1956 and 1961. See Attachment 3 "Prescriptions" for detailed descriptions of the current vegetative conditions. The previous logging and fire suppression history of this parcel has led to stands that that have become overstocked with shade tolerant species and are not regenerating with species consistent with the desired future condition. Current cover types and Desired Future Condition stand maps can be seen in Attachment 1, Maps.

Stand within the project area are beginning to show increase in fuel loading as advanced shade tolerant regeneration (Douglas fir, grand fir and alpine fir) has become a green ladder fuel. This type of fuel loading is developing in parts of all stands within the project area. Insect and disease mortality in all stand components is contributing to dead fuel loading. The primary disease that is found in the stand is Dwarf mistletoe (*Arceuthobium douglasii & Arceuthobium laricis*) and this can be found in the Douglas-fir and western larch. There is also grand fir that is dieing and falling over due to fir engraver (*Scolytus ventalis*). The overstory, intermediate components and the overstocked understory are all being affected at a moderate level now, but increasing due to competition from overstocking and advanced age.

Noxious weeds, mainly knapweed, are present throughout the project area, mostly prevalent along the open roads and within stand openings.

ENVIRONMENTAL EFFECTS

Direct and Indirect

No Action Alternative

No timber harvest or associated activities would occur under this alternative. Timber types would continue to advance towards climax conditions with shade tolerant grand fir continuing to thrive in the understory. Grand fir has already started to dominate the understory and will continue to shade out the seedlings from more desirable species. Growth and vigor of the trees present in the analysis area would continue to decline as competition for resources increases. The diseases and insects will continue to thrive which will lead to increased mortality and fuel loading. Noxious weeds would continue to exist along the roads and move into the forested areas as natural disturbances prepare appropriate seedbeds.

Action Alternative

The proposed alternative would harvest timber on approximately 98 acres and enhance the desired future condition overstory of western larch, Douglas-fir cover type. The harvest would be focused on the removal of those affected by or susceptible to insect and disease mortality, as well as shade tolerant tree species. More detailed information for treatment can be obtained in Attachment 3, "Prescriptions". Proposed harvest would move 98 acres of mixed conifer cover types toward the Desire Future Condition western larch/Douglas fir cover type. Through harvest and site preparation activities, fuel loadings would be reduced by the removal of ladder fuels from the understory intermediate components of these stands as well as crown spacing in the intermediate and overstory components. Growth and vigor would increase because residual tree spacing would allow full light to crowns and more access to water. Logging operations would

create openings and roads, landing and skid trails would be more visible. The selective harvest along open roads should minimize the visual impact. The end result will be still denser and contain larger trees than does most of the surrounding ownership. Noxious weeds may increase due to the disturbance and the opening in the canopy. However, this will be monitored and addressed through an integrated pest management plan including chemical and biological control methods.

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 dominant species.
Fuel loading is also expected to increase.

Action Alternative

The Alternative Action would alter the current cover and move the cover type to the desired future conditions as well as enhance the desired potential vegetation types as identified by the Stand Level Inventory. The project area would be altered with regard to overall size class distribution and a reduction in stocking levels.

The proposed action will occur on about 98 acres of the Plains Unit total 52,795 acres. This will have an impact on less than 1% of the total acreage. So these changes will not have a significant impact across the landscape of the Plains Unit.

HYDROLOGY ANALYSIS

INTRODUCTION

This analysis is designed to disclose the existing condition of the hydrologic and fisheries resources and display the anticipated effects that may result from each alternative of this proposal. The following issue statements were expressed from internal comments regarding the effects of proposed timber harvesting:

- Timber harvesting and road construction has the potential to increase water yield which in turn may affect stream channel stability
- Timber harvesting and road construction activities may increase sediment delivery into 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. Due to the lack of surface water in the project area, fisheries resources will not be addressed.

The Environmental Effects sections disclose the anticipated indirect, direct and cumulative effects to water resources within the analysis area from the proposed actions. Past, current, and future planned activities on all ownerships within the analysis area have been taken into account for the cumulative effects analysis.

ANALYSIS METHOD

Sediment Delivery

The methods applied to the project area to evaluate potential direct, indirect and cumulative effects include a review of field data to look at potential sediment sources from haul routes and proposed harvest areas.

Water Yield

A review of the watershed boundaries and sized was completed as part of a preliminary analysis. The proposed harvest unit would be split between two watersheds; Big Prairie Creek and Middle Thompson River 6th-code Hydrologic Unit Code (HUC). Due to the small size of this harvest area in relation to the watershed sizes only a very low risk of measurable increases in annual water yield could occur from this proposal. Because measurable direct, indirect or cumulative impacts would not likely be measurable, no further analysis of water yield is deemed appropriate as described in ARM 36.11.423 (1)(a)(i).

ANALYSIS AREA

Sediment Delivery

The analysis area for these parameters is limited to the harvest units and roads used for hauling. This includes upland sources of sediment that could result from this project as well as vegetation removal within harvest units.

Cumulative Effects

The analysis area for cumulative effects is limited to the harvest units and roads used for hauling This is selected as the appropriate scale of analysis due to the size of the project versus the watershed size and the potential for 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 streams in the project area including Big Prairie Creek and the Thompson River are not listed as a water quality limited water body in the 2008 303(d) list. The 303(d) list is compiled by the Montana Department of Environmental Quality (MDEQ) as required by Section 303(d) of the Federal Clean Water Act and the Environmental Protection Agency Water Quality Planning and Management Regulations (40 CFR, Part 130). Under these laws, DEQ is required to identify water bodies that do no fully meet water quality standards, or where beneficial uses are threatened or impaired.

Streamside Management Zone Law (SMZ)

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

WATER RIGHTS AND BENEFICIAL USES

Water rights for surface water exist within 3 miles downstream of the project area on the Thompson River for stock watering, lawn and garden use, domestic water, industrial use and fire protection.

EXISTING CONDITION

The northern portion of the project area is in the Big Prairie watershed which is approximately 2000 acres in size. The drainage flows south along McCully Ridge before turning east to its confluence with the Thompson River. The watershed is a relatively low elevation watershed with its maximum elevation of 5,140 feet near the northern boundary and the lowest elevation of approximately 3,000 feet at the confluence. Precipitation in the watershed ranges from 20 to 26 inches per year. Although the USGS maps indicate a stream across the project area, no evidence of a stream was found during initial field review. A review by another DNRC hydrologist in 1990 indicated that "…the streamflow goes subsurface above the sale area and there is a lack of continuous flow to the Thompson River. (DSL 1991) No visible sign of surface drainage is evident in the section." The southern portion of the project area is in the Middle Thompson River watershed. All other attributes of this portion of the project area are similar to the northern portion, including the lack of surface drainage features.

Sediment Delivery

In 2000, DNRC contracted a road inventory on the haul route. Because the terrain is generally flat, road surface drainage features have been maintained and no surface water is present, no evidence of sediment delivery was identified on the haul route.

ENVIRONMENTAL EFFECTS

Description of Alternatives

No Action Alternative

No timber harvest or associated activities would occur under this alternative. Existing activities such as recreational use, and firewood gathering would continue.

Action Alternative

One unit approximately 103 acres in size would be harvest with a heavy seedtree/shelterwood prescription that removes lodgepole pine and grand fir. Healthy western larch, ponderosa pine and Douglas-fir would be retained in the overstory and as a seed source for regeneration after site preparation (scarification and slash piling with an excavator). All work would be completed during dry, frozen and/or snow-covered conditions with conventional ground-based equipment. Some minor road maintenance would occur on the haul road.

Direct and Indirect Effects

No Action Alternative

Sediment Delivery

Under this alternative, no timber harvest or related activities would occur. No direct or indirect impacts to water quality due to sediment delivery would be expected.

Action Alternative

Sediment Delivery

Under this alternative, sediment delivery into streams from harvest units would not likely occur due to the lack of streams in the project area. In addition, the generally flat terrain and properly designed road would limit the potential for sediment transport.

Cumulative Watershed Effects

No Action Alternative

Under the no action alternative the potential for sediment contribution from the proposed haul route and would still exist, however, no additional cumulative effects would be expected beyond those impacts described in the existing condition.

Action Alternative

Due to the lack of streams in the project area, no additional cumulative effects would be expected from the timber harvesting or the minor maintenance work on the haul route. Because applicable Forestry BMPs would be implemented and no streams occur in the project area, the risk of long-term cumulative impacts to water quality and beneficial uses from this action would be very low.

REFERENCES

- DSL, 1991. Environmental Assessment/Silvicultural Prescription: Big Prairie Creek Road Timber Sale. Montana Department of State Lands, Plains Unit.

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. Comments were received from the general public and agency colleagues; however no specific soil concerns were expressed. The following issue statement was expressed from comments regarding the effects of proposed timber harvesting:

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

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

ANALYSIS AREA

The analysis area for soil impacts will be the harvest. This analysis area will adequately allow for disclosure of existing conditions, direct, indirect and cumulative impacts.

ANALYSIS METHODS

Methods for disclosing impacts include using general soil descriptions and the management limitations of the landtype and then qualitatively assessing the risk of negative effects to soil productivity from compaction and displacement from each alternative.

EXISTING CONDITIONS

General Conditions

The Plains Unit is dominated by partially metamorphic, sedimentary rocks from the 600-million year old Belt Supergroup. The project area is within the Wallace formation that encompasses the foothills and lower mountain slopes from Plains to the Thompson Lakes. Rocks in this formation are generally comprised of argillites, quartzites and siltites. Overlying these sediments is a layer of loess influenced volcanic ash deposited and redeposited from Mount Mazama approximately 6700 years ago.

Glacial Lake Missoula sediments were deposited in the Thompson River Valley during the periods with a functional ice jam. Rapid draining of the lake would occur when the ice jam would break leaving the glacial silt deposits as terraces in the larger valleys near Plains and Thompson Falls. These silty terraces are found south of the Bend Guard Station. Underlying these surface soils are deposits of reddish, clay rich sediments which can be found in some road cuts along the Thompson River Valley.

Information about the soils in the project area can be found in two documents: The Plains Unit Soil Survey (Collins and Ottersberg 1985) and the Soil Survey of Sanders and Parts of Lincoln

and Flathead Counties, Montana (NRCS 1996). The Plains Unit Soil Survey combined landform and soil quality information with habitat types to inventory and map soils in the project area. The combination of vegetation, soil and landform information results in map units referred to as landtypes. The Web Soil Survey (*http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm*) by the Natural Resources Conservation Service was used to identify management implications for the project area landtypes as well as physical attributes of soils found in the project area. One general landtype was found in the project area.

Table ST-1: Project Area Landtype Descriptions

Soil Description			Management Implications (erosion hazard)	
Landtype	Name	Soil & Vegetation Descriptions	Erosion Potential	Comments
14-J	Lacustrine Terraces 0-20% slopes	Surface soils are deep Glacial Lake Missoula lacustrine silts. Rocky outcrops are rare and not found in the project area. These lacustrine soils have a silty volcanic ash surface over the deep silt surface layer. Very limited gravel is present. Vegetation is generally grand fir habitat types with Douglas fir on southern aspects and subalpine fir in swales and draws. The understory is twinflower, pinegrass or queencup beadlily.	Due to the fine texture of the surface soils, bare soils have a high potential for erosion. However, due to the gentle terrain, sediment delivery potential is low.	Timber productivity potential is high. Well suited for tractor operations. Due to grass competition and frost pockets, regeneration may be difficult. Due to compaction risk, season of use must be managed to limit operations to periods of dry (18% soil moisture), frozen or snow-covered conditions.

Existing Conditions Due to Past Management

DNRC strives to maintain soil productivity by limiting cumulative soil impacts to 15 percent or less of a harvest area as noted in the State Forest Management Plan (DNRC, 1996). As a recommended goal, if existing detrimental soil effects exceed 15 percent of an area, proposed harvest should minimize any additional impacts. Harvest proposals on areas with existing soil impacts in excess of 20 percent should avoid any additional impacts and include restoration treatments as feasible base on site-specific evaluation and plans. Past monitoring on DNRC timber sales from 1988 to 2005 has shown an average of 13.9 percent soil impacts across all parent materials. Soil monitoring on the similar soils (lacustrine) found total soil impacts of 10.5 percent. Harvesting under winter conditions resulted in total soil impacts of 9.4 percent and summer harvest on lacustrine soils resulted in total soil impacts of 11.5 percent. Results of the monitoring suggests that gentle slopes and fine textured soils were the most susceptible to compaction when operated on when wet. Total soil impact is considered to be the sum of impacts due to erosion, displacement or severe compaction.

Cumulative effects from past and current uses in the proposed harvest units are limited to skid trails and landings. An ocular estimation of the area impacted in these proposed units by moderate or higher compaction is less than five percent. While some of these skid trails and roads are still discernable, vegetation similar to the surrounding vegetation is generally present and growing. Through the freeze-thaw cycles and root mass penetrating the soil, impacts from past entries are substantially reduced. Past harvesting operations in the proposed unit includes large (>200mbf) harvests in 1948. Harvest adjacent to the proposed unit occurred in 1992. A list of harvesting in the project area can be found in the project file. Other forest product removals include firewood, and individual and commercial Christmas tree harvests throughout the last 60 years.

No large woody debris transects were conducted in the proposed area, consequently a quantifiable estimate of existing LWD is not available.

ENVIRONMENTAL EFFECTS

Description of Alternatives

No Action Alternative

No timber harvest or associated activities would occur under this alternative. Existing activities such as recreational use, and firewood gathering would continue.

Action Alternative

One unit approximately 103 acres in size would be harvest with a heavy seedtree/shelterwood type prescription that removes lodgepole pine and grand fir. Healthy western larch, ponderosa pine and Douglas-fir would be retained in the overstory and as a seed source for regeneration after site preparation (scarification and slash piling with an excavator). All work would be completed during dry or frozen and/or snow-covered conditions with conventional ground-based equipment. Some minor road maintenance would occur on the haul road.

Direct and Indirect Effects

No Action Alternative

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

Action Alternative

To provide an adequate analysis of potential impacts to soils, a brief description of implementation requirements is necessary. The Administrative Rules of Montana 36.11.422 (2) and (2)(a) state that appropriate BMPs shall be determined during project design and incorporated into implementation. To ensure the incorporated BMPs are implemented, the specific requirements would be incorporated into the DNRC Timber Sale Contract. As part of this alternative design, the following BMPs are considered appropriate and, therefore would be implemented during harvest operations:

1) Limit ground based equipment operations to periods when soils are relatively dry, (less than 18**%**), frozen or snow covered to minimize soil compaction and rutting, and maintain drainage features. Check soil moisture conditions prior to equipment start-up.

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

3) Tractor skidding should be limited to slopes less than 35% unless the operation can be completed without causing excessive erosion. Short steep slopes above incised draws may require a combination of mitigation measures based on site review, such as adverse skidding to ridge or winch line skidding from more moderate slopes less than 35%.

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

5) Slash Disposal- Limit disturbance and scarification combined to 30-40% of harvest units. Consider lop and scatter or jackpot burning on steeper slopes. Retain 10 to 15 tons per acre of material 3 inches diameter and larger. Minimize removal of fine (<1/4" diameter) material for nutrient cycling.

Considering data from the DNRC Soil Monitoring Report (DNRC, 2005), the implementation of Forestry Best Management Practices has resulted in less risk of detrimental soil impacts from erosion, displacement and severe compaction. While the report noted that compaction was more prevalent on gentle slopes with fine textured soils, reduced soil productivity due to compaction can minimized through soil moisture restrictions and season of use. Also, the greatest impacts of the monitoring report were noted where harvest implementation departed from BMPs such as harvesting during wet conditions.

Assuming the impacts would be similar to previous timber harvest on lacustrine soils, the expected total impact to soils would be approximately 11.5 percent of the harvest area. This would equate to approximately 11.8 acres of reduced productivity due to compaction, displacement and erosion. As vegetation begins to establish on the impacted areas, and freeze-thaw cycles occur, the area of reduced productivity would decrease.

Coarse woody debris would be retained on site at levels similar to those recommended for grand fir habitat types to maintain forest productivity (Graham et al, 1994). In addition, fine material (<1/4" diameter) removal would be minimized to facilitate on-site nutrient cycling. Because these measures would be implemented, coarse and fine woody debris inputs to forest productivity would likely be maintained at an adequate level.

Cumulative Soil Effects

Cumulative effects would be controlled by limiting the area of adverse soil impacts to less than 15 percent of harvest units (as recommended by the SFLMP) through implementation of BMPs, skid trail planning on tractor units and limiting operations to frozen and/or snow-covered 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.

Some 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.

REFERENCES:

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

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

DNRC, 1996. State Forest Land Management Plan. Montana Department of Natural Resources and Conservation. Missoula, MT.

DNRC, 2005. DNRC Compiled Soils Monitoring Report on Timber Harvest Projects, 1988 2004. Prepared by J. Collins, Forest Management Bureau. Missoula, MT.

DSL, 1991. Environmental Assessment/Silvicultural Prescription: Big Prairie Creek Road Timber Sale. Montana Department of State Lands, Plains Unit.

Graham, R.T., A.E. Harvey, M.F. Jurgensen, T.B. Jain, J.R. Tonn, and D. S. Page-Dumroese. 1994. *Managing Coarse Woody Debris in Forest of the Rocky Mountains.* USDA Forest Service Research Paper. INT-RP-447. 13 pp.

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

WILDLIFE ANALYSIS

INTRODUCTION

This analysis is designed to disclose the existing condition of the wildlife resources and display the anticipated effects that may result from each alternative of this proposal. DNRC Forest Management Rules and comments received during initial scoping led to the following list of issues:

- Timber harvesting could reduce forested cover, which could reduce the amount of mature forested habitats available to those species that rely on these habitats and/or decrease the ability of some wildlife species to move through the landscape, which could alter their ability to use the area and or successfully reproduce.
- Timber harvesting could reduce snags and coarse woody debris densities, leading to a decline in the quality of habitat for those wildlife species that are dependent on these resources, which could alter their survival and/or reproductive ability.
- Timber harvesting and associated activities could alter cover, increase access, and reduce secure areas, which could adversely affect grizzly bears by displacing grizzly bears from important habitats and/or increasing risk to bears of human-caused mortality.
- Timber harvesting and associated activities could displace gray wolves from important habitats, particularly denning and rendezvous sites, and/or alter prey availability.
- Timber harvesting and associated activities could remove canopy cover and snags needed by pileated woodpeckers to forage and nest and/or displace nesting pileated woodpeckers from active nests, resulting in increased mortality to pileated woodpecker chicks.
- Timber harvesting and associated activities could remove forest cover on big game winter range, which could reduce the carrying capacity of the winter range.

The following sections disclose the anticipated direct, indirect, and cumulative effects to these wildlife resources in the analysis area from the proposed actions. Past and current activities on all ownerships in each analysis area, as well as planned future agency actions, have been taken into account for the cumulative-effects analysis.

ANALYSIS AREA

The discussions of existing conditions and environmental effects will focus on 2 different scales. The first will be the “project area”, which consists of section 2 in T23N, R27W. The second scale or the “analysis area” relates to the surrounding landscape for assessing cumulative effects to wildlife species and their habitats. The scales of these analysis areas vary according to the species being discussed, but generally approximate the size of the home range of the discussed species.

ANALYSIS METHODS

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

and sensitive species (*ARM 36.11.406*). The fine-filter approach focuses on a single species' habitat requirements.

To assess the existing condition of the proposed project area and surrounding landscape, a variety of techniques were used. Field visits, scientific literature, SLI data, aerial photographs, Montana Natural Heritage Program (MNHP) data, and consultations with other professionals provided information for the following discussion and effects analysis. Specialized methodologies are discussed under the species in which they occur. Species were dismissed from further analysis if habitat did not exist in the project area or would not be modified by any alternative.

RELEVANT AGREEMENTS, LAWS, PLANS, RULES, AND REGULATIONS

Various legal documents dictate management criteria for the management of wildlife and their habitats on state lands. The documents most pertinent to this project include: *DNRC Forest Management Rule*s, the *Endangered Species Act*, the *Migratory Bird Treaty Act*, and the *Bald and Golden Eagle Protection Act*.

COARSE FILTER WILDLIFE ANALYSIS

Of the 108 mammal species found in Montana, 68 are suspected or known to occur in Sanders County (*Foresman 2001*). The majority of terrestrial vertebrates that were present at the time of European settlement likely still occur in the vicinity of the proposed project area. Eight amphibian and nine reptile species have also been documented in Sanders County (*Maxell et al. 2003*) and at least 151 species of birds have been documented in the vicinity in the last 10 years (*Lenard et al. 2003*). Terrestrial species that rely on special habitat elements, such as white bark pine (*Pinus albicaulis*), western white pine (*Pinus monticola*), or burned areas, may not be present or may occur in lower abundance due to the decline of these elements across the landscape. Over time, due to fire suppression, tree densities have increased and shade-tolerant species, such as Douglas-fir and grand fir, have become more prevalent than they were historically. These departures probably benefit wildlife species that rely on shade-tolerant tree species and/or closed-canopy habitats, while negatively affecting species that rely on shade-intolerant tree species and/or open habitats. However, in the vicinity of the project area, the forests are a mosaic of mature stands, which benefit species relying on mature forests, and regenerating forests, which benefit wildlife species that use early seral stages either exclusively or seasonally.

MATURE FORESTED HABITATS AND LANDSCAPE CONNECTIVITY

Issue: Timber harvesting could reduce forested cover, which could reduce the amount of mature forested habitats available to those species that rely on these habitats and/or decrease the ability of some wildlife species to move through the landscape, which could alter their ability to use the area and or successfully reproduce.

Introduction

A variety of wildlife species rely on mature to old stands for some or all life requirements. A partial list of these species includes pileated woodpeckers (*Dryocopus pileatus)*, American marten (*Martes americana*), brown creepers (*Certhia americana)*, and winter wrens (*Troglodytes troglodytes*). Wildlife species that require connectivity of forest habitat types between patches or those species that are dependent upon interior forest conditions can be sensitive to the amount and spatial configuration of appropriate habitats. Some species are adapted to thrive near patch edges, while others are adversely affected by the presence of edge or the other animals that prosper in edge habitats. Connectivity of forested habitats facilitates

movements of those species that avoid nonforested areas and other openings; connectivity under historical fire regimes likely remained relatively high as fire differentially burned various habitats across the landscape.

Analysis Area

Direct and indirect effects were analyzed on the project area. Cumulative effects were analyzed on the rest of section 2 and the 12 sections surrounding the state parcel. This scale of analysis would be large enough to support a diversity of species that use mature forested habitats and/or require connected forested habitats.

Analysis Methods

Mature forested habitats and landscape connectivity were assessed using field evaluations, aerial-photograph interpretation, and Geographical Information System (GIS) analysis. Factors considered in the analysis include the level of timber harvesting, amount of densely forested habitats, and connectivity.

Existing Environment

The project area currently contains approximately 103 acres of mature stands (100-plus years in age) of Douglas-fir/western larch and mixed-conifer stands that have a reasonably closed canopy. No stands in the project area meet the definition of old-growth (*Green et al. 1992;* see *VEGETATION ANALYSIS*). In addition to the mature stands in the project area, three roughly 20-acre blocks of younger-aged stands of Douglas-fir/western larch exist due to past timber management. Connectivity within the project area has been reduced with past timber harvesting and road construction.

Presently, roughly 86 percent of the cumulative effects analysis area is not in mature, forested conditions due to past timber harvesting, road building, and other human developments. Additionally this network of open roads in the cumulative-effects analysis area, coupled with timber management and land clearing has largely eliminated landscape-level connectivity in the cumulative effects analysis area. Any harvesting that may be occurring on other ownerships in the cumulative effects analysis area could continue altering forested habitats and landscape connectivity. Across the cumulative-effects analysis area, landscape connectivity has largely been compromised for species requiring connected stands of mature forests.

Environmental Effects

Direct and Indirect Effects of the No-Action Alternative on Mature Forested Habitats and Connectivity

Forest conditions would continue to age, and denser stands of shade-tolerant tree species with high amounts of canopy cover would gradually develop. Largely, no appreciable changes to forest age, the distribution of dense forested cover, or landscape connectivity would be anticipated. No changes in wildlife use would be expected; wildlife favoring 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 American marten, northern goshawk, and pileated woodpecker, would continue to be limited, but would likely improve with this alternative; however, western larch and ponderosa pine, the preferred snag species, could decline in abundance over time. Thus, no direct or indirect effects to mature forested habitats and connectivity would be expected that could affect wildlife in the project area since: 1) no changes to existing stands would occur; 2) no appreciable changes to forest age, the

distribution of dense forested cover, or landscape connectivity would be anticipated; and 3) no changes to wildlife use would be expected.

Direct and Indirect Effects of the Action Alternative on Mature Forested Habitats and Connectivity

Approximately 103 acres of mature western larch/Douglas-fir, ponderosa pine, and mixed-conifer stands with a closed canopy would be harvested. All these acres of mature, forested habitats would receive a regeneration-type treatment, which would reduce habitat for those species relying on mature, closed-canopy forested habitats. Overall, the resultant changes in stand age and density would reduce habitats for species associated with older stands, such as American marten and pileated woodpecker, which benefited from the increasing stand ages and densities caused, in part, by modern fire suppression. In general, under this alternative, habitat conditions would improve for species adapted to the more-open forest conditions, while reducing habitat quality for species that prefer dense, mature forest conditions. However, the project area is rather small for those species generally requiring mature forested conditions. Following proposed harvesting the majority of the project area would be in younger-aged stands as the proposed harvest units would blend with the existing younger stands. Connectivity in the project area has been previously compromised with past harvesting and road construction, and proposed harvesting would not appreciably alter landscape connectivity given the limited presence in the project area. Thus, minor adverse direct and indirect effects to mature forested habitats and connectivity would be expected that could affect wildlife in the project area since: 1) harvesting would revert succession on roughly 103 acres of mature forested stands, reducing stand age and the amount of forested cover; 2) minor changes to landscape connectivity would occur; and 3) some changes to wildlife use would be expected.

Cumulative Effects of the No-Action Alternative on Mature Forested Habitats and Connectivity

Habitats in the cumulative-effects analysis area are largely younger-aged stands that are a result off past timber harvesting. This alternative would continue to contribute a small component of mature forested stands in the cumulative-effects analysis area. Losses of individuals and pockets of trees would not likely alter the overall age or landscape connectivity. Ongoing activities could continue reducing forested habitats and/or altering connectivity. Under this alternative, any use of the analysis area by species favoring dense stands of shade-tolerant tree species and those species requiring larger areas of mature forests would be expected to continue at present levels. Habitat for forested-interior species and old-stand-associated species, such as the American marten, northern goshawk, and pileated woodpecker, would not change and would continue to be largely absent from the cumulative effects analysis area. Thus, no cumulative effects to mature forested habitats and connectivity would be expected that could affect wildlife in the cumulative-effects analysis area since: 1) no changes to existing stands would occur; 2) no further changes to forest age, the distribution of dense forested cover, or landscape connectivity would be anticipated; and 3) no changes to wildlife use would be expected.

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

Past harvesting in the cumulative effects analysis areas has reduced the amount of mature, forested habitats available while altering landscape connectivity. Reductions in mature, forested habitats associated with this alternative would be additive to losses associated with past harvesting activities and any ongoing activities. Across the cumulative-effects analysis area, very few forested habitats would exist and landscape connectivity would not be appreciably altered. Habitats for forested interior species and old-stand-associated species, such as the American marten, northern goshawk, and pileated woodpecker, would be further reduced, and

would continue to be largely absent from the cumulative effects analysis area. Wildlife species favoring earlier seral stage habitats would see another increase in available habitats. Landscape connectivity would not change given that connectivity is largely absent from the cumulative effects analysis area; however future development of connected, mature forests could occur as the vast areas of similarly-aged stands, including these stands proposed to be harvested with this alternative, continue developing across the cumulative effects analysis area. Thus, minor adverse cumulative effects to mature forested habitats and connectivity would be expected that could affect wildlife in the cumulative-effects analysis area since: 1) harvesting would remove mature stands, further reducing the amount of forested cover in the cumulative-effects analysis area; 2) no appreciable changes to landscape connectivity would occur; and 3) some changes to wildlife use would be expected.

SNAGS AND COARSE WOODY DEBRIS

Issue: Timber harvesting could reduce snags and coarse woody debris densities, leading to a decline in the quality of habitat for those wildlife species that are dependent on these resources, which could alter their survival and/or reproductive ability.

Introduction

Snags and coarse woody debris are important components of forested ecosystems. The following are 5 primary functions of deadwood in the forested ecosystems: 1) increase structural diversity, 2) alter the canopy microenvironment, 3) promote biological diversity, 4) provide critical habitat for wildlife, and 5) act as a storehouse for nutrient and organic matter recycling agents (*Parks and Shaw 1996*).

Snags and defective trees (e.g. partially dead, spike top, broken top) are used by a wide variety of wildlife species for nesting, denning, roosting, feeding, and cover. Snags and defective trees may be the most valuable individual component of Northern Rocky Mountain forests for wildlife species (*Hejl and Woods 1991*). The quantity, quality, and distribution of snags affect the presence and population size of many of these wildlife species relying on these resources. Snags provide foraging sites for insectivorous species and offer opportunities for primary cavity-nesting species to excavate nests. The cavities created by primary excavators (i.e. woodpeckers) also provide habitat for secondary cavity users, including other birds and small and mid-sized mammals. Snags and defective trees can also provide nesting sites for secondary cavity users where cavities are formed by broken tops and fallen limbs. Larger, taller snags tend to provide nesting sites, while shorter snags and stumps tend to provide feeding sites (*Bull et al. 1997*). Many species that use smaller-diameter snags will also use large snags; however, the opposite is not true. Typically, older-aged stands will have greater numbers of large snags. Finally, snag densities are another important aspect of habitat value for cavity-nesting birds, as many of these species tend to nest in areas where snag densities are high, using one snag for nesting, but having others nearby for foraging or roosting opportunities.

Meanwhile, coarse woody debris provides food sources, areas with stable temperatures and moisture, shelter from the environment, lookout areas, and food-storage sites for several wildlife species. Several mammals rely on deadwood for survival and reproduction. The size, length, decay, and distribution of woody debris affect their capacity to meet these life requisites. Logs less than 6 feet in length tend to dry out and provide limited habitat for wildlife species. Single, scattered downed trees could provide lookout and travel sites for squirrels or access under the snow for small mammals and weasels, while log piles provide foraging sites for weasels and denning sites for lynx.

Analysis Area

Direct and indirect effects were analyzed on the project area. Cumulative effects were analyzed on the rest of section 2 and the 12 sections surrounding the state parcel. This scale of analysis would be large enough to support a diversity of species that use coarse woody debris resources, from birds to small mammals and meso-carnivores.

Analysis Methods

Snags and coarse woody debris were assessed during site visits and while reviewing past DNRC harvesting information. Factors considered in the analysis include the level of harvesting, number of snags and coarse woody debris, and the risk level of firewood harvesting.

Existing Environment

During field visits to the project area, relatively few (0-2/acre) large (>21" dbh) snags per acre were observed, which were largely dominated by western larch, ponderosa pine, and Douglas-fir. Large snags (greater than 21 inches dbh) were more abundant in the older stands and away from open roads where firewood cutting often occurs. Likewise, coarse woody debris is typically abundant in these older stands, with much of the volume coming from larger pieces of downed wood (greater than 10 inches dbh). Medium-sized snags (15-21" dbh) were also variable within the project area with a similar species mixture. Generally evidence of snag use for feeding and/or cavity building was observed across the project area. Coarse woody debris levels were also variable across the project area, with 20-30 tons per acre. Elsewhere in the project area, areas that have been harvested in the recent past have a couple of snags per acre and some coarse woody debris. The open roads in portions of the project area have facilitated some firewood gathering, which has affected snag and coarse woody debris levels in the vicinity of those open roads.

Past harvesting in the cumulative-effects analysis area has reduced the availability of snags and snag recruits while increasing coarse woody debris levels; however, minimum-retention thresholds for each of these resources have been retained on DNRC-managed lands that have been harvested in the recent past. Any ongoing harvesting in the vicinity on other ownerships could continue to alter snags, snag recruits, and coarse woody debris levels. Snags and coarse woody debris are frequently collected for firewood, especially near open roads, and firewood gathering occurs in the cumulative-effects analysis area. Snags and coarse woody debris are largely absent from those portions of the cumulative effects analysis area that are non-forested.

Environmental Effects

Direct and Indirect Effects of the No-Action Alternative on Snags and Coarse Woody Debris

No direct changes in the deadwood resources would be expected. Existing snags would continue to provide wildlife habitats, and new snags would be recruited as trees die. However, in the long-term, densities of shade-intolerant trees and resulting snags could decline as these species are replaced by increasing numbers of shade-tolerant species. Shade-intolerant species tend to provide important habitats, such as nesting structures and foraging habitats, for cavity-nesting birds. Coarse woody debris would persist without other disturbances influencing its distribution and quality. Continued decay and decline in existing snags and trees would continue to contribute to the coarse woody debris in the project area. Thus, negligible direct and indirect effects would be anticipated to snags, and coarse woody debris would be expected to affect wildlife species requiring these habitat attributes since: 1) no harvesting would occur that would alter present or future snag or coarse woody debris concentrations, and 2) no changes to human access for firewood gathering would occur.

Direct and Indirect Effects of the Action Alternative on Snags and Coarse Woody Debris

Present and future snags and coarse woody debris would be reduced due to timber harvesting on 103 acres in the project area. Portions of the project area adjacent to open roads or in stands that lack larger snags would not see appreciable changes in the availability of large snags and/or coarse woody debris since these attributes are currently somewhat limited in those areas. Prescriptions call for a minimum of 2 large snags per acre (greater than 21 inches dbh where they exist, otherwise the next largest size class), 2 large snag recruits per acre (greater than 21 inches dbh where they exist, otherwise the next largest size class; additional large-diameter recruitment trees may be left if sufficient large snags are not present), and 10 to 15 tons of coarse woody debris per acre would be planned for retention in the proposed harvest areas. However, some snags and/or recruit trees could be lost due to safety and operational concerns, but replacements would be identified in order to stay in compliance with *ARM 36.11.411*. Future snag quality in the harvested areas would be enhanced with proposed silvicultural prescriptions that should lead to the reestablishment of shade-intolerant species that tend to provide important habitats, such as long-lasting nesting structures and foraging habitats, for cavity nesting birds. Given the amounts, range of variability in sizes, and decay classes of snags and coarse woody debris present in the project area, prescriptions aiming to maintain a variety of these resources would benefit the suite of species that rely on these habitat components. No changes in human access would occur and, therefore, no changes to the potential risk for snag and coarse woody debris loss due to firewood gathering would occur. Thus, minor adverse direct and indirect effects to snags and coarse woody debris would be anticipated that would affect wildlife species requiring these habitat attributes since: 1) harvesting would reduce snags, snag recruitment trees, and coarse woody debris and 2) no changes to human access for firewood gathering would occur.

Cumulative Effects of the No-Action Alternative on Snags and Coarse Woody Debris

Snags and coarse woody debris would not be altered in the project area. The species composition of future snags could be altered with changing species composition in the stands due to advances in succession. Snags have been retained during some of the past harvesting on adjacent ownerships including on the Big Prairie Timber Sale Project on DNRC-managed lands in the cumulative effects analysis area. Any harvesting that may be occurring on other ownerships in the cumulative effects analysis area could continue to alter snag and coarse woody debris densities. Firewood and other forest-product gathering have reduced deadwood resources in the vicinity of the open roads. Snags and coarse woody debris are largely absent from the non-forested habitats in the cumulative effects analysis area and would not be expected to develop in the future. Wildlife species in the cumulative-effects analysis area that rely on snags and coarse woody debris would be expected to persist. Thus, no cumulative effects to snags and coarse woody debris would be anticipated since: 1) no further harvesting would occur, 2) changes in the numbers of snags would be negligible, and 3) no change in the level of firewood gathering would be expected.

Cumulative Effects of the Action Alternative on Snags and Coarse Woody Debris

Some snags and coarse woody debris could be removed from the project area, while others may be recruited. Surrounding lands have experienced gone different management regimes by the differing owners through time, and within each of these management regimes, snags and coarse woody debris have received different levels of consideration; however, harvesting on all ownerships in the vicinity has reduced these deadwood resources. The losses of snags and coarse woody debris associated with this alternative would be additive to the losses associated with past harvesting, any ongoing harvesting, as well as ongoing firewood gathering. However,

the project requirements to retain a minimum of 2 large snags per acre (greater than 21 inches dbh where they exist, otherwise the next largest size class), 2 large snag recruits per acre (greater than 21 inches dbh where they exist, otherwise the next largest size class), and 10 to 15 tons of coarse woody debris per acre would mitigate additional cumulative effects associated with this project. Due to a lack of snags or the risk of firewood gathering, some areas would not meet these requirements; efforts to retain additional snags in areas where they are more likely to persist would be beneficial. No change in human access would be anticipated; thus, no changes to the potential loss of snags and coarse woody debris to firewood gathering would occur. Wildlife species that rely on snags and coarse woody debris in the cumulative-effects analysis area would be expected to persist at similar levels, albeit slightly lower numbers in proposed units following treatment. Thus, minor adverse effects to wildlife species requiring snags and coarse woody debris would be anticipated in the cumulative-effects analysis area since: 1) a cumulative amount of the cumulative-effects analysis area would be harvested reducing snags and snag-recruit trees while increasing coarse woody debris levels, 2) no changes in access for the general public and associated firewood gathering would be anticipated, and 3) the slightly increased representation of shade-intolerant species that could become snags in the long term.

FINE-FILTER ANALYSIS

In the fine-filter analysis, individual species of concern are evaluated. These species include wildlife species listed as threatened or endangered under the Endangered Species Act of 1973, species listed as sensitive by DNRC, and species managed as big game by DFWP. TABLE W-1 – FINE FILTER summarizes how each species considered was included in the following analysis or removed from further analysis because suitable habitat does not occur within the project area or proposed activities would not affect their required habitat components.

TABLE W-1 – FINE FILTER. *Status of species considered in the fine-filter analysis for this proposed project.*

	SPECIES/HABITAT	DETERMINATION – BASIS
Threatened and Endangered Species	Grizzly bear (*Ursus arctos*) Habitat: Recovery areas, security from human activity	The project area is approximately 4 miles from the Mount Headley bear management unit of the Cabinet-Yaak Ecosystem.
	Canada lynx (*Felis lynx*) Habitat: Subalpine fir habitat types, dense sapling, old forest, deep snow zone	No suitable Canada lynx habitats were identified in the project area. Thus no direct, indirect, or cumulative effects to Canada lynx would be expected to occur as a result of either alternative.
Sensitive Species	Bald eagle (*Haliaeetus leucocephalus*) Habitat: Late-successional forest more than 1 mile from open water	There are no known nest territories in the vicinity of the project area. Thus, no direct, indirect, or cumulative effects to bald eagles would be expected to occur as a result of either alternative.
	Black-backed woodpecker (*Picoides arcticus*) Habitat: Mature to old burned or beetle-infested forest	No recently (less than 5 years) burned areas are in the project area. Thus, no direct, indirect, or cumulative effects to black-backed woodpeckers would be expected to occur as a result of either alternative.

	Coeur d'Alene salamander (*Plethodon idahoensis*) Habitat: Waterfall spray zones, talus near cascading streams	No moist talus or streamside talus habitat occurs in the project area. Thus, no direct, indirect, or cumulative effects to Coeur d'Alene salamanders would be expected to occur as a result of either alternative.
	Columbian sharp-tailed grouse (*Tympanuchus Phasianellus columbianus*) Habitat: Grassland, shrubland, riparian, agriculture	No suitable grassland communities occur in the project area. Thus, no direct, indirect, or cumulative effects to Columbian sharp-tailed grouse would be expected to occur as a result of either alternative.
	Common loon (*Gavia immer*) Habitat: Cold mountain lakes, nest in emergent vegetation	No suitable lake habitats occur within the project area. Thus, no direct, indirect or cumulative effects to common loons would be expected to occur as a result of either alternative.
	Fisher (*Martes pennanti*) Habitat: Dense mature to old forest less than 6,000 feet in elevation and riparian	No suitable fisher habitats exist in the project area. Thus, no direct, indirect, or cumulative effects to fisher would be anticipated.
	Flammulated owl (*Otus flammeolus*) Habitat: Late-successional ponderosa pine and Douglas-fir forest	No suitable dry ponderosa pine and Douglas-fir stands exist in the project area. Thus, no direct, indirect or cumulative effects to flammulated owls would be expected to occur as a result of either alternative.
	Gray Wolf (*Canis lupus*) Habitat: Ample big game populations, security from human activities	The project area is roughly 4 miles from the annual home range for the Corona wolf pack. The project area contains big game winter range.
	Harlequin duck (*Histrionicus histrionicus*) Habitat: White-water streams, boulder and cobble substrates	No suitable high-gradient stream or river habitats occur in the project area. No direct, indirect or cumulative effects to harlequin ducks would be expected to occur as a result of either alternative.
	Northern bog lemming (*Synaptomys borealis*) Habitat: Sphagnum meadows, bogs, fens with thick moss mats	No suitable sphagnum bogs or fens occur in the project area. Thus, no direct, indirect, or cumulative effects to northern bog lemmings would be expected to occur as a result of either alternative.
	Peregrine falcon (*Falco peregrinus*) Habitat: Cliff features near open foraging areas and/or wetlands	No suitable cliffs/rock outcrops occur in the project area. Thus, no direct, indirect, or cumulative effects to peregrine falcons would be anticipated as a result of either alternative.

	Pileated woodpecker(*Dryocopus pileatus*) Habitat: Late-successional ponderosa pine and larch-fir forest	Mature western larch/Douglas-fir habitats exist in the project area.
	Townsend's big-eared bat (*Plecotus townsendii*) Habitat: Caves, caverns, old mines	No suitable caves or mine tunnels are known to occur in the project area. Thus, no direct, indirect or cumulative effects to Townsend's big-eared bats are anticipated as a result of either alternative.
Big Game Species	Big game winter range	Big game winter range exists in the project area.
	Elk security habitat	No elk security habitat exists in the project area and no large blocks of security habitat exist that contribute to a larger block of elk security habitat outside of the project area. Thus, no direct, indirect, or cumulative effects to elk security habitat would be anticipated as a result of either alternative.

THREATENED AND ENDANGERED SPECIES

GRIZZLY BEAR

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

Introduction

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

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the project area. Cumulative effects were analyzed on a 27,892-acre area that is adjacent to the Mount Headley bear management unit of the Cabinet-Yaak Ecosystem and is bounded by Meadow Creek to the north, Thompson River to the east, and Jungle Creek to the south. This combined area approximates the home range size of a female grizzly bear.

Analysis Methods

Field evaluations, aerial photograph interpretation, and GIS analysis were the basis for this analysis. Open road densities in the cumulative effects analysis area were calculated using a simple linear calculation method and areas that are free of motorized human access that could contribute to security habitats were determined using GIS. Security habitats are areas that are > 0.3 miles (500 meters) from any open road, restricted road, or high use roads and trails and meet a minimum size of 2,500 acres. Factors considered in the analysis include amount of the area with open road densities greater than 1 mile per square mile, the amount of available security habitat, and availability of timbered stands for hiding cover.

Existing Environment

The project area is approximately 4 miles outside of the Mount Headley bear management unit of the Cabinet-Yaak Recovery Area. Grizzly bears have not been documented in the project area, but use of the project area is possible. Grizzly bears generally use different habitats relative to season. The project area primarily provides habitat for grizzly bears in the spring, due to the lower elevations and the presence of riparian areas in which vegetation greens up earlier in the spring. Summer or autumn habitat values are fairly low in the area.

Managing human access is a major factor in management for grizzly bear habitat. Open road densities in the cumulative effects analysis area are reasonably high with approximately 1.66 miles/square mile (simple linear calculation). No security habitat exists in the project area, however 2 blocks of potential security habitat exists in the cumulative effects analysis area. Hiding cover exists within both the project area and cumulative effects analysis area. Within the cumulative effects analysis area, no other harvesting is occurring on DNRC-managed lands, but ongoing harvesting may be occurring on other ownerships in the cumulative effects analysis area that could be altering grizzly bear habitats and/or human disturbance levels.

Environmental Effects

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

No direct effects to grizzly bears would be expected. No changes to the level of disturbance to grizzly bears would be anticipated. Foraging opportunities might decline due to the lack of diversity in habitat such as forest edge and younger age-class stands. No changes in security core, open-road densities, or hiding cover would be anticipated. Thus, no direct or indirect effects to grizzly bears would be anticipated since: 1) no disturbance or displacement would be expected, 2) no changes in hiding cover would occur, 3) security habitat would not be altered, and 4) no changes in long-term open-road densities would be anticipated.

Direct and Indirect Effects of the Action Alternative on Grizzly Bears

This alternative might affect grizzly bears directly through increased road traffic, noise, and human activity, and indirectly by altering the amount of hiding cover and forage resources. Activities in grizzly bear habitats reduce grizzly bear security, possibly resulting in increased stress and/or energy expenditure to endure the disturbance or to move from the area. These disturbances would only be present during harvesting operations; therefore, the season of disturbance is important in addressing impacts to grizzly bears. The proposed harvesting would likely occur during the non-denning period, which would likely have minor direct effects to grizzly bears; no direct effects to grizzly bears would be anticipated if harvesting occurred during the denning period. Use of the project area by grizzly bears would likely be the greatest during the spring; efforts to avoid the spring period would further reduce the likelihood of disturbing and displacing grizzly bears. Overall, the proposed activities would occur in areas where low levels of grizzly bear use would be anticipated or would occur during the time periods when grizzly

bears would not be expected to be using the area, leading to negligible disturbance and displacement of grizzly bears.

Hiding cover, defined as vegetation that will hide 90 percent of a grizzly bear at a distance of 200 feet, would be reduced on much of the 103 acres proposed for harvesting. Some hiding cover in the form of brush, shrubs, and sub-merchantable trees may persist, albeit at a reduced level from the existing condition; hiding cover would increase through time as young trees and shrub regeneration proceeds over the next 5 to 10 years. Security habitat would not be entered or altered with this alternative.

No new roads would be constructed with the proposed activities, thus no changes in open road densities would be anticipated. All existing roads would revert to the existing status after proposed harvesting, thus no changes to long-term open road densities and public motorized access would be anticipated. Thus, since 1) negligible disturbance and displacement would be anticipated, 2) hiding cover would be reduced in the project area and would be expected to recover in the short-term, 3) no changes to security habitats would be expected, and 4) no changes to long-term open road densities would be anticipated; minor adverse direct or indirect effects to grizzly bears in the local area would be expected in the short-term.

Cumulative Effects of the No-Action Alternative on Grizzly Bears

Motorized access to the area, open road densities, and security habitat would remain unchanged. Existing forested stands in the cumulative effects analysis area would be expected to persist in to the future; regenerating stands are either presently providing hiding cover and forage resources, or would be expected to do so in the near future. Ongoing harvesting on other ownerships could continue altering grizzly bear habitats. Moderate levels of human disturbance in the cumulative effects analysis area would be anticipated, which could be disturbing grizzly bears. Thus, since 1) no changes in human disturbance levels would be expected, 2) no changes to open road densities would occur, 3) no further losses of hiding cover would occur, and 4) no changes to security habitats would be expected; no further adverse cumulative effects would be expected to affect grizzly bears in the cumulative effects analysis area.

Cumulative Effects of the Action Alternative on Grizzly Bears

The increased use of road systems during the proposed project would temporarily increase human disturbance to grizzly bears within a portion of the cumulative effects analysis area, should they occur there. Proposed activities would occur in the portion of the cumulative effects analysis area already experiencing moderate levels of human disturbance, largely associated with open roads, and would be away from the more remote portions of the cumulative effects analysis area that are more likely to be used by grizzly bears. Collectively, minor short-term (2-4 years) increases in human disturbance would be anticipated in the cumulative effects analysis area. Continued use of the cumulative effects analysis area by grizzly bears would be anticipated at levels similar to present. Reductions in hiding cover would be additive to the reductions from past timber harvesting and any ongoing harvesting; however, appreciable amounts of the cumulative effects analysis area are currently providing hiding cover. Early successional stages of vegetation occurring in harvest units could provide foraging opportunities that do not exist in some mature stands. Open road densities would increase in the short-term, but no changes in long-term open-road densities would be expected. The fairly extensive road system would persist and would continue to facilitate human access within the cumulative effects analysis area; a slight increase in non-motorized access to a small portion of the cumulative effects analysis area might occur. Thus, since 1) minor increases in human

disturbance levels would be expected within the cumulative effects analysis area, 2) hiding cover would be lost in the short-term on a small portion of the cumulative effects analysis area, but would be expected to recovery fairly rapidly, 3) no changes in long-term open road densities would occur, and 4) no changes to security habitats would be expected; minor adverse cumulative effects to grizzly bears would be expected in the short-term (2-4 years) and minimal adverse cumulative effects would be anticipated in the long term.

SENSITIVE SPECIES

When conducting forest-management activities, the *SFLMP* directs DNRC to give special consideration to sensitive species. These species may be sensitive to human activities, have special habitat requirements, are associated with habitats that may be altered by timber management, and/or may, if management activities result in continued adverse impacts, become listed under the *Federal Endangered Species Act*. 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 Townsend's big-eared bats and fisher in the vicinity of the project area. As shown in ***TABLE W-1 - STATUS OF SPECIES CONSIDERED IN THE FINE-FILTER ANALYSIS FOR THIS PROPOSED PROJECT***, the sensitive species portion of this analysis will focus on gray wolves and pileated woodpeckers.

GRAY WOLF

Issue: Timber harvesting and associated activities could displace gray wolves from important habitats, particularly denning and rendezvous sites and/or alter prey availability.

Introduction

The gray wolf was listed as 'endangered' under the Endangered Species Act in the northern portion of Montana, which includes the project area; however, the USFWS recently delisted the gray wolf (May 4, 2009). To meet the delisting criteria, the 3 recovery areas need to support a minimum of 30 breeding pairs for 3 consecutive years. The 3 recovery zones have met the recovery objectives for breeding pairs since 2000. In 2008, 95 packs that met the definition of a 'breeding pair' were documented within the tri-state region (*USFWS et al. 2009*). Of those 95 packs, 34 occurred in Montana, with 17 of those found in the northern Montana portion of the recovery area, along with 28 additional packs that didn't meet the requirements to be considered a 'breeding pair' (*Sime et al. 2009*).

Wolves are a wide-ranging, mobile species that occupy a wide range of habitats, which possess adequate prey and minimal human disturbance, especially at den and/or rendezvous sites. The Lazy Creek pack has been in the vicinity for at least the last 8 years and has been a breeding pair counted toward the recovery goals for 3 of the last 5 years. The home range for this pack is variable, but typically includes part of the project area (*USFWS et al. 2009*).

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

Wolves typically den during late April in areas with gentle terrain near a water source (valley bottoms), close to meadows or other openings, and near big game wintering areas. When the pups are 8 to 10 weeks old, wolves leave the den site and start leaving their pups at rendezvous sites while hunting. These sites are used throughout the summer and into the fall. Disturbance at den or rendezvous sites could result in avoidance of these areas by the adults or force the adults to move the pups to a less adequate site. In both situations, the risk of pup mortality increases. No known wolf den or rendezvous sites are known in the project area; however, landscape features frequently associated with these sites occur in the project area. Wolves may be using the vicinity of the project area for hunting, breeding, and other life requirements.

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the project area. Cumulative effects were analyzed on the 27,892-acre area defined under *GRIZZLY BEAR* in this analysis. This area includes portions of previous annual home ranges for the Fishtrap and Lonepine wolf packs and would be large enough to support this wolf pack.

Analysis Methods

Since changes in winter range could have a sizable effect on the availability of prey for wolves, portions of the analysis are tied to the big game winter range section. Meanwhile, disturbance at den and rendezvous sites are important during certain portions of the year, and the timing of proposed activities in relation to these sites is also important. Direct and indirect, as well as cumulative effects, were analyzed using field evaluations, aerial-photograph interpretation, and a GIS analysis of habitat components. Factors considered in the analysis include the amount of winter range modified and the level of human disturbance in relation to any known wolf dens or rendezvous sites.

Existing Environment

Big game species are fairly abundant in the project area. Deer and elk winter range exists in the project area. The project area is approximately 4 miles from the annual home range for the Corona wolf pack and has been previously included in the annual home ranges of the Fishtrap and Lonepine wolf packs. In the project area, several landscape features commonly associated with denning and rendezvous sites occur, including meadows and openings, water sources, and a few areas of gentle terrain. Wolves have been documented in the project area in the past and would be expected to continue using the area into the future. No known den or rendezvous sites occur in the project area. Wolves may be using the vicinity of the project area for hunting, breeding, and other life requirements.

Within the larger, cumulative-effects analysis area, big game species are abundant, and winter range exists in the cumulative-effects analysis area. Numerous landscape features commonly associated with denning and rendezvous sites, including meadows and other openings near water and in gentle terrain, occur in the cumulative-effects analysis area. The known den site, along with the suspected rendezvous sites for the Corona wolf pack, occurs on private ownership to the south of the project area (*K. Laudon, DFWP, personal communication, December 1, 2009).* Wolves have used the cumulative-effects analysis area in the past and could use this area into the future. Past harvesting on all ownerships in the cumulative effects analysis area altered big game and wolf habitats. Similarly, ongoing harvesting is altering alter wolf and big game habitats.

Environmental Effects

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

Disturbance to wolves would not increase. No changes in big game habitat, including no changes to big game winter range would be expected during the short term; therefore, no changes in wolf prey availability would be anticipated. Wolf use of the project area would be expected to continue at current levels. Thus, no direct and indirect effects would be expected to affect gray wolves in the project area since: 1) no changes in human disturbance levels would occur, and 2) no changes to big game winter range would occur.

Direct and Indirect Effects of the Action Alternative on Gray Wolves

Wolves using the area could be disturbed by harvesting activities and are most sensitive at den and rendezvous sites, which are not known to occur in the project area. After harvesting activities, human disturbance levels would likely revert to preharvest levels and no changes in human access or open-road densities would be anticipated. Likewise, wolf use of the project area for denning and rendezvous sites would likely revert to preharvest levels. Harvesting would reduce white-tailed deer and elk winter range on the 103 acres in the project area. In the short term, the proposed harvest areas could lead to shifts in big game use, which could lead to a shift in wolf use of the project area. Thus, minor direct and indirect effects would be expected to affect gray wolves in the project area since: 1) minor short-term increases and negligible long-term changes in human disturbance levels would occur, with no increases near known wolf den and/or rendezvous sites anticipated, and 2) white-tailed deer and elk winter range would be removed across the project area.

Cumulative Effects of the No-Action Alternative on Gray Wolves

White-tailed deer, mule deer, and elk winter range would not be affected and substantive change in big game populations, distribution, or habitat use would be not anticipated. Levels of human disturbance would be expected to remain similar to present levels. Timber management on other ownerships may cause shifts in white-tailed deer use and subsequently gray wolf use of the cumulative effects analysis area; however, no changes would be anticipated that would alter levels of gray wolf use of the cumulative effects analysis area. No changes inhuman access would be anticipated. Thus, no further cumulative effects would be expected to affect gray wolves in the cumulative effects analysis area since: 1) no changes in human disturbance levels would occur, particularly near known wolf den and/or rendezvous sites, and 2) no changes to big game winter range would occur.

Cumulative Effects of the Action Alternative on Gray Wolves

Harvesting would reduce much of the thermal cover and snow intercept from a small portion of the winter range in the cumulative effects analysis area. Generally, some slight shifts of big game use may occur in the cumulative effects analysis area. Reductions in cover may cause slight decreases in use by deer and elk; however, no appreciable changes would be expected within the cumulative-effects analysis area. These reductions in cover would be additive to losses from past timber-harvesting activities and ongoing harvesting in the cumulative-effects analysis area. Human-disturbance levels would be expected to revert to levels similar to current levels after the proposed harvesting has been completed and roads would again be closed. No changes in motorized human access would be anticipated. No substantive change in wolf use of the cumulative effects analysis area would be expected; wolves would continue to use the area in the long term. Thus, negligible further cumulative effects would be expected to affect gray wolves in the cumulative effects analysis area since: 1) negligible short-term and long-

term changes in human disturbance levels would occur with no increases near known wolf den and/or rendezvous sites anticipated, and 2) negligible reductions to big game winter range would occur.

PILEATED WOODPECKER

Issue: Timber harvesting and associated activities could remove canopy cover and snags needed by pileated woodpeckers to forage and nest and/or displace nesting pileated woodpeckers from active nests, resulting in increased mortality to pileated woodpecker chicks.

Introduction

Pileated woodpeckers play an important ecological role by excavating cavities that are used in subsequent years by many other species of birds and mammals. Pileated woodpeckers excavate the largest cavities of any woodpecker. Preferred nest trees are western larch, ponderosa pine, cottonwood, and quaking aspen, usually 20 inches dbh and larger. Pileated woodpeckers primarily eat carpenter ants, which inhabit large downed logs, stumps, and snags. *Aney and McClelland (1985)* described pileated nesting habitat as..."stands of 50 to 100 contiguous acres, generally below 5,000 feet in elevation with basal areas of 100 to 125 square feet per acre and a relatively closed canopy." The feeding and nesting habitat requirements, including large snags or decayed trees for nesting and downed wood for feeding, closely tie these woodpeckers to mature forests with late-successional characteristics. The density of pileated woodpeckers is positively correlated with the amount of dead and/or dying wood in a stand (*McClelland 1979*).

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the project area. Cumulative effects were analyzed on the rest of section 2 and the 12 sections surrounding the state parcel. This scale includes enough area to support a couple of pairs of pileated woodpeckers (*Bull and Jackson 1995*).

Analysis Methods

To assess potential pileated woodpecker nesting habitats on DNRC-managed lands in the cumulative-effects analysis area, SLI data were used to identify sawtimber stands with more than 100 square feet basal area per acre, older than 100 years, had greater than 40-percent canopy closure, and occurring below 5,000 feet in elevation. Foraging habitats are areas that do not meet the definition above, but include the remaining sawtimber stands below 5,000 feet in elevation with greater than 40-percent canopy cover. Direct and indirect effects, as well as cumulative effects, were analyzed using a combination of field evaluation, aerial-photograph interpretation, and these mapped potential habitats. Factors considered included the amount of potential habitat, degree of harvesting, and amount of continuous forested habitat.

Existing Environment

In the project area, potential pileated woodpecker nesting habitat exists on approximately 103 acres that are dominated by Douglas-fir and mixed conifers. No other stands in the project area support mature stands suitable for pileated woodpecker foraging or nesting. Removal of large western larch and ponderosa pine by past timber-harvesting activity has reduced the quality of habitat for pileated woodpeckers. Large live and dead trees are less common than would occur naturally due to these past timber-harvesting activities in portions of the project area. During field visits, numerous feeding sites and 0-2 large (>21 in dbh) snags per acre were observed; these provide foraging and nesting opportunities for pileated woodpeckers. Large cavities were detected in the project area.

Presently, roughly 86 percent of the cumulative effects analysis area is not in mature, forested conditions due to human development and past harvesting, and thus is not likely providing pileated woodpecker habitats. Similarly, any harvesting that may be occurring on other ownerships in the cumulative effects analysis area could continue altering pileated woodpecker habitats. Collectively, very little potential pileated woodpecker habitats exist in the cumulative effects analysis area.

Environmental Effects

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

No disturbance of pileated woodpeckers would occur. Forest succession and natural disturbance agents would continue to bring about changes in existing stands. Trees would continue to grow, mature, and die, thus providing potential nesting and foraging structure for pileated woodpeckers. Continual conversion to shade-tolerant species would reduce the quality of habitat for pileated woodpeckers over time; through time, suitable pileated woodpecker habitats would begin developing in those areas harvested 15-20 years ago. Overall, a reduction in suitable nesting trees would be likely over time, which could lead to decreased reproduction in the project area. Thus, negligible adverse direct and indirect effects to pileated woodpeckers in the project area would be expected until some other disturbance reverses stand succession since: 1) no further harvesting would occur; 2) no changes in the amount of continuously forested habitats would be anticipated; 3) no appreciable changes to existing pileated woodpecker habitats would be anticipated; and 4) long-term, succession-related declines in the abundance of shade-intolerant tree species, which are valuable to pileated woodpeckers, would be anticipated.

Direct and Indirect Effects of the Action Alternative on Pileated Woodpeckers

Pileated woodpeckers tend to be tolerant of human activities (*Bull and Jackson 1995*), but might be temporarily displaced by the proposed harvesting. Harvesting 103 acres would reduce forested habitats for pileated woodpeckers and enlarge existing younger-aged stands. Roughly 103 acres of potential nesting habitat would be altered with regeneration-type treatments and would be too open to be considered pileated woodpecker habitats following proposed treatments. Collectively, all 160 acres in the project area would be too open to be considered pileated woodpecker habitats. In the stands proposed for treatment, potential pileated nesting and foraging habitats would be removed for 30 to 100 years. Elements of the forest structure important for nesting pileated woodpeckers, including snags (a minimum of 2 snags greater than 21 inches dbh per acre where they exist and would be expected to persist if they are not lost due to firewood gathering), coarse woody debris (10 to 15 tons per acre), numerous leave trees, and snag recruits (a minimum of 2 trees per acre greater than 21 inch dbh where they exist) would be retained in the proposed harvest areas. Some areas currently lack sufficient large snags, while other areas are either close to open roads, where snag loss could continue due to legal and illegal firewood and forest-product gathering. Since pileated woodpecker density is positively correlated with the amount of dead and/or dying wood in a stand (*McClelland 1979*), pileated woodpecker densities in the project area would be expected to be reduced on 103 acres. The silvicultural prescriptions would retain healthy ponderosa pine, western larch, and Douglas-fir while promoting the regeneration of many of these same species, which would benefit pileated woodpeckers in the future by providing nesting, roosting, and foraging habitats. Thus, moderate direct and indirect effects would be anticipated that would affect pileated woodpeckers in the project area since: 1) harvesting would reduce the amount of continuous forested habitats available, including the remaining 103 acres of mature forested habitats in the project area; 2) potential nesting and foraging habitats would be reduced; 3)

several snags and snag recruits per acre would be removed; however, mitigation measures to retain a minimum of 2 snags per acre and 2 snag recruits per acre in most of the harvest areas would be included, and 4) harvest prescriptions would retain and promote seral species in the proposed harvest areas.

Cumulative Effects of the No-Action Alternative on Pileated Woodpeckers

No disturbance of pileated woodpeckers would occur. Trees would continue to grow, mature, and die, thus providing potential nesting and foraging structure for pileated woodpeckers. Continued low levels of use of the cumulative-effects analysis area by pileated woodpeckers would be expected. Ongoing harvesting could continue to remove potential pileated woodpecker habitats while reducing the amount of the cumulative-effects analysis area that would be in mature, forested covertypes. Thus, negligible adverse cumulative effects to pileated woodpeckers in the cumulative-effects analysis area would be expected since: 1) no further changes to existing habitats would occur; 2) no further changes to the amount of continuously forested habitats available for pileated woodpeckers would be anticipated; and 3) long-term, succession-related declines in the abundance of shade-intolerant tree species, which are valuable to pileated woodpeckers, would occur.

Cumulative Effects of the Action Alternative on Pileated Woodpeckers

Under this alternative, further reductions in pileated woodpecker habitat would be expected in a cumulative effects analysis area with limited potential habitat. Several snags, coarse woody debris, and potential nesting trees would be retained in the project area; however, future recruitment of these attributes may be reduced in a portion of the area by the proposed activities. In the project area, the canopy on 103 acres proposed for regeneration-type treatments would likely be too open for appreciable pileated woodpecker use and would be more similar to existing stands on adjacent ownerships. Proposed harvesting would further reduce the quality of the cumulative effects analysis area for pileated woodpeckers by reducing the amount of the cumulative effects analysis area in mature forested conditions from 14 percent to 12 percent. Recently harvested stands, ongoing harvesting, and the various human developments in the cumulative effects analysis area have reduced pileated woodpecker habitats; reductions associated with this alternative would be additive to those reductions. Continued maturation of stands across the cumulative-effects analysis area is increasing suitable pileated woodpecker habitats through time. Thus, moderate cumulative effects would be anticipated that would affect pileated woodpeckers in the cumulative-effects analysis area since: 1) harvesting would further reduce the amount of continuous forested habitats available in the cumulative-effects analysis area, but small areas of forested habitats would persist; 2) potential nesting and foraging habitats would be reduced; 3) several snags and snag recruits per acre would be removed in the proposed harvest areas; however, mitigation measures would retain some of these attributes in several of the harvest areas; and 4) harvest prescriptions would promote seral species in the proposed harvest areas.

BIG GAME WINTER RANGE

Issue: Timber harvesting and associated activities could remove forest cover on white-tailed deer winter range, which could reduce the carrying capacity of the winter range.

Introduction

Winter ranges enable big game survival by minimizing the effects of severe winter weather conditions. Winter ranges tend to be relatively small areas that support large numbers of big game, which are widely distributed during the remainder of the year. These winter ranges have

adequate midstory and overstory to reduce wind velocity and intercept snow. The effect is that temperatures are moderated and snow depths are lowered, which enables big game movement and access to forage with less energy expenditure than in areas with deeper snow and colder temperatures. Snow depths differentially affect big game; white-tailed deer are most affected, followed by mule deer, elk, and then moose.

Analysis Area

Direct and indirect effects were analyzed on the winter range in the project area. Cumulative effects were analyzed on the 54,432-acre portion of the elk winter range north of Barktable Creek that includes the project area. This scale includes enough area to support a couple hundred elk.

Analysis Methods

Effects were evaluated using a combination of field evaluation, aerial photograph interpretation, and GIS analysis. Factors considered within this cumulative effects analysis area include acres of winter range harvested and level of human disturbance and development.

Existing Environment

Montana Department of Fish, Wildlife, and Parks identified elk (160 acres), white-tailed deer (160 acres), and moose (38 acres) winter ranges in the project area. These winter ranges are part of much larger elk (309,415 acres), white-tailed deer (540,054 acres), and moose (2,028,810 acres) winter ranges, respectively. Winter snow depths and suitable microclimates influence big game distribution and use within the vicinity. In the past, roughly 60 acres in each of these winter ranges in the project area have been harvested by DNRC and is not yet providing winter range attributes. Mature Douglas-fir/western larch, ponderosa pine, and mixed conifer stands in the project area are providing attributes likely facilitating use by wintering big game. Evidence of use by big game was noted in the project area during field visits.

Presently, numerous stands across the winter range in the cumulative effects analysis area are providing thermal cover and snow intercept for big game. Considerable amounts of this portion of the larger winter range have been harvested in the last 30 years, likely limiting the usefulness of these acres for wintering big game. Additionally, portions of the cumulative effects analysis area burned in the last 5 years, which has also likely limited the usefulness of that portion of the cumulative effects analysis area. Similarly, any harvesting that may be occurring on other ownerships in the cumulative effects analysis area could continue altering big game winter range. Human disturbance within the winter range is largely associated with timber management, recreational snowmobile use, and numerous open roads, which combined, likely influences wintering big game populations and their habitats.

Environmental Effects

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

No direct effects to big game winter range would be anticipated. No additional disturbance or displacement would be anticipated within the project area. In the near-term, big game thermal cover would continue to be absent from those stands harvested in the past; no additional changes to the winter range would be anticipated. In the longer-term, continued succession could reduce forage production while increasing thermal cover in these stands. No appreciable changes to winter carrying capacity would be anticipated. Since 1) subtle changes in thermal cover due to mortality and successional advances increasing canopy densities would be anticipated, 2) the amount of mature forested habitats on the winter range would not further

change, and 3) the levels of human disturbance would remain similar, no direct or indirect effects to big game winter range would be anticipated.

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

Some displacement would be expected as a result of the proposed harvesting operations, particularly if any of the units would be harvested during the winter. However, winter logging provides felled tree tops, limbs, and slash piles that could concentrate feeding big game during nighttime and quiet periods when logging operations are shut down. Increasing short-term forage availability in this manner could partially offset some of the effects associated with temporary displacement caused by logging disturbance. All of the 103 acres proposed for harvesting is providing big game thermal cover and these attributes would be removed with this alternative. Thermal cover and snow intercept would be expected to develop in these stands over the next 30-70 years when suitable sized trees (>40 ft. tall) start to provide these attributes again. No thermal cover or snow intercept would exist in the project area following proposed treatments. Proposed timber harvesting would not prevent big game movement through the project area appreciably in winter and could stimulate browse production within the units. Thus, since 1) the relatively short-term that logging activities would create disturbance in this area, and 2) areas providing thermal cover and snow intercept would not exist in the project area, moderate adverse direct and indirect effects to big game would be expected.

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

No further changes would be anticipated in elk winter range attributes during the short-term. Stands that are providing thermal cover would be expected to continue providing this resource under this alternative. Those portions of the winter range where timber harvesting occurred in the last 30 years could start developing thermal cover and snow intercept in the next 10-30 years. Harvesting on other ownerships could continue to displace wintering big game and reduce available winter range habitats. Human disturbance levels would be anticipated to continue at similar levels. Continued winter use of the larger winter range would be expected. Thus, since: 1) subtle changes in thermal cover due to advances in succession that would increase canopy densities would be anticipated over time, 2) the amount of mature forested habitats on the winter range would not change, and 3) the levels of human disturbance would remain similar, negligible beneficial cumulative effects to big game and big game winter range would be anticipated that would benefit big game in the cumulative effects analysis area.

Cumulative Effects of the Action Alternative on Big Game Winter Range

Reductions in thermal cover and snow intercept in the project area would further reduce the amount of the larger winter range providing these attributes for big game. Similarly, any harvesting that may be occurring on other ownerships in the cumulative effects analysis area could continue altering big game winter range. Those portions of the winter range where timber harvesting occurred in the last 30 years could start developing thermal cover and snow intercept in the next 10-30 years. Harvesting on other ownerships could continue to displace wintering big game and reduce available winter range habitats; displacement associated with this alternative could be additive to any displacement associated with ongoing timber harvesting. Thus, since 1) the relatively short-term that logging activities would create disturbance in a small portion of the cumulative effects analysis area, 2) a small percentage of the winter range in the cumulative effects analysis area would be altered, 3) availability of lower-quality cover on surrounding ownerships that provides some opportunity for big game should they be displaced, minor adverse cumulative effects to big game would be expected.

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ARCHEOLOGIST ANALYSIS

From: Rennie, Patrick
Sent: Monday, October 26, 2009 11:13 AM
To: Olsen, Dave
Subject: RE: West Prairie Salvage timber sale

It looks like virtually all of the SE1/4 Section 2, T23N R27W was inventoried for cultural resources in 1991 with no negative results. No additional archaeological investigative work is recommended for you proposed project.

Patrick Rennie
DNRC Archeologist

Attachment III

Prescriptions

Proposed West Prairie Salvage Timber Sale Harvest Unit Prescriptions

Harvest Unit: 1 **Harvest Unit Acres:** 98 acres

Elevation: 3200 ft. **Slope:** 0-10 % **Aspect:** Flat to easterly

Habitat Type: ABGR/CLUN, ABLA/CLUN

Current Cover Type: Mixed Conifer

Desired Future Condition: Western larch/Douglas fir

Soil Type: Half Moon Silt Loam

Description of Existing Stand:

This unit is located to the west of the ACM/Thompson River Road approximately 23 airmiles northwest of Plains, MT. Big Prairie Creek Road runs through the east and north portions of the State parcel. The unit is comprised of stands in the southeast quarter of Section 2, Township 23 North, Range 27 West. The topography is mostly flat with slopes ranging from 0-10% and is comprised of two identified stands in the Stand Level Inventory. The stand structure is consists of three distinct canopy layers. Douglas-fir and western larch are the co-dominant species in the overstory (70%), along with grand and sub alpine fir (25%) and a scattered population of ponderosa pine (5 %). Overstory tree height averages 90 feet with an average of 15" DBH with a few scattered +25" DBH. The age of the stand ranges from 90 to 210 years and averages 130 years old. Overstory trees are evenly distributed and form a relatively closed canopy layer (70-80% canopy closure).

The mid-canopy forms a relatively closed canopy layer (70-80% canopy closure) and is comprised mainly Douglas-fir (30-40%), grand fir (20-30%) sub alpine fir and western larch (10-20 %). The mid canopy average age is 70-80 years old, averages 8" DBH and is 80 feet in height. Average age is 80 years old.

The understory forms a relatively closed canopy layer (70-80% canopy closure) and is comprised mainly of grand fir (40-50%), Douglas fir (30-40%), lodgepole pine and western larch each in the 10-20% range. The understory ranges in height from 10-20 feet, 2-3" DBH and is 30 years old.

Bark beetle (*Dendroctunus pseudotsugae*) activity is evident in the Douglas fir and western larch in endemic proportions. Fir engraver beetles (*Scolytus ventralis*) are active in the grand fir overstory in epidemic proportions. Mistletoe is prevalent in the western larch and Douglas fir in all canopies along with root and stem rot diseases. Tree boring indicated core rot in many of the large diameter (> 25 "dbh) Douglas fir. Surface fuel loading of down material ranges from 20-30 tons per acre.

Treatment Objectives:

- Remove unhealthy, diseased 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 loading.
- Promote natural western larch and ponderosa pine regeneration in areas where grand and sub alpine fir is becoming dominant component in the stand.
- Retain large diameter, decadent Douglas fir for shading, cover and snag replacement.

Prescribed Treatment:

- Seed tree harvest, spacing out healthy trees with good crown and bark characteristics on a variable spacing of 40-50 feet leaving 15-25 TPA. Favor leaving healthy western larch and ponderosa pine, then Douglas-fir in that order. Remove all merchantable lodgepole, grand fir and alpine fir.
- Shelterwood harvest each side of the open Big Prairie Creek road reduce cut tree spacing to 30-40 feet to retain visual cover for wildlife.
- Reduce 70% canopy cover to 30-40% canopy cover.
- Create openings of 100’ on at least two sides of existing clumps or isolated individual ponderosa pine and western larch overstory trees in the areas where grand fir and Douglas fir are the predominant species.
- Retain at least two snags per acres >14” DBH and two snag recruits per acre to remain standing if they are not a safety hazard.

Harvest Method:

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

Hazard Reduction:

- Pile and burn slash at landings following harvest if grinding slash is not feasible.
- 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. Jackpot burn open areas during pile burning operations.
- Machine pile and burn all slash in excess of retention requirements of 5 to 10 tons per acre.

Regeneration/Site Preparation:

- Precommercial thin healthy regeneration to promote future growth and vigor within 5 years after harvest.
- In areas where ponderosa pine and western larch regeneration is a primary goal, 30% of ground would be scarified during machine piling and burned one year after harvest.
- 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, planting needs and possible precommercial thinning opportunities as the stand progresses in age.
- Look for opportunity to remove overstory in 25 years.

Attachment IV

Mitigations

Roads: A transportation system minimizing road miles and meeting Best Management Practices (BMPs) has been designed by the DNRC. The existing roads will be utilized in the project area and no new roads will be built. Existing roads that will be reopened during the harvest will be Kelly humped on completion of the project.

Wildlife:

- A DNRC biologist will be consulted if a threatened or endangered species is encountered to determine if additional mitigations that are consistent with the administrative rules for managing threatened and endangered species (ARM 36.11.428 through 36.11.435) are needed.
- Public access would be restricted at all times on restricted roads that are opened for harvesting activities; signs will be used during active periods and a physical closure (gate, barriers, equipment, etc.) will be used during inactive periods (nights, weekends, etc.).
- Roads and skid trails that are opened with the proposed activities will be reclosed to reduce the potential for unauthorized motor vehicle use.
- Use a combination of topography, group retention, and roadside vegetation to reduce views into harvest units along open roads where feasible.
- Manage for snags, snag recruits, and coarse woody debris, particularly favoring ponderosa pine and western larch (ARM 36.11.439(1)(b)). Clumps of existing snags could be maintained where they exist to offset areas without sufficient snags.
- Prohibit contractors and purchasers conducting contract operations from carrying firearms while operating on restricted roads (ARM 36.11.432(1)(m)).

Soils:

1) Limit ground based equipment operations to periods when soils are relatively dry, (less than 18%), frozen or snow covered to minimize soil compaction and rutting, and maintain drainage features. Check soil moisture conditions prior to equipment start-up.

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

3) Tractor skidding should be limited to slopes less than 35% unless the operation can be completed without causing excessive erosion. Short steep slopes above incised draws may require a combination of mitigation measures based on site review, such as adverse skidding to ridge or winch line skidding from more moderate slopes less than 35%.

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

5) Slash Disposal- Limit disturbance and scarification combined to 30-40% of harvest units. Consider lop and scatter or jackpot burning on steeper slopes. Retain 10 to 15 tons per acre of material 3 inches and larger. Minimize removal of fine (<1/4” diameter) material for nutrient cycling.

Regeneration: Allow for natural regeneration when possible or plant seedlings of the desired future vegetation species where soil conditions allow and there is little or no seed source.

Visual Effects: Harvest prescriptions, seasonal road closures, topography, and a buffer along the main road should limit any adverse effects to visual concerns.

Weed Management: Prior to entering site, off-road equipment would be cleaned and inspected through the timber sale contract to avoid see migration.

Attachment V

Consultants and References

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