DNRC - Trust Land Management Division

ENVIRONMENTAL ASSESSMENT

FOR THE

DOG VALLEY TIMBER SALE

North Fork Valley Creek
Section 16, T17N, R21W

RECEIVED
JUN 30 2006
LEGISLATIVE ENVIRONMENTAL POLICY OFFICE

Hewolf Creek
Section 36, T17N, R22W

PREPARED BY

Dale Peters, Management Forester

Plains Unit, Northwestern Land Office

Montana Department of Natural Resources and Conservation

May 2006

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MEMORANDUM

To: Shawn Thomas, Forest Management Supervisor, Plains Unit

From: Larry Ballantyne, Plains Unit Resource Program Manager

Date: March 1, 2005

RE: Dog Valley Timber Sale Objectives

Primary Objective

The primary objective of the Dog Valley Timber Sale is to generate income for the Common School (CS) trust. Parcels involved in this proposed project are found in Section 36 T17N, R22W, and Section 16 of T17N R21W. This project would provide an estimated 3 MMBF of merchantable timber toward the Northwestern Land Office's FY 2007 timber sale program targeted volume goal.

Secondary Objectives

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

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

Reduce fire hazard and associated risks of loss to both State, private, and tribally 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:	Dog Valley Timber Sale
Proposed Implementation Date:	August 2006
Proponent:	DNRC, Northwestern Land Office, Plains Unit
Location:	Section 16 Township 17N Range 21W & Section 36 Township 17N Range 22W
County:	Sanders

I. TYPE AND PURPOSE OF ACTION

The Department of Natural Resources and Conservation proposes to sell an estimated 20,500 tons of timber (3.1 MMBF) in Section 16 Township 17N Range 21W & Section 36 Township 17N Range 22W, five & nine air miles southwest of Ravalli, Montana. This action would produce revenue for the Common School (C.S.) Trust Grant. Activities proposed would maintain and improve forest health, reduce fuel loadings, and increase forest productivity beneficial to future Trust actions.

The proposal would include eight harvest units totaling an estimated 600 acres. Approximately 4 miles of new road construction, 11 of miles of reconstruction or reconditioning of existing system roads and abandonment of an existing ford through North Fork Valley Creek would be required. Income to the Trust from this project is estimated at $900,000.00.

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

II. PROJECT DEVELOPMENT

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

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

Public involvement has been solicited through newspaper advertisements plus letters sent to adjacent landowners, Confederated Salish & Kootenai Tribes and other known interested parties and organizations. Public response was received and used to assist in defining issues surrounding the proposed project. DNRC specialists and field foresters identified management issues and concerns. Issues and concerns have been resolved or mitigated through project design or would be included as specific contractual requirements of the project (See Attachment 2, Resource analysis; Attachment 3, Prescriptions; Attachment 4, Mitigation; Attachment 5, Consultants and References).

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

- Tribal Cultural and Historical Sites Review. (Clearance granted 18-Oct-05)
- Tribal and BIA road use permits have been applied for and would be secured prior to the project's implementation.
- An Aquatic Lands Conservation Ordinance permit from the CS&KT would be secured prior to installing the stream/draw crossings.

3. ALTERNATIVES CONSIDERED:

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

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

III. IMPACTS ON THE PHYSICAL ENVIRONMENT

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

4. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE:

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

Measures to minimize impacts and cumulative effects as recommended by a DNRC specialist have been included in the project design. (See Attachment 2, Resource analysis, Hydrology Analysis / Soils Analysis; Attachment 4, Mitigation. As detailed in the Soil analysis, limiting the area of adverse soil effects would control cumulative effects.)

5. WATER QUALITY, QUANTITY AND DISTRIBUTION:

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

A DNRC hydrologist has reviewed the project area, transportation system, and harvest plan. Recommendations to minimize impacts have been incorporated into the project design (See Attachment 2, Resource analysis, Hydrology Analysis/ Soils Analysis; Attachment 4, Mitigation Measures).

6. AIR QUALITY:

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

The project area is located within a Class 1 Air shed. Some particulate matter would be introduced into the Air shed from the burning of logging slash as specified in the project plan. Impacts are expected to be minor and temporary with slash burning to be conducted when conditions favor good to excellent smoke dispersion."

7. VEGETATION COVER, QUANTITY AND QUALITY:

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

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

8. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS:

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

The Dog Valley sale area is in big game habitat. (See attachment 2, Resource analysis; Wildlife Analysis.) The proposed activities are designed to limit impacts to wildlife habitat. Unit marking and treatments would retain some visual screening in the project area. Wildlife security would be maintained through active road management. Timber harvesting and road construction activities may affect fish habitat by increasing sediment delivery to streams and decreasing levels of recruitable woody debris. (See attachment 2, Resource analysis; Fisheries Analysis.) BMPs would be implemented during timber harvest and road construction operations; therefore the risk of adverse cumulative impacts to water quality and beneficial uses would be low.

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

Four species indigenous to northwestern Montana are classified as "threatened' or "endangered" under the Endangered Species Act of 1973. The bald eagle, grizzly bear, and Canada lynx are listed as "threatened," while the gray wolf is listed as "endangered." The analysis identified suitable habitat for the following threatened, endangered, and sensitive species in the project area and vicinity: bald eagle, gray wolf, grizzly bear, Canada lynx, fisher, flammulated owl and the pileated woodpecker. Recommendations to minimize direct, indirect and cumulative impacts have been incorporated in the project design. (See attachment 2, Resource analysis; Wildlife Analysis.)

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

The CS&KT of the Flathead Nation, Tribal Preservation Office, Cultural and Historical Sites Review, has granted cultural clearance and a DNRC archeologist has reviewed this project. (See attachment 2, Resource analysis; Archaeological Analysis.)

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

The topography of this proposed project area is mountainous and is not readily visible from the major highway corridors or population centers. Prescriptions are designed to mimic historical stand conditions. Harvest unit shapes and residual tree retention patches would follow topographical features such as natural contour breaks and riparian retention zones. The cumulative visual effects of this proposed action in conjunction with current adjacent land management practices would blend into the landscape and soften any hard ownership boundaries. (See attachment 4, Mitigation)

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

No effect.

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

No other projects have been identified.

IV. IMPACTS ON THE HUMAN POPULATION

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

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

No effect.

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

Timber harvest would provide continuing industrial production in Sanders County.

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

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

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

No effect.

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

Log trucks hauling to the purchasing mill would result in temporary increases in traffic on the designated haul route. This increase is a normal contributor to the activities of the local community and industrial base and cannot be considered a new or increased source. Cumulative impacts are not likely to occur.

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 biological 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 13, 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 cumulative effects to recreational and wilderness activities.

No increase in recreational use is expected following the project. Roads through the area that would be closed after the project only access the immediate area, closure of them would not affect the ability of people to recreate on these parcels.

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

No effect.

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

None identified.

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

None identified.

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

Costs, revenues and estimates of return are estimates intended for relative comparison of alternatives. They are not intended to be absolute estimates of return. The estimated stumpage is based on comparable sales analysis. This method compares recent sales to find a market value for stumpage. These sales have similar species, quality, average diameter, product mix, terrain, date of sale, distance from mills, road building and logging systems, terms of sale, or anything that could affect a buyers willingness to pay for stumpage. The project would harvest approximately 20,500 tons of timber (3.1 MMBF) returning approximately $900,000.00 to the Common School (C.S.) Trust Grant. Development costs borne by the purchaser have been included when determining the projected income to the Trust. The No Action alternative does not generate any return to the school trust at this time.

EA Checklist Prepared By:	**Name:**	Dale Peters	**Date:**	**March/2006**
	Title:	Management Forester		

V. FINDING

25. ALTERNATIVE SELECTED: The Action Alternative as proposed meets the stated project objectives. It complies with all applicable environmental law and DNRC Administrative Rules. A consensus of professional opinion finds this alternative within the limits of acceptable environmental impact. The No Action Alternative meets none of the project objectives. For these reasons I have selected the Action Alternative for implementation.

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

27. NEED FOR FURTHER ENVIRONMENTAL ANALYSIS:

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

EA Checklist Approved By:	**Name:**	Larry Ballantyne		
	Title:	Plains Unit Resource Program Manager		
Signature:			**Date:**	May 3, 2006

Attachment 1

Sale & Access Maps

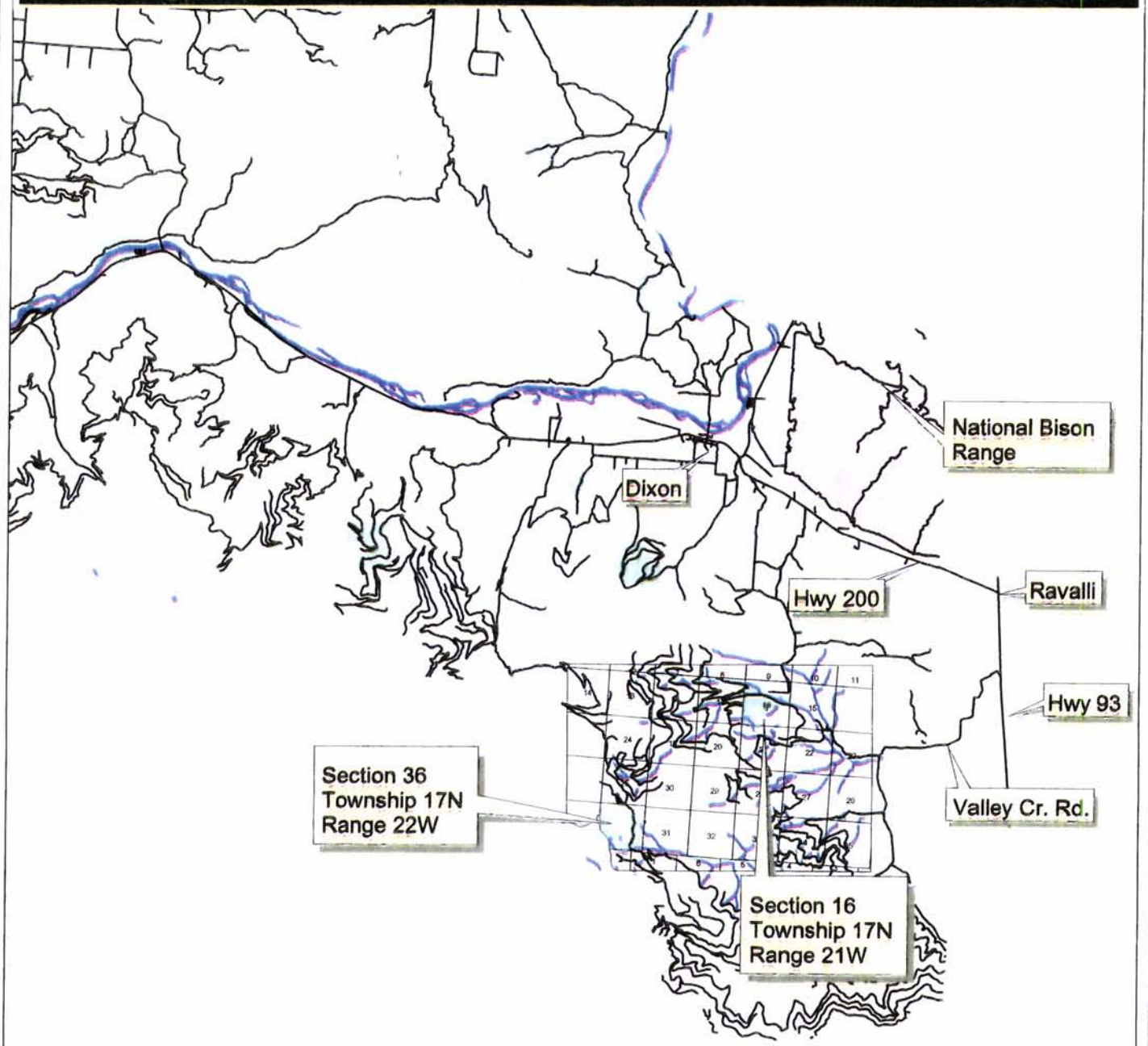
Harvest Unit & Travel Plan

Cover Types

Table 1

Dog Valley Timber Sale

Vicinity Map



Ownership

Fish and Wildlife Service

State of Montana (DNRC)

Water

Montana DNRC
Trust Land Management Division
Northwestern Land Office
Plains Unit

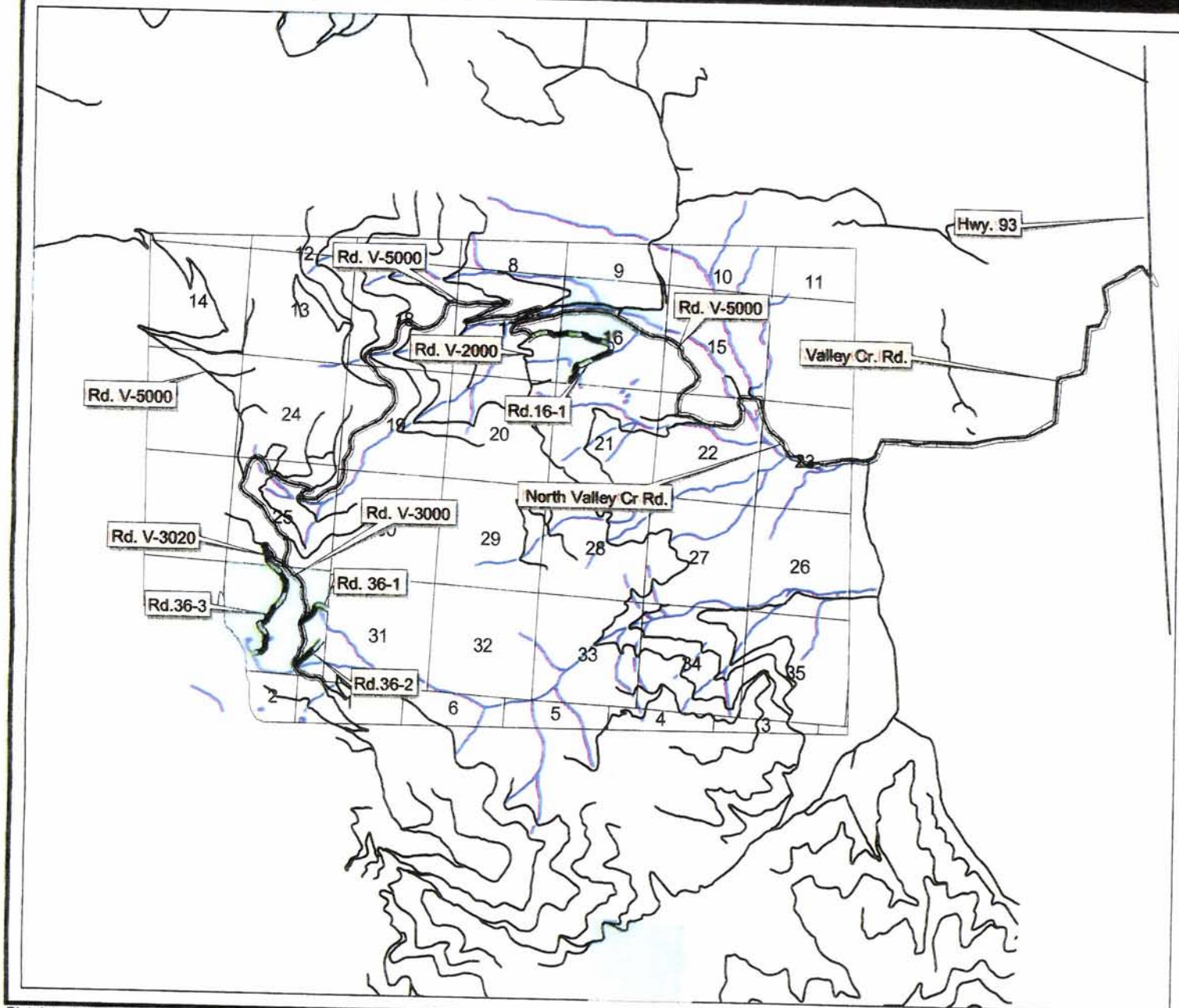
N W E S

2.5 0 2.5 5 Miles

1 : 216,377 1 inch = 3.42 miles

Plot date: February 7, 2006 c:\gis\dale\dog valley\dogv.apr

Dog Valley
Haul Routes



New Construction

Haul Route

Montana DNRC
Trust Land Management Division
Northwestern Land Office
Plains Unit

0.5 0 0.5 1 1.5 Miles

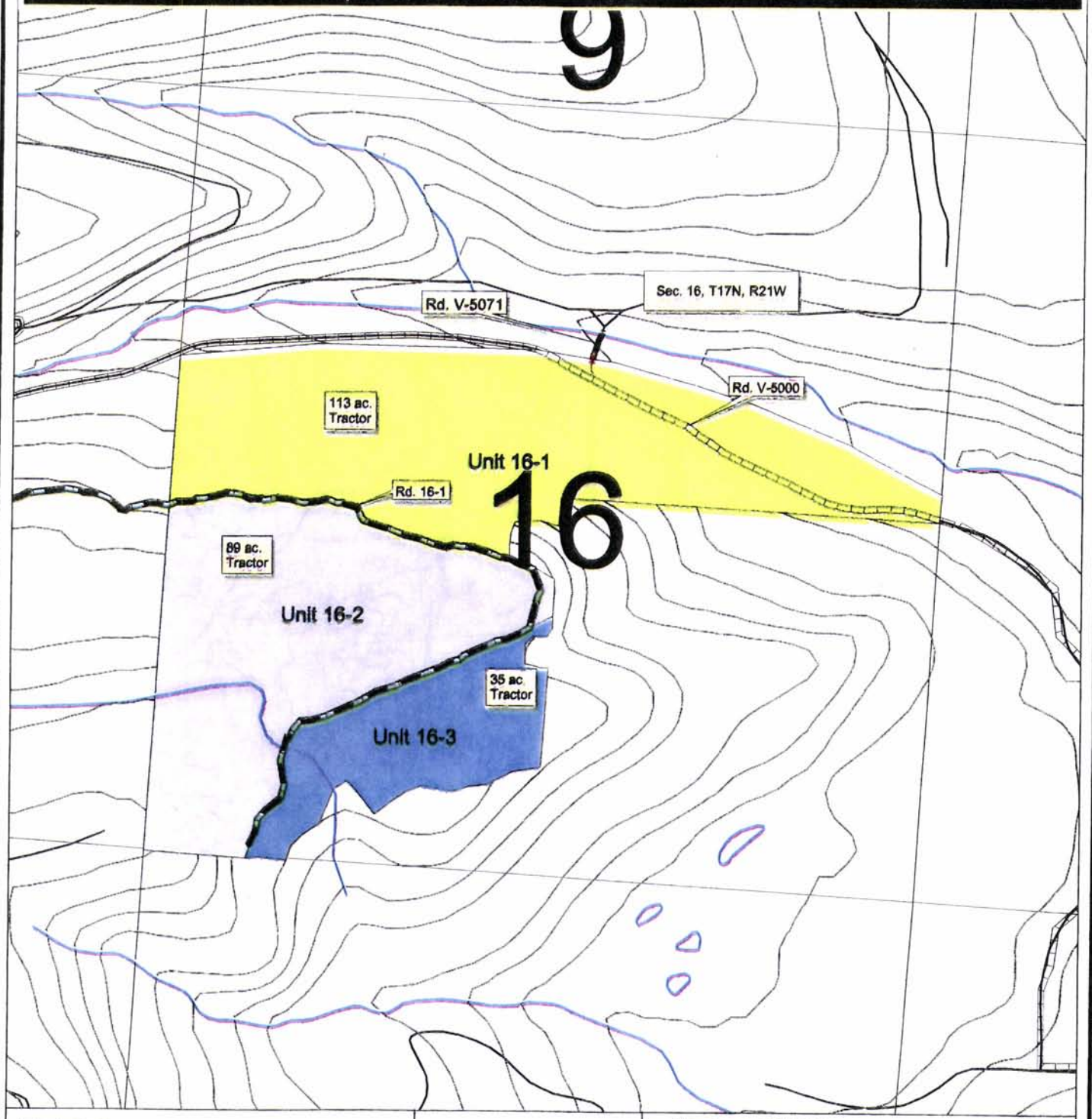
1 : 89,908 1 inch = 1.42 miles

N
W E
S

Plot date: February 7, 2006 c:\gis\dale\dog valley\dogv.apr

Dog Valley, Sec.16, T17N, R21W

Harvest and Transportation Plan



Open Road (Primary)
New Construction
Proposed Units
Unit 1
Unit 16-1
Unit 16-2
Unit 16-3
Unit 2
Unit 3
Unit 4
Unit 5
Obliterate / Reclaim Road

Montana DNRC
Trust Land Management Division
Northwestern Land Office
Plains Unit

N
W E
S

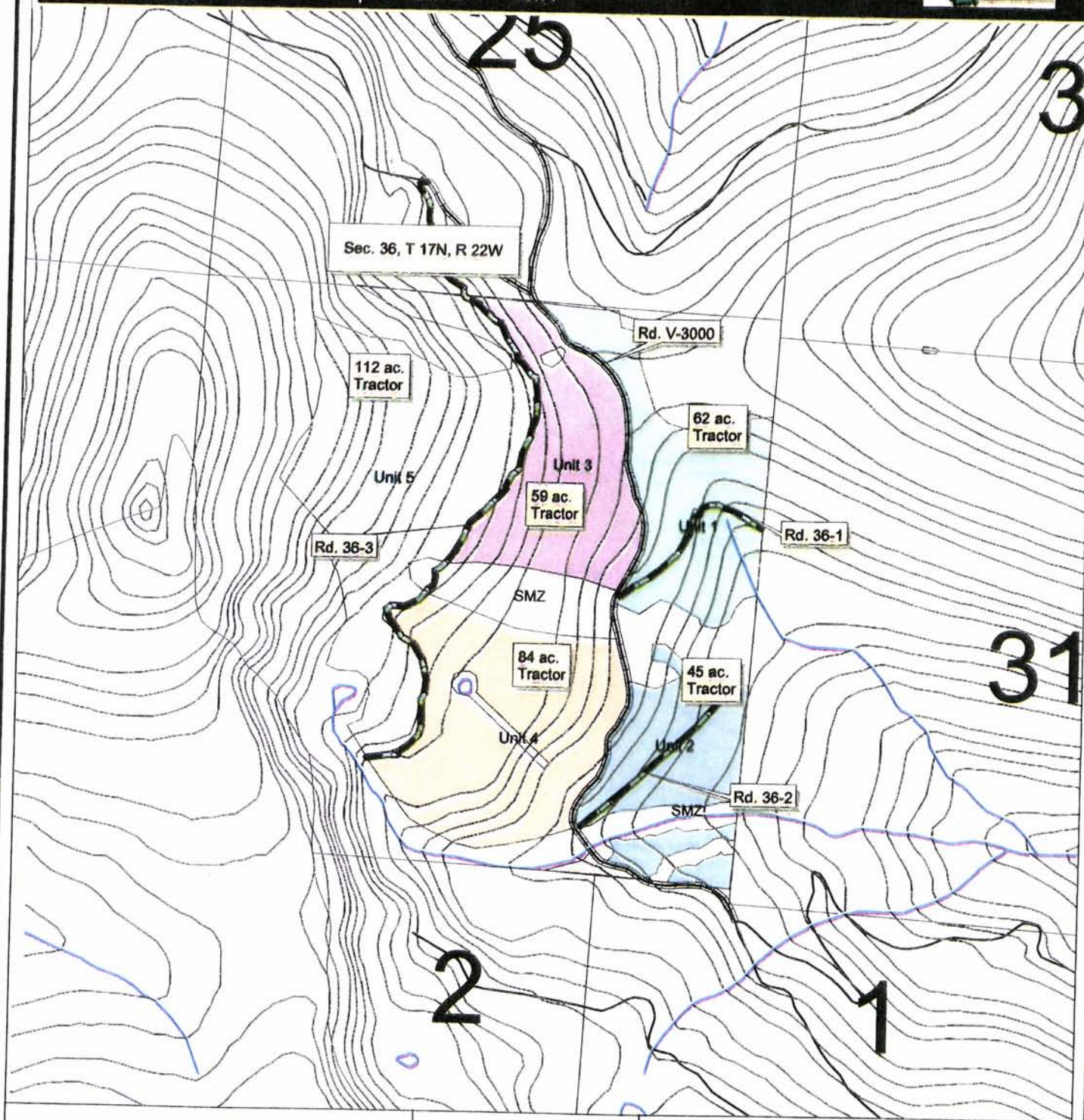
0.1 0 0.1 0.2 0.3 Miles

1 : 12,031 1 inch = 0.19 miles

Plot date: March 27, 2006 c:\gis\dale\dog valley\dogv.apr

Dog Valley, Sec.36, T17N, R22W

Harvest and Transportation Plan



Open Road (Primary)

New Construction

Proposed Units

Unit 1

Unit 16-1

Unit 16-2

Unit 16-3

Unit 2

Unit 3

Unit 4

Unit 5

Montana DNRC
Trust Land Management Division
Northwestern Land Office
Plains Unit

N
W E
S

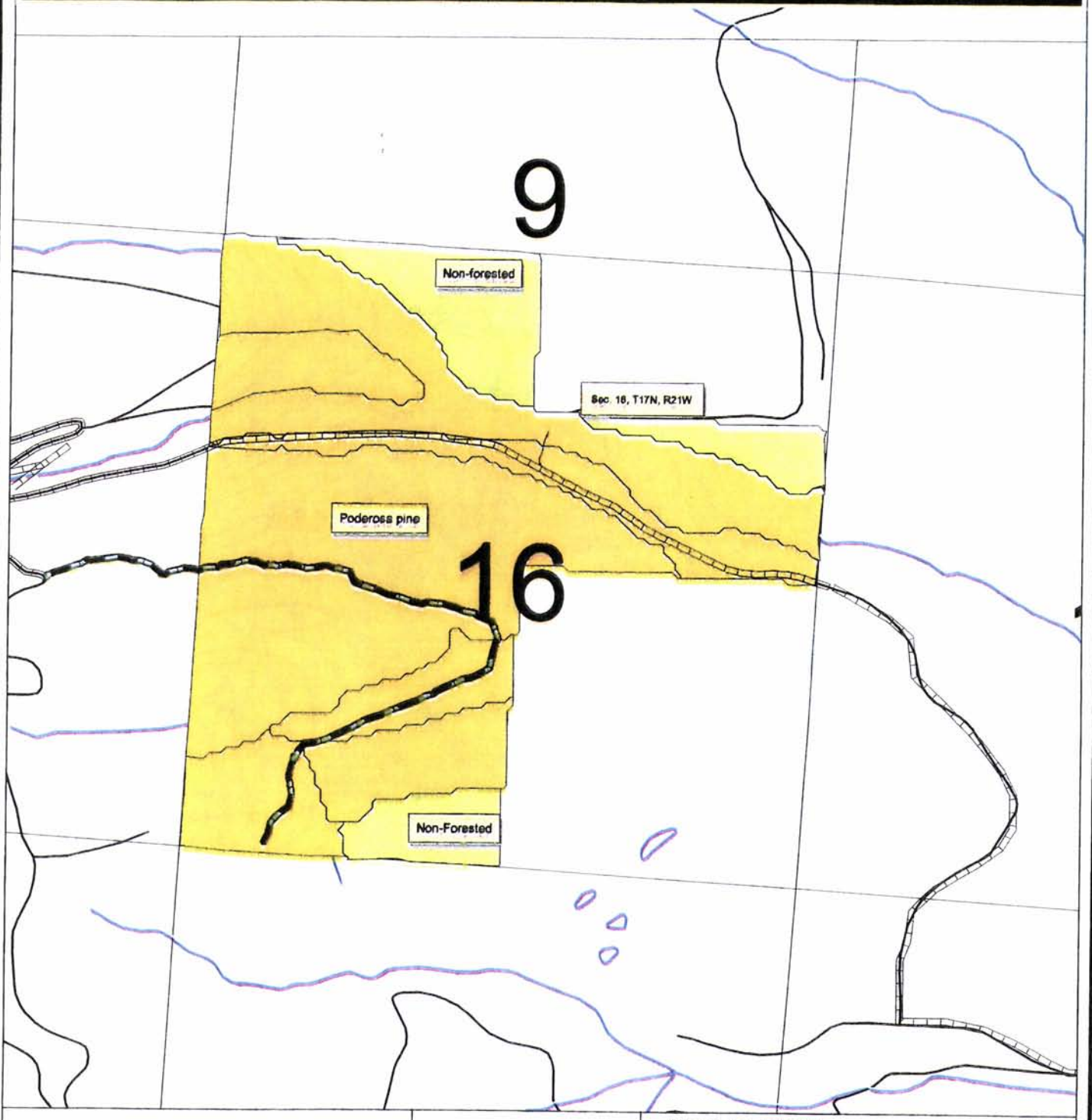
0.1 0 0.1 0.2 0.3 0.4 Miles

1 : 16,053 1 inch = 0.25 miles

Plot date: February 8, 2006 c:\gis\dale\dog valley\dogv.apr

Dog Valley, Sec. 16, T17N, R21W

Current, Appropriate and Post Cover Types



Open Road (Primary)

New Construction

Post Cover Types

NONFOR (67 ac.)

PP (333 ac.)

Montana DNRC
Trust Land Management Division
Northwestern Land Office
Plains Unit

N
W E
S

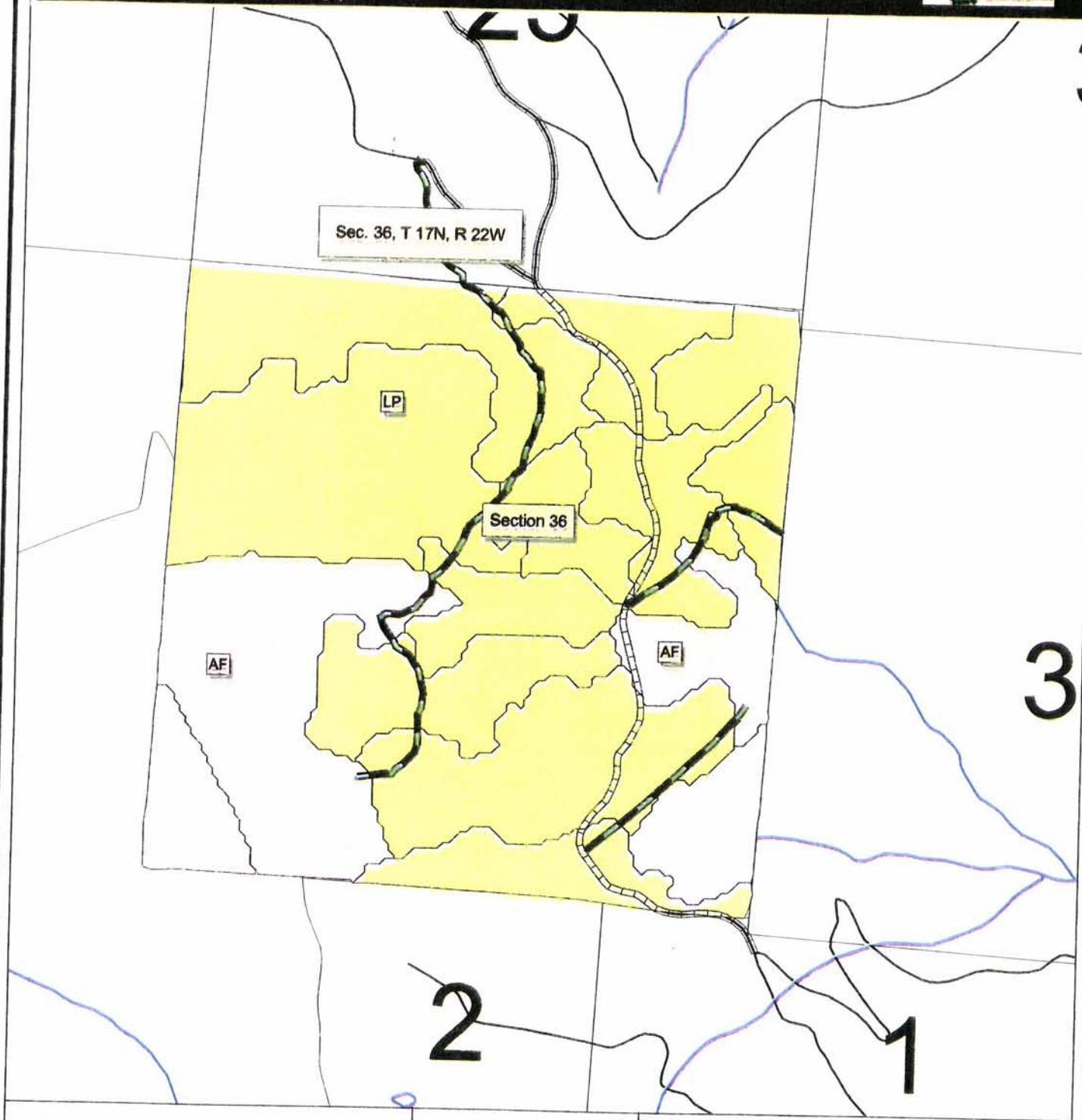
0.1 0 0.1 0.2 0.3 0.4 Miles

1 : 15,038 1 inch = 0.24 miles

Plot date: March 27, 2006 c:\gis\dale\dog valley\dogv.apr

Dog Valley, Sec. 36, T17N, R22W

Current Cover Types



New Construction

Open Road (Primary)

Current Cover Types

ALPFIR (173 ac.)

LP (467 ac.)

Montana DNRC
Trust Land Management Division
Northwestern Land Office
Plains Unit

N
W E
S

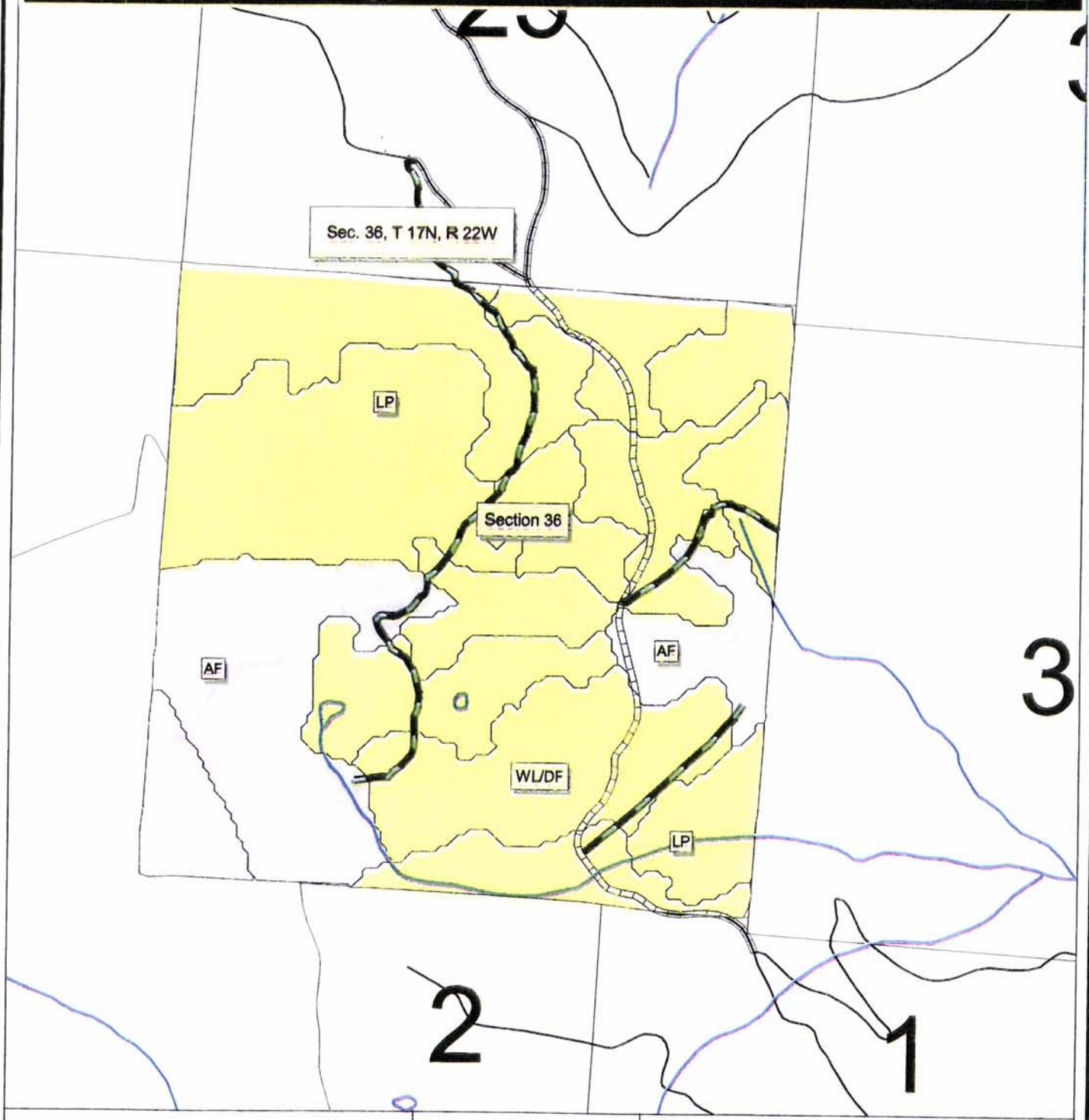
0.1 0 0.1 0.2 0.3 0.4 Miles

1 : 15,038 1 inch = 0.24 miles

Plot date: February 8, 2006 c:\gis\dale\dog valley\dogv.apr

Dog Valley, Sec. 36, T17N, R22W

Appropriate Cover Types



New Construction

Open Road (Primary)

Appropriate Cover Types

- ALPFIR (145ac.)
- LP (422 ac.)
- WL/DF (73 ac.)

Montana DNRC
Trust Land Management Division
Northwestern Land Office
Plains Unit

N W E S

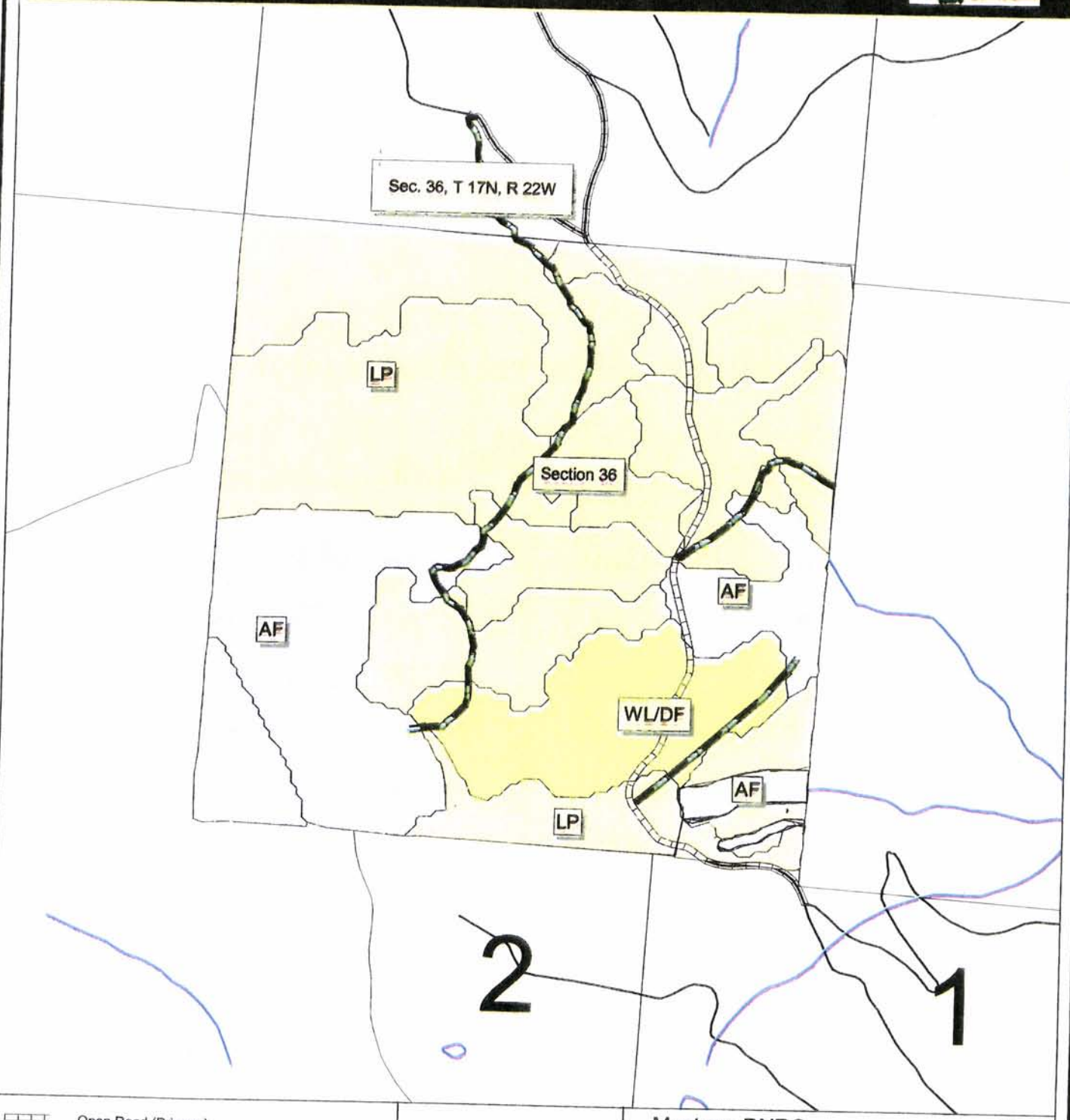
0.1 0 0.1 0.2 0.3 0.4 Miles

1 : 15,038 1 inch = 0.24 miles

Plot date: February 8, 2006 c:\gis\dale\dog valley\dogv.apr

Dog Valley, Sec. 36, T17N, R22W

Post Cover Types



Open Road (Primary)

New Construction

Post Cover Types

- ALPFIR (156 ac.)
- LP (413 ac)
- WL/DF (71 ac.)

Montana DNRC
Trust Land Management Division
Northwestern Land Office
Plains Unit

N W E S

0.1 0 0.1 0.2 0.3 0.4 Miles

1 : 15,038 1 inch = 0.24 miles

Plot date: February 9, 2006 c:\gis\dale\dog valley\dogv.apr

TABLE 1

DOG VALLEY PROJECT COVERTYPE COMPARATIVE TABLE

	SLI Current Cover types	SLI Appropriate Cover types	Post Project Cover types	Net Change Acres
PP	333	333	333	0
LLP	467	422	413	-54
AF	173	145	156	-17
WL/DF	0	73	71	+71
NF	67	67	67	0
Total Acres	1040	1040	1040	

Attachment 2

Resource Analysis

- **Vegetation Analysis** **24 – 26**
- **Hydrology Analysis** **27 – 35**

  Fig H-1 pg 28; Hydrology Map pg 29; Activity Table pg 33
- **Soils Analysis** **36 – 42**

  Fig S-1 & Fig S-2 pg 38; Table S-1 pg 39
- **Fisheries Analysis** **43 – 50**

  Activity Table pg 46
- **Wildlife Analysis** **51 – 73**

  Table W-1 pg 60; Table W-2 pg 62; Fig W-1 pg 73

Archaeological Analysis **75 - 76**

⇒ **Footnote:** All road miles and acreages are close approximations as this proposal has not yet been implemented on the ground.

VEGETATION ANALYSIS

Introduction

This analysis is designed to disclose the existing condition of the vegetative resource and display the anticipated effects that may result from each alternative of this proposal. (During the initial scoping, issues were developed by the public and internally regarding vegetative conditions.)

- Concern for the current insect infestation that is causing tree mortality and increasing wildfire risk.
- Concern for maximizing return to the School Trust Fund by intensively managing for healthy and biologically diverse forests. Without timber harvest, acreage of appropriate forest cover types would decrease and forest health would decline.

Analysis Area

The analysis area for vegetation is for the state ownership in section 16 of T17N R21W referred to as the North Fork Valley Creek parcel and section 36 of T17N R22W referred to as the Hewolf parcel. This analysis would adequately allow for the disclosure of existing conditions, direct, indirect, and cumulative impacts.

Analysis Method

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

Existing Condition

Past and current events have changed the forest conditions on the proposed North Fork Valley Creek parcel involved in the project area from what would have been present historically according to Losensky's "Historical Vegetation of Montana" (1997). The area was historically characterized by frequent, low-intensity wildfires prior to the early 1900's. Since the early 1900's fire has been virtually excluded from the project area. Due to the remote nature and elevation of the Hewolf parcel, the long term effects of insects and fire have influenced the current forest conditions there.

Section records for the North Fork Valley Creek parcel did not reveal any commercial timber harvest activity. Large scale logging for export started in this area about 1900. By the time the timber inventory was conducted in the mid 1930's, cutting occurred in the major valley bottoms where the ponderosa pine type was harvested. Several old remnant stumps on this parcel indicate that this may have also occurred on this parcel as well. Section records show that this

area was a favored place to harvest Christmas trees with permits being issued from 1942 through 1965. See Attachment 3, Prescriptions, for detailed descriptions of current vegetative conditions. Although the current cover types are consistent with the appropriate cover types (Attachment 1, Maps), the past management activities have contributed to a movement towards and overstocking of Douglas-fir, *pseudotsuga menziesii*. Some stands within the project area are infected with Dwarf mistletoe, *Arceuthobium douglasii & Arceuthobium laricis* in the western larch, *larix occidentalis*. There are some pockets of mountain pine beetle, *Dendroctonus ponderosae*, activity and mortality in the ponderosa pine, *pinus ponderosa.*

The Hewolf parcel is located high on the mountain, 5,700-7,000 feet, with limited access. Section records show that this area has had limited commercial harvest. 140 tons of pulp was removed in 1990 and 22mbf of dead saw logs was removed in 2004 through 2005. Since 1960 to the present approximately 15,000 pieces of lodge pole posts, poles and rails were permitted for removal in addition to easily accessed un-permitted activity. See Attachment 3, Prescriptions, for detailed descriptions of current vegetative conditions and Attachment 1, Maps, for current and appropriate cover types. The mountain pine beetle has been active in the lodgepole pine, *pinus contorta,* over the past several years. This has resulted in varying degrees of mortality affecting the larger diameter (8-12 inch) lodgepole pine.

Direct and Indirect Effects of Activities on Vegetation

No Action Alternative

No timber harvest or associated activities would occur under this alternative. Timber types in the North Fork Valley Creek parcel would continue to advance towards climax conditions with Douglas-fir continuing to thrive in the understory. This species has already begun to become dominate and is replacing the Ponderosa pine. Growth and vigor of the trees present in the analysis area would continue to decline. The mountain pine beetle in the Hewolf parcel would continue to cause increased mortality creating a heavy fuel load and a dangerously increased fire danger.

Action Alternative

The proposed action alternative for the North Fork Valley Creek parcel would harvest timber on approximately 240 acres. Dominant and co-dominate trees with good crowns and vigor would be left. Removal of the less vigorous, suppressed trees in addition to those affected by Dwarf mistletoe and mountain pine beetle would result in a thinned, healthier stand of timber. Growth and vigor would increase because residual tree spacing would allow full light to crowns and more access to water and nutrients. More detailed information for treatment by individual units can be obtained in Attachment 3, Prescriptions. Gated road closures would help to prevent the unauthorized removal of snags. Through harvest and site preparation activities, fuel loadings and fire danger would be reduced by the removal of ladder fuels from the understory, as well as crown spacing in the intermediate and overstory components. Noxious weeds would be monitored and addressed through an integrated pest management plan including chemical and biological control methods. Chemical control methods would be implemented should they become necessary and as funding is available.

The proposed action alternative for the Hewolf parcel would harvest timber on approximately 375 acres. The merchantable lodgepole pine, subalpine fir, *abies lasiocarpa,* and Engelmann spruce, *picea engelmanni,* would be removed. This would result in dispersed retention of Douglas-fir and western larch as well as some aggregated retention of sub-merchantable lodgepole pine. The removal of the merchantable lodgepole pine component would also result in the utilization of this dead and dying material. Should the opportunity present itself to harvest additional post and pole material, additional volume may be removed. More detailed information for treatment by individual units can be obtained in Attachment 3, Prescriptions.

Gated road closures would prevent the unauthorized removal of snags. Harvest and site preparation activities would significantly reduce fuel loadings and fire danger. Noxious weeds would be monitored and addressed through an integrated pest management plan including chemical and biological control methods. Chemical control methods would be implemented should they become necessary and as funding is available.

Cumulative Effects

No Action Alternative

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

Action Alternative

Across the Plains Unit, there would be a slight increase toward appropriate cover types, as proposed treatments would alter the current type. The project area would be altered with regard to overall size class distribution and stocking levels. Fuel loading, ladder fuels, insect and disease incidence would be reduced. This change would have a minor impact across the landscape of the Plains Unit as this project affects approximately only 615 acres of the 52,795 acres on the Plains Unit.

HYDROLOGY ANALYSIS

Introduction

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

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

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

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 each analysis area have been taken into account for the cumulative effects analysis.

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

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

Analysis Area

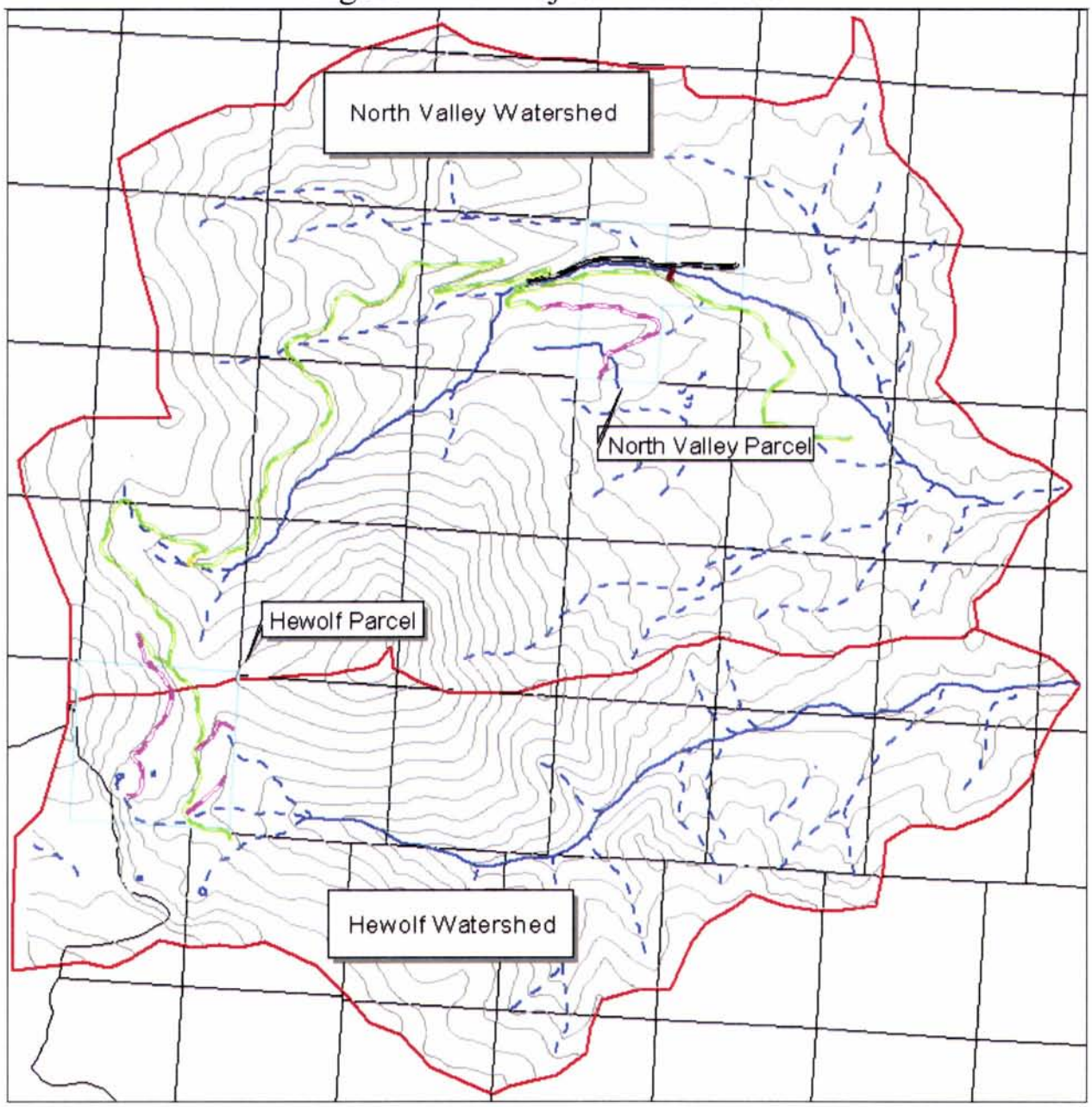
Sediment Delivery

The analysis area for sediment delivery is limited to the harvest units and roads used for hauling. This includes upland sources of sediment that could result from this project. The analysis area for increases in sediment from in-channel sources of project area streams will be addressed as part of the annual water yield analysis.

Water Yield and Cumulative Effects

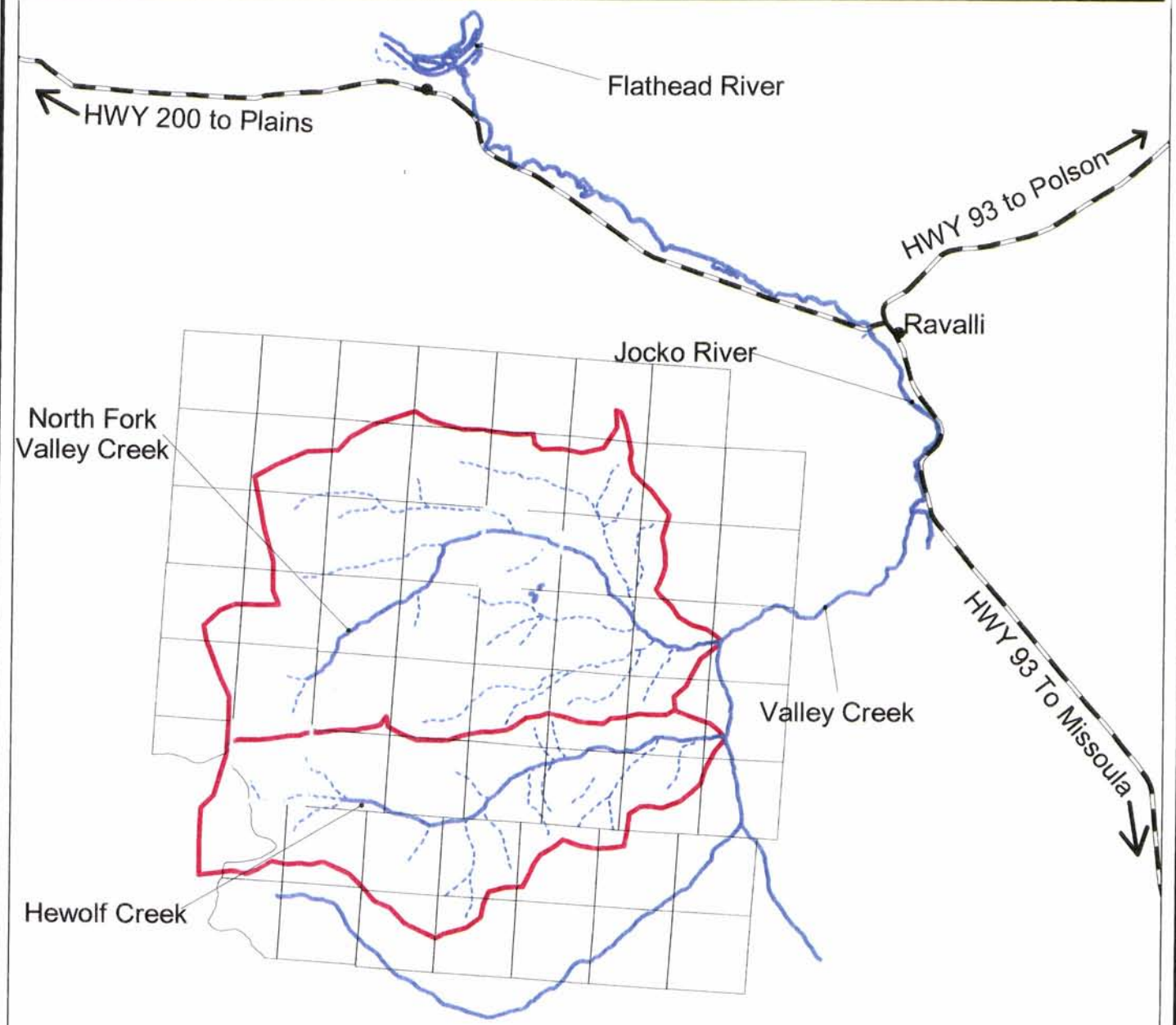
The analysis areas for water yield and cumulative effects are the Hewolf Creek watershed and the North Fork Valley Creek watershed (see Figure H1: Project Watersheds).

Figure H-1: Project Watersheds



Dog Valley Timber Sale

Hydrology Vicinity Map



LEGEND

- Highways
- Towns
- Watersheds
- Water
  - P. Water
  - I. Water

Map Location

Montana DNRC
Trust Land Management Division
Northwestern Land Office
Plains Unit

N W E S

1 0 1 2 3 4 Miles

1": 126,720 1 inch = 2.00 miles

Plot date: March 14, 2006 n:\projects\hewolf_nvalley\soil_water_fish.apr

Both of these streams are tributary to Valley Creek, which is tributary to the Jocko River (see Hydrology Vicinity Map). This is selected as the appropriate scale of analysis due to the size of the project versus the watershed size and the low potential for impacts.

Analysis Methods

Sediment Delivery

The methods applied to the project area to evaluate potential direct, indirect and cumulative effects include a field review to look at potential sediment sources from existing and proposed roads proposed for use as haul routes. Roads were evaluated to determine existing sources of introduced sediment. Proposed roads were evaluated for their potential for sediment delivery based upon design features, proximity to waterbodies and soils information.

Water Yield

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

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

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

In order to evaluate the potential effects of water yield increases, a threshold of concern for each watershed was established per ARM 36.11.423. Thresholds were established based on evaluating the existing watershed conditions, beneficial uses, channel stability, and acceptable risk level.

Water Uses and Regulatory Framework

Water Quality Standards

This portion of the Flathead River basin, including the tributaries to Valley Creek is classified as B-1 by the Confederated Salish and Kootenai Tribes of the Flathead Reservation Surface Water Quality Standards and Antidegradation Policy (CS&KT, 1995). 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.

Water quality regulations prohibit any increase in sediment above naturally occurring concentration in water classified B-1. *Naturally occurring* means the range, mean, mode and

other appropriate descriptors of seasonal water quality in Reservation waters occurs at levels over which humans have no control or material derived from runoff or percolation over developed land occurs where all reasonable and cost-effective best management practices have been applied (CS&KT, 1995).

Water Quality Limited Waterbodies

Waters included in the boundary of the Flathead Reservation are not included in the Montana Department of Environmental Quality 303(d) list. The 303(d) list is compiled by the DEQ as required by Section 303(d) of the Federal Clean Water Act and the Environmental Protection Agency Water Quality Planning and Management Regulations (40 CFR, Part 130). Under these laws, DEQ is required to identify water bodies that do no fully meet water quality standards, or where beneficial uses are threatened or impaired.

Streamside Management Zone Law (SMZ)

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

In addition, this project is under the regulations of the Forestry Best Management Practices of the Confederated Salish and Kootenai Tribes (CS&KT, 1994). In situations where the two regulations have different requirements, the CS&KT would be consulted to determine which BMPs would be applicable for a specific site.

Water Rights and Beneficial Uses

Water rights for surface water exist within and downstream of the parcels for irrigation and stock watering. A list of the water rights and diversion locations can be found in the project file.

Existing Condition

This project area includes two separate parcels: North Fork Valley Creek and Hewolf. Both parcels eventually contribute to the Jocko River and Flathead River. The North Fork Valley Creek parcel is drained by the North Fork of Valley Creek into Valley Creek, the Jocko River and Flathead River. The Hewolf parcel is drained primarily by Hewolf Creek, which flows into the South Fork of Valley Creek, Valley Creek and so on. A small part of the Hewolf parcel is drained by the North Fork of Valley Creek.

Hewolf Creek

The Hewolf Creek watershed is a 7,300-acre tributary to South Fork Valley Creek. The second-order stream flows in a general west-to-east direction from its headwaters in the state parcel through tribal owned land on the Flathead Indian Reservation. Average precipitation in the Hewolf watershed is estimated at 27 inches per year with a range of 17 to 37 inches per year.

The headwater streams on the state parcel are generally spring-fed upwellings flowing through, under and over Engelmann spruce and subalpine fir roots. Bankfull widths vary greatly (approximately 3 to 10 feet) as the headwater streams flow intermittently subsurface.

Two reaches of Hewolf Creek (see Hydrology Vicinity Map) were inventoried as part of the Valley Creek Management Area Proposed Timber Sale and Road Management EA completed by the Bureau of Indian Affairs (BIA) for the CS&KT (USDI, 1998). The uppermost reach inventoried by the CS&KT hydrologist is located approximately 2.5 miles downstream of the state managed parcel. Channel characteristics in this approximately 500-foot reach included 24% cascades flowing over large rock; 42% step-pool units; 12% in bedrock steps and waterfalls; and, 22% in pools associated with large woody debris. The upper reach had a very limited floodplain due to a confined channel. No bank impacts were observed in this reach. In contrast, the lower reach was a multi-channel braided reach approximately 2350 feet in length. The majority of this reach (97%) was a riffle comprised of small rounded boulders and organic material. The floodplain was unconstrained and bank impacts attributed to continuous grazing were considered severe. Additional riparian impacts were noted as over widened channels and elevated fine sediment deposition.

Roads within the Hewolf Parcel are generally in sloped, ditched roads with relief culverts at various distances. During snowmelt and heavy runoff events, road surface runoff and ditch flows are delivered directly to larger intermittent and perennial streams at crossings sites. While some of these crossings are not connected to Hewolf Creek with perennial surface flow, the potential exists for delivery of road sediment to downstream fisheries habitat.

North Fork Valley Creek

The North Fork Valley Creek watershed is a 12,810-acre tributary to Valley Creek. The third-order stream flows in a general west-to-east direction from its forested headwaters on tribal land through the state section and onto rangeland immediately east of the state parcel. Approximately 20% of the watershed is rangeland and the remaining 80% is forested.

Channel characteristics in the state parcel include a relatively steep pool-riffle sequence. Average gradient is approximately 5%. The average bankfull width is 15-20 feet with short areas of braided channel. The Rosgen stream class (Rosgen, 1996) within the state parcel is estimated as a B4a channel. This stream type is considered relatively stable and is not considered as a high sediment supply risk. In this channel type, woody debris is important for pool formation and fisheries habitat.

During reconnaissance, two sediment-contributing stream crossing were identified within and above the state parcel. The stream crossing within the state parcel is an unimproved ford that contributes sediment during runoff events and vehicle crossings. The ford is not a designed crossing; instead it is used as a short cut between a tribal road and a BIA road.

An old wooden bridge, that has not been upgraded to meet CS&KT Forestry BMPs or state Forestry BMPs, crosses North Fork Valley Creek upstream of the state parcel. Sediment is routed towards the stream crossing and ample evidence of direct delivery is present at this location.

Other potential sediment sources to North Fork Valley Creek include surface drainage features that do not meet BMPs due to a lack of maintenance. These sources include non-functioning surface drainage features and inadequate filtration near streams.

Cumulative Effects

Annual water yield increases (AWYI) were calculated in 1998 as part of the Valley Creek Management Area Proposed Timber Sale and Road Management EA. Existing AWYI for Hewolf Creek was estimated 2% before the Valley Creek project was implemented. After the implementation of the project, the projected AWYI for Hewolf is 4-5%. After reviewing the beneficial uses, existing channel conditions and existing watershed condition per ARM 36.11.423, the threshold of concern was set at 11%.

North Fork Valley Creak AWYI was estimated at 8% in 1998 as part of the Valley Creek Management Area Proposed Timber Sale and Road Management EA. However, no timber management was proposed in this watershed as part of the Valley Creek project therefore no increase would have occurred as a result of implementation. However, firewood cutting, gathering of easily accessible non-permitted forest products, insect infestations and disease has occurred throughout the drainage, which may have slightly increased the previously modeled annual water yield. No data or recent aerial photos were identified to develop more accurate annual water yield estimation. Because more current data is not available, a conservative approach to estimating the cumulative effects would include the assumption that no recovery since 1998 has occurred.

After reviewing the beneficial uses, existing channel conditions and existing watershed condition per ARM 36.11.423, the threshold of concern was set at 11%.

Description of Alternatives Affecting Sediment Delivery

No Action Alternative

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

Action Alternative

Three units in the North Fork Valley Creek parcel and five units in the Hewolf parcel would be harvested under the Action Alternative using conventional ground-based equipment. Harvest may be completed under summer or winter conditions. In addition, activities on the proposed haul route would be implemented. A summary of the proposed activities by watershed is presented in the table below.

Watershed	Harvest (acres)	New Road Construction (miles)	Road Reconstruction (miles)	Road Maintenance Drainage Improvements (miles)	Road Obliteration (miles)
Hewolf	318	1.6	0	10.7	0
N. Fork Valley Creek	279	1.8	0.1	1.4	0.1
Total	597	3.4	0.1	12.1	0.1

Activity Table

Environmental Effects

No Action Alternative

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

Action Alternative

Three units totaling approximately 237 acres in the North Valley Parcel and five units totaling approximately 362 acres in the Hewolf parcel would be commercially thinned or regenerated under the Action Alternative using conventional ground-based equipment. In addition, 3.4 miles of new road would be constructed, 12.1 miles of road would be maintained, reconstructed or have minor drainage improvements installed as necessary to meet BMPs and 0.1 miles would be obliterated. Harvest may be completed under summer or winter conditions

Direct and Indirect Effects

No Action Alternative

Under this alternative, no timber harvest or related activities would occur. Potential sediment sources would remain in the state parcel with a varying risk of sediment delivery North Valley and Hewolf Creeks.

Action Alternative

If this alternative were selected, approximately 237 acres would be harvested using conventional ground-based methods in the North Valley watershed and approximately 362 acres would be harvested in the Hewolf watershed. ECA generated from these activities would increase the modeled annual water yield by an estimated 2.5% in the Hewolf watershed and an estimated 0.8% in the North Valley watershed.

Reclamation activities at the ford would result in moderate potential short-term sediment delivery, however this potential would be reduced with mitigation such as sediment fence and slash filter windrows. Some short-term sediment delivery associated with culvert installations in the Hewolf parcel would likely result from the implementation of this alternative.

A long-term reduction in sediment delivery potential would result from minor drainage improvements such as drain dips and ditch-relief culvert installations. Reclaiming the ford would substantially reduce or eliminate direct long-term sediment delivery to North Valley Creek. Although new road construction would be implemented, no new stream crossings would exist and therefore a risk of prolonged sediment delivery from an additional crossing would not result. The new road construction would be located well away from streams and designed using BMPs that limit the risk of sediment transport. Because of the location and design of the proposed road, the risk of sediment delivery to streams would be very low.

Because DNRC would incorporate BMPs into the project design as required by ARM 36.11.422 (2), and all laws pertaining to SMZs would be followed, sediment from timber harvest would not be expected to enter streams in the project area and therefore the risk of long-term adverse direct or indirect effects to water quality or beneficial uses would be low.

Cumulative Watershed Effects

No Action Alternative

Under the no action alternative the potential for sediment contribution from the proposed haul route and direct sediment delivery at the ford would still exist, however, no additional cumulative effects would be expected.

Action Alternative

Considering the data and assumptions from the existing conditions and direct/indirect effects for annual water yield increases in the Hewolf and North Valley watersheds, DNRC estimates the cumulative annual water yield increases to remain below the thresholds of concern. By maintaining the AWYI below the threshold, the risk for adverse impacts such as channel destabilization and excessive in-stream erosion would be low.

Cumulative effects to sediment delivery from roads would be reduced because of BMP implementation and reclamation of the North Valley ford. Short-term turbidity increases during culvert installation would be minimized with BMPs and mitigation measures required by relevant permitting agencies.

Because the annual water yield increases would remain below the thresholds of concern and BMPs would be implemented during timber harvest and road construction operations, the risk of adverse cumulative impacts to water quality and beneficial uses would be low.

REFERENCES

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

USDI, 1998. Valley Creek Management Area Proposed Timber Sale and Road Management Environmental Assessment. Bureau of Indian Affairs, Flathead Agency for the Confederated Salish and Kootenai Tribes. Pablo, MT.

CS&KT, 1994. Forestry Best Management Practices. Confederated Salish and Kootenai Tribes. Pablo, MT.

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Rosgen, D. L.1996. Applied River Morphology. Wildland Hydrology, Pagosa Springs, CO.

SOILS ANALYSIS

Introduction

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

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

Analysis Area

The analysis areas for soils analysis are the proposed harvest units in the state parcels described as follows:

North Valley Parcel	Section 16, T17N, R21W
Hewolf Parcel	Section 36, T17N, R22W

These analysis areas will adequately allow for disclosure of existing conditions, direct, indirect and cumulative impacts.

Analysis Methods

Soil productivity will be analyzed by evaluating the geology/soils in the analysis areas, current levels of soil disturbance in the proposed project area and anticipated impacts from each alternative. While the anticipated impacts from each alternative will disclose the direct/indirect effects, the cumulative impacts will be the result of previous ongoing and proposed activities.

Existing Conditions

Geology

Parent materials in the project area are generally quartzite and argillite bedrock soils with small areas of glacial till or glacial drift influence. Volcanic ash surface layers are common above 5000 feet, especially on northern aspects (Dutton, 1990). The majority of the bedrock consists of slightly metamorphosed sedimentary rocks formed from sand, silt, clay, and carbonate materials deposited in an ancient shallow sea during the Precambrian period. These sediments were compressed and cemented into sedimentary rocks. These sedimentary rocks were metamorphosed by heat and pressure so that sandstone became quartzite, siltstone became siltite and shale or hard mudstone e became argillite. Some properties of the Precambrian sedimentary rocks include (1) weathering to soils with sandy loam, loam and silt loam textures and a high percentage of rock fragments; (2) generally a low moisture and nutrient holding capacity except in areas with a fine volcanic ash surface layer; and, (3) typically very stable and forgiving for most land management activities.

Since the Precambrian time, glaciation in western Montana occurred. Although it is questionable whether the project area was affected by the continental glaciers, it is likely that alpine glaciation helped carve the upper drainages of the Flathead Indian Reservation. Other influences on surface materials can be attributed to volcanic ash from Mount Mazama and other smaller eruptions, climatic weathering, and topographic influences (Dutton, 1990).

Land Types

Land types in the analysis area were mapped by the Natural Resources Conservation Service. A copy of the soil survey covering Sanders and parts of Lincoln and Flathead counties, Montana was obtained from the NRCS website (http://www.nris.state.mt.us/nrcs/soils/). Several land types are present in the analysis areas described above. A brief description of the land types and soils can be found in Table S1. The corresponding land type maps are exhibited in Figure S1 and S2.

Cumulative Effects

DNRC strives to maintain soil productivity by limiting cumulative soil impacts to 15% 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% of an area, proposed harvest should minimize any additional impacts. Harvest proposals on areas with existing soil impacts in excess of 20% should avoid any additional impacts and include restoration treatments as feasible based on site-specific evaluation and plans. Past monitoring on DNRC timber sales from 1988 to 2003 has shown an average of 13.9% soil impacts across all parent materials. Stratifying the results by parent material shows an average 12.4% of the harvest areas impacted (DNRC, 2004).

Cumulative effects from past and current uses on these parcels are limited to skid trails, roads and off-road trails from vehicles. In general, past harvest operations in the North Valley section were limited to Christmas tree harvest. On the Hewolf section, several post and pole permits have been issued since 1960 and salvage harvest of approximately 20mbf of sawlog size material was removed in the winter of 2004-2005. In addition, the removal of easily accessible non-permitted products has taken place on both parcels over time.

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 (1940's through 1960's) are substantially reduced. Skid trails from more recent activities remain apparent on the landscape but because of the limited area accessed, the cumulative impact is estimated to cover less than 10% of the analysis area.

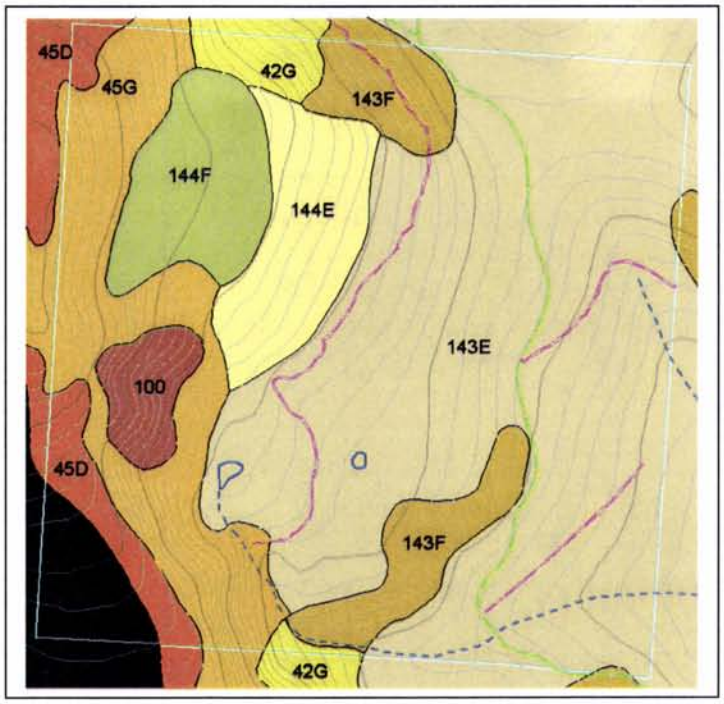

FIGURE S-1: Land type map of Hewolf Parcel

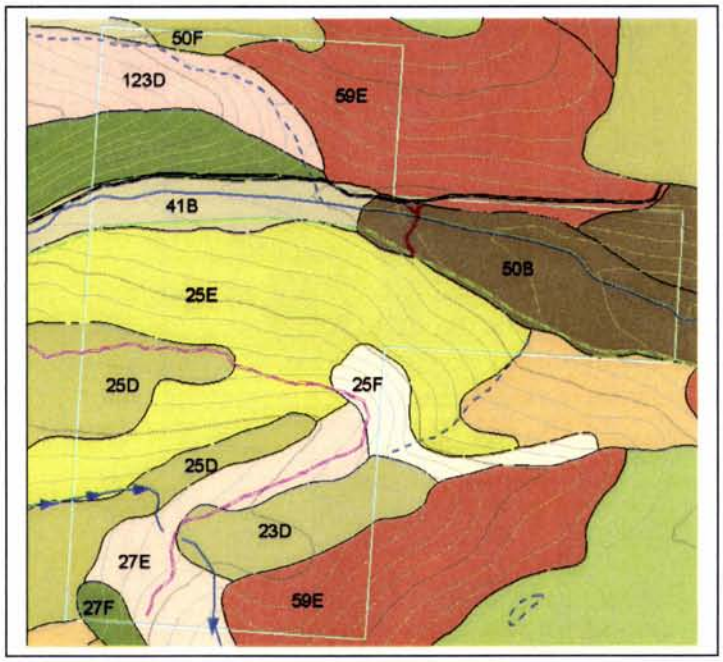

FIGURE S-2: Land type map of North Valley Parcel

Table S-1: General soil descriptions

Soil Description					Management Implications (erosion hazard)	
Land type	Name	Parent Material	Subsoils	Surface soils	Surface Erosion Off trail/on trails	Comments
23D	Yourame gravelly loam, 4-15% slopes	Alpine till or drift from argillite and quartzite	Gravelly loam 0-17"	Gravelly loam 0-17"	Low/Moderate	
25D 25E 25F	Wildgen gravelly loam, 4-15% slopes (D) 15-30% slopes (E) 30-50% slopes (F)	Alpine till or drift from argillite and quartzite	Very gravelly loam 7-26"	Gravely loam 0-7"	(D) Low/Moderate (E) Moderate/High (F) High/High	25D and 25E have high risk of rutting if not properly managed Less than 5 acres of 25F proposed for harvest
27E 27F	Wildgen gravelly loam, dry 15-30% slopes (E) 30-50% slopes (F)	Alpine till or drift from argillite and quartzite	Very gravelly loam 7-26"	Gravely loam 0-8"	(E) Moderate/High (F) High/High	Less than 5 acres of 27F proposed for harvest
41B	Oldtrail-Glaciarcreek-Larchpoint complex 0-8% slopes	Alluvium/volcanic ash over alluvium or outwash/alluvium	Extremely gravelly loamy coarse sand 4-12" Extremely gravelly loamy sand 14-60" Silt loam 7-27"	Gravelly sandy loam 0-4" gravelly ashy silt loam 0-14" silt loam 0-7"	Low/Low	Less than 5 acres proposed for harvest
50B	Bigarm gravelly loam 2-8%	Alluvium and colluvium from argillite and quartzite	Very gravelly clay loam 17-60"	Gravelly loam 0-11"	Low/Moderate	
54E	Finleypoint gravelly loam 15-30% slopes	Alpine till or drift from argillite and quartzite	Very gravelly to extremely gravelly sandy loam	Gravelly to very gravelly sandy loam, loam or silt loam	Moderate/Moderate	54E has high risk of rutting if not properly managed Less than 5 acres proposed for harvest
57E 59E	Minesinger stony loam 15-30% slopes	Tertiary sediments	Very gravelly clay loam 24-60"	Stony loam 0-6"	Moderate/High	No harvest proposed on 57E Less than 5 acres of 59E proposed for harvest
42G	Holloway, cool-Rock outcrop complex, 40-70% slopes	Colluvium and residium from quartzite and argillites.	Very gravelly loam, silt loam and/or sandy loam	Gravelly silt loam/loam with volcanic ash layer	High/High	Proper Best Management Practice implementation reduces the risk of erosion Less than 5 acres proposed for harvest
45G	Philcher-Rock outcrop complex 40-70% slopes	Volcanic ash over till or drift	Very gravelly sandy loam 14-60"	Gravelly silt loam 0-14" with ash influence	High/High	Proper Best Management Practice implementation reduces the risk of erosion Less than 5 acres of proposed for harvest
100	Rock Outcrop					No timber production—no harvest proposed
143E 144E	Waldbillig-Holloway gravely ashy silt loams 8-30% slopes, cool	Volcanic ash over till or drift/ Volcanic ash over colluvium from argillite or quartzite	Very gravelly fine sandy loam 9-20"	Gravelly ashy silt loam 0-9"	Moderate/High	Proper Best Management Practice implementation reduces the risk of erosion
143F 144F	Holloway-Waldbillig gravely ashy silt loams 30-50% slopes, cool	Volcanic ash over till or drift/ Volcanic ash over colluvium from argillite or quartzite	Extremely gravelly fine sandy loam 9-20"	Gravelly ashy silt loam 0-9"	High/High	143F has high risk of rutting if not properly managed. Proper Best Management Practice implementation reduces the risk of erosion.

Environmental Effects

No Action Alternative

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

Action Alternative

Three units totaling approximately 237 acres in the North Valley Parcel and five units totaling approximately 362 acres in the Hewolf parcel would be commercially thinned or regenerated under the Action Alternative using conventional ground-based equipment. In addition, 3.4 miles of new road would be constructed, 12.1 miles of road would be maintained or have minor drainage improvements installed as necessary to meet BMPs, 0.1 miles would be reconstructed and 0.1 miles would be obliterated. Harvest may be completed under summer or winter conditions.

Direct and Indirect Effects of Activities on Soil Productivity

No Action Alternative

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

Action Alternative

Considering data from the DNRC Soil Monitoring Report (Collins, 2004), 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 the highest impacts occurred on the fine textured soils and steep slopes, reduced soil productivity may occur on coarser parent materials similar to those found in the state parcels.

Comparing the soil type map with the proposed harvest unit map indicates that approximately 87% of the proposed harvest would occur on soils with a low-to-moderate potential for off-road/trail erosion hazard. Conversely the potential for road/trail erosion hazard for 86% of the proposed harvest units is considered as high. The implementation of standard forestry BMPs would reduce the risk of erosion compaction and displacement on trails and roads. A list of recommended mitigation measures can be found at the end of this analysis.

Under this alternative, moderate or higher impacts to soil from compaction and displacement would be expected cover approximately 15% of the harvest units or less assuming that (1) the season of operation is during the summer and fall; (2) trafficked areas of skid trails and landings are restricted to 20% of the harvest units; and, (3) harvest equipment operation is limited to periods of 20% or less soil moisture at 6 inches below the soil surface.

As vegetation begins to establish on the impacted areas, and freeze-thaw cycles occur, the area of reduced productivity would decrease. Across all parcels in the project, approximately 3.4 miles of new road would be constructed removing this ground from timber production. In addition, approximately 0.1 miles of road would be abandoned/obliterated.

Cumulative Soil Effects

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

General Mitigation Measures

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

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

Tractor skidding should be limited to slopes less than 40%. Short steep slopes above incised draws may require a combination of mitigation measures based on site review, such as adverse skidding to ridge or winch line skidding from more moderate slopes less than 40%.

Keep skid trails to 20% or less of the harvest unit acreage. On high erosion risk soils, reduce the risk of erosion by operating on slash, frozen ground or snow. Provide for drainage in skid trails and roads concurrent with operations.

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

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

References:

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.

Dutton, B.L. 1990. Forest Soils of the Flathead Indian Reservation. Dutton Resource Consulting. Missoula, MT. 136pp.

FISHERIES ANALYSIS

Introduction

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

- Timber harvesting and road construction activities may affect fish habitat by increasing sediment delivery to streams and decreasing levels of recruitable woody debris.
- Stream crossings accessed, as part of the proposal, may not provide adequate fish passage and Westslope cutthroat (WCT) connectivity.
- Some forms of riparian harvest adjacent to North Fork Valley Creek and Hewolf Creek may have an adverse effect on large woody debris recruitment and stream shading.

These issues can best be evaluated by analyzing the anticipated effects of sediment delivery and riparian management on fish habitat in the project area. Connectivity for WCT can best be addressed by analyzing the expected fish passage limitations of stream crossings.

Analysis Area

Sediment Delivery

The analysis area for sediment delivery is limited to the harvest units and roads used for hauling. This includes upland sources of sediment that could result from this project. The analysis area for increases in sediment from in-channel sources of project area streams will be addressed as part of the annual water yield analysis.

Large Woody Debris Recruitment and Stream Shading

The analysis area for large woody debris and stream shading is the portion of the state parcel(s) that include riparian areas adjacent to a fish-bearing stream.

Connectivity

The analysis area for connectivity is limited to stream crossings on roads proposed for use as part of this timber harvest.

Cumulative Effects

The cumulative effects analysis area for North Fork Valley Creek and Hewolf Creek watersheds. These analysis areas mimic those used in the Hydrology Analysis for this project. A complete description including maps can be found in the Hydrology Analysis.

Analysis Methods

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

Sediment Delivery

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

Large Woody Debris Recruitment and Stream Shading

The analysis method for woody debris recruitment will evaluate the potential reduction in available large woody debris due to timber harvest activities in riparian areas. Stream shading will evaluate the risk of decreased riparian canopy due to timber harvest.

Connectivity

Connectivity is addressed by collecting stream crossing information and modeling fish passage limitations using FishXing (1999).

Existing Condition

This proposal includes timber harvest and associated activities on two parcels located southwest of Ravalli, Montana. Streams draining the parcels include Hewolf Creek and the North Fork Valley Creek; both are tributaries to Valley Creek.

Hewolf Creek was found to contain pure-strain Westslope cutthroat trout in 1993, although it is unknown if the species is found within the state parcel. Additional species may exist in Hewolf Creek, but no survey data has been collected since 1993 to verify the species composition or the distribution of fish throughout the stream.

The North Fork Valley Creek contains two species according to the Montana Fisheries Information System (MFISH): lake chub and mountain sucker. The Confederated Salish and Kootenai Tribes considered this stream as 'unoccupied bull trout habitat' (S. Makepeace (CS&KT Hydrologist personal communication, 2005)).

Sediment delivery

Potential sediment sources from roads and stream crossings were identified during field reconnaissance. All sediment sources identified as part of the existing condition can be found in the Hydrology Analysis portion of this EA.

Large Woody Debris Recruitment

North Fork Valley Creek flows west-to-east through the state parcel. Riparian overstory gradually changes from a relatively dense stand of mostly grand fir, Douglas-fir and western larch to an open stand of large ponderosa pine and eventually non-forested rangeland. Because some limited evidence of riparian vegetation manipulation was found in this parcel, some minor impacts to the function of large woody debris and stream shading may exist. The main road through the parcel runs parallel to the stream. The western-most 900 feet of the main road is, in places, as close as 30 feet from the stream, although the remainder of the road through the state parcel is at least 100 feet away and generally further. Some evidence of past harvesting (mostly firewood) exists along the open road.

In the Hewolf parcel, the riparian area is generally undisturbed. Evidence of past harvest away from open roads is very limited. Riparian overstory consists of Engelmann spruce, subalpine fir and lesser amounts of western larch and lodgepole pine. Sine the riparian areas adjacent to this stream are undisturbed, there are likely no existing impacts to the function of large woody debris recruitment and stream shading in this state parcel.

To delineate the Riparian Management Zone (RMZ) as required by ARM 36.11.425 (5), site potential tree heights (SPTH) were determined along the North Fork Valley Creek. The SPTH for this project is estimated at 115 feet using regional index curves. Trees used to determine the site potential tree height ranged in age from 75 to 100 years old and from 97 to 140 feet tall.

Connectivity

In the North Fork Valley Creek parcel, only one stream crossing was found. This crossing is an undeveloped ford that likely does not restrict fish passage.

In the Hewolf parcel, fish passage is likely restricted due to an undersized culvert. The existing culvert is estimated to restrict passage of juvenile fish at all flows and adult fish during periods of high flow. More information on modeled fish passage can be found in the project file. Because no fish presence/absence data exists above this stream crossing, DNRC assumes fish would inhabit the stream above the culvert until data direct otherwise.

Description of Alternatives Affecting Fisheries

No Action Alternative

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

Action Alternative

Three units totaling approximately 237 acres in the North Valley Parcel and five units totaling approximately 362 acres in the Hewolf parcel would be commercially thinned or regenerated under the Action Alternative using conventional ground-based equipment. Harvest may be completed under summer or winter conditions. In addition, activities on the proposed haul route

would be implemented. A summary of the proposed activities by watershed is presented in the table below.

Watershed	Harvest (acres)	New Road Construction (miles)	Road Reconstruction (miles)	Road Maintenance Drainage Improvements (miles)	Road Obliteration (miles)
Hewolf	318	1.6	0	10.7	0
N. Fork Valley Creek	279	1.8	0.1	1.4	0.1
Total	597	3.4	0.1	12.1	0.1

Activity Table

Environmental Effects

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

The primary concerns relating to fisheries within the affected environment are (1) potential impacts to water quality from sources outside the channel as well as inside the channel; (2) adequate large woody debris recruitment and stream shading; and, (3) fish passage at stream crossings. In order to address these issues the following parameters are analyzed by alternative:

-Miles of new road construction and new stream crossings on fish bearing streams
-Potential for sediment delivery to streams
-Changes in recruitable large woody debris and riparian canopy.
-Changes in fish passage at stream crossings

Direct and Indirect Effects

No Action Alternative

Sediment Delivery

Under this alternative, no timber harvest or related activities would occur. Potential sediment sources that currently exist would remain.

Large Woody Debris Recruitment and Stream Shading

No timber harvest would occur in riparian zones under this alternative, therefore changes to large woody debris and stream shading would be driven by natural events.

Connectivity

Fish passage at the crossing in the Hewolf parcel would continue to restrict adults at high flows and juveniles at all flows.

Action Alternative

Sediment Delivery

If this alternative were selected, three units totaling approximately 237 acres in the North Valley Parcel and five units totaling approximately 362 acres in the Hewolf parcel would be commercially thinned or regenerated under the Action Alternative using conventional ground-based equipment. ECA generated from these activities would increase the modeled annual water yield by an estimated 2.5% in the Hewolf watershed and an estimated 0.8% in the North Valley watershed.

As disclosed in the Hydrology Analysis, reclamation activities at the ford would result in moderate potential short-term sediment delivery, however this potential would be reduced with mitigation such as sediment fence and slash filter windrows. Some short-term sediment delivery associated with culvert installations in the Hewolf parcel would likely result from the implementation of this alternative.

A long-term reduction in sediment delivery potential would result from minor drainage improvements such as drain dips and ditch-relief culvert installations. Reclaiming the ford would substantially reduce or eliminate direct long-term sediment delivery to North Fork Valley Creek. Although new road construction would be implemented, no new stream crossings would exist and therefore a risk of prolonged sediment delivery from an additional crossing would not result. The new road construction would be located well away from streams and designed using BMPs that limit the risk of sediment transport. Because of the location and design of the proposed road, the risk of sediment delivery to streams would be very low.

Because DNRC would incorporate BMPs into the project design as required by ARM 36.11.422 (2), and all laws pertaining to SMZs would be followed, there is expected to be a low risk of sediment from timber harvest entering streams in the project area and therefore the risk of long-term adverse direct or indirect effects to water quality or beneficial uses would be low.

Large Woody Debris Recruitment and Stream Shading

As described in the Existing Conditions portion of this analysis, the SPTH is estimated at 115 feet in North Fork Valley Creek. Trees recruitable to the stream would generally be found within the 115-foot RMZ. Because no harvest would occur within 100 feet of the south side of the stream (except for the western-most 900 feet) and no harvest is proposed north of the stream, a majority of the existing recruitable trees would remain after harvesting. Therefore, in this riparian area there is expected to be a very low risk of adverse impacts to woody debris recruitment.

Within the western-most 900 feet of the North Valley parcel, no harvest would occur between the main road and the stream. Merchantable trees outside of the road may be harvested in accordance with the Montana SMZ law and site-specific recommendations from CS&KT resource professionals (S. Makepeace (CS&KT Hydrologist personal communication, 2005)). Recruitable woody debris from the southern side of this reach of stream would be reduced, however, because this is an open road, it is likely that recruitable trees would be harvested for firewood once they were discovered. Therefore, within the western-most 900 feet of the North Valley parcel there is expected to be a low risk of adverse impacts to woody debris recruitment as a result of implementing the action alternative. Recruitable woody debris from the northern side of this reach would not be subject to change from this alternative.

In the Hewolf parcel, no timber harvest would occur with in 100 feet of a fish-bearing stream. Because riparian tree heights are comparable to North Fork Valley Creek riparian area, DNRC expects the RMZ width to be similar. By maintaining all recruitable woody debris within 100 feet of the stream, this alternative would result in a very low risk of adverse impacts to large woody debris recruitment.

A review of available literature by Castelle and Johnson (2000) concluded that maximum shade produced adjacent to streams was within 17 to 30 meters (approximately 51 to 90 feet) of the stream. Considering this information, where no harvest is proposed within 100 feet of the stream, a very low risk of reducing stream shade would result.

Although a reduction in riparian trees would likely occur in 900 feet of North Fork Valley Creek RMZ, the majority of the existing riparian trees in both parcels would be maintained; therefore DNRC expects the prescription to retain adequate stream shading. There would be a low risk to stream shading along this particular section of RMZ.

Connectivity

Under the action alternative, presence/absence of fish above the Hewolf road would be completed. If fish were found upstream of the road, fish passage would be improved by installing a 60"x30" arch-pipe.

Cumulative Effects

No Action Alternative

No timber harvest or road construction is associated with this alternative. Existing sediment sources would continue to contribute sediment to streams until remedial action were implemented or natural healing occurs. No reductions in shade or large woody debris would occur and fish passage restrictions would remain. For these reasons no additional adverse cumulative effects would be expected and no reduction in existing cumulative effects would occur.

Action Alternative

Sediment Delivery

As disclosed in the Hydrology Analysis, cumulative effects to sediment delivery from roads would be reduced because of BMP implementation and reclamation of the North Fork Valley Creek ford. Although new road construction would be implemented, no new stream crossings would exist and therefore a risk of prolonged sediment delivery from an additional crossing would not result. Short-term turbidity increases during culvert installation would be minimized with BMPs and mitigation measures required by relevant permitting agencies. Because BMPs would be implemented during timber harvest and road construction operations, the risk of adverse cumulative impacts to water quality and beneficial uses would be low.

Because the annual water yield increases would remain below the thresholds of concern and BMPs would be implemented during timber harvest and road construction operations, the risk of adverse cumulative impacts to water quality and beneficial uses from sediment delivery would be low.

Large Woody Debris Recruitment and Stream Shading

Cumulative effects to recruitable large woody debris would include a limited reduction in the available woody debris due to timber harvest along 900 feet of North Fork Valley Creek. Because no harvest would occur within 100 feet of a fish-bearing stream (with one exception) DNRC expects remaining recruitable large woody debris and stream shading to be an adequate amount to maintain fisheries habitat.

Connectivity

Installing a fish passage culvert at a location that currently is restricting juveniles and some adults would reduce cumulative effects to connectivity.

Cumulative Effects Summary

Under the action alternative, the risk of additional adverse cumulative effects to fish and fish habitat is low because (1) sediment delivery would be reduced, (2) adequate large woody debris recruitment and stream shading would be maintained, (3) connectivity would be restored by the installation of an adequate culvert size, 4) only minor impacts from related actions such as firewood cutting, and (5) no foreseeable related future actions have been scoped by the state.

REFERENCES

Castelle, A.J. and A.W. Johnson. 2000. Riparian vegetation effectiveness. Technical Bulletin No. 799. National Council for Air and Stream Improvement. Research Triangle Park, NC.

CS&KT, 1994. Forestry Best Management Practices. Confederated Salish and Kootenai Tribes. Pablo, MT.

FishXing, ver 2.2. 1999. Six Rivers watershed interaction team, USDA.

MFISH (Montana Fisheries Information System). 2005. Montana Fish, Wildlife and Parks, Montana Natural Resource Information System.

WILDLIFE ANALYSIS

During the initial scoping, no issues were identified by the public regarding wildlife. The following issue statements were expressed from internal comments regarding the effects of proposed timber harvesting:

- Timber harvesting could reduce mature forested cover and alter landscape connectivity.
- Recruitment of large-sized snags and coarse woody debris could be altered with timber harvesting.
- Timber harvesting could alter habitats for threatened and endangered wildlife species and/or alter their movements through the vicinity.
- Timber harvesting could alter quality and quantity of habitats for sensitive species and/or create barriers to movements.
- Big game security could be affected by timber harvesting and associated road building.

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

Introduction

Of the 108 mammal species known for the state, 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 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 subalpine 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.

Analysis Area

In this section the discussions will focus on 2 areas of different scale. The first will be the "project area", which consists of the state managed portions of section 16 in T17N R21W (North Fork Valley Creek parcel) and section 36 in T17N R22W (Hewolf parcel). The North Fork Valley Creek parcel ranges from 3,480 to 4,160 feet and is largely on a northerly aspect with slopes of varying steepness. The Hewolf parcel ranges from 5,760 to 7,160 feet and is mostly on steep slopes with an easterly aspect. The North Fork Valley Creek parcel is largely a ponderosa pine and Douglas-fir habitats while lodgepole pine and subalpine fir habitats dominate the

Hewolf parcel. The second scale or the "analysis area" relates to the surrounding landscape for assessing cumulative effects. 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., land type, habitat type, disturbance regime, unique characteristics). A coarse-filter approach assumes that if landscape patterns and processes are maintained similar to those with which the species evolved, 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 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.

Issue 1: Mature Forested Habitats and Landscape Connectivity

A variety of wildlife species rely upon 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*). The proposed project area currently contains approximately 618 acres of mature stands (100+ years in age) of reasonably closed canopy Douglas-fir/ponderosa pine (108 acres, North Fork Valley Creek parcel), lodgepole pine (340 acres, Hewolf parcel) and subalpine fir (170 acres, Hewolf parcel). Within the state parcels, these stands are interspersed with areas of regenerating forest and non-forested areas.

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 non-forested areas and other openings; connectivity under historical fire regimes likely remained relatively high as fire differentially burned various habitats across the landscape. Today, the mosaic of ownership and diversity of past management within the general vicinity of the project area have compromised connectivity and forest-interior habitats to a degree. However, forested habitats in the project area are presently providing some connectivity to forested patches on adjacent ownerships.

Cumulative effects were analyzed on the combined area of the Hewolf and North Valley watersheds (approximately 20,124 acres, Figure W-1) using field evaluations and aerial photograph interpretation. Factors considered within the analysis area include the level of harvesting, amount of densely forested habitats, and connectivity. Within the cumulative effects analysis area, stands are similar to those on state parcels. Stands around the North Fork Valley Creek parcel are largely dominated by ponderosa pine and Douglas-fir in mature age classes. Small areas of regenerating forest are intermixed within this matrix, and non-forested areas dominate some of the lower elevations. Stands on adjacent ownerships around the Hewolf parcel are also dominated by lodgepole pine and subalpine fir. Stands in the vicinity are a combination of age classes, ranging from recently harvested stands to mature stands. Connectivity in the analysis area has been compromised, to a degree, with differing ownerships and management; however, no significant barriers to movement exist in the analysis area and the existing forested stands are reasonably interconnected.

Direct and Indirect Effects to Wildlife Species due to Changes in Mature Forested Habitats and Connectivity

No Action Alternative

Forest conditions would continue to age and move toward denser stands of shade-tolerant tree species with high canopy cover. Individual trees and possibly pockets would continue to die and create openings where younger trees could become established. 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 the American marten, northern goshawk, and pileated woodpecker, would likely improve with this alternative, however western larch and ponderosa pine (preferred snag species) would decline in abundance over time.

Action Alternative

Approximately 362 acres of mature lodgepole pine, sub-alpine fir, and Engelmann spruce stands would be largely removed on the Hewolf parcel. These conditions would lead to younger, more open stands, which could interrupt movement by species requiring extensive, connected forested habitats. On the North Fork Valley Creek parcel, roughly 237 acres of mature Douglas-fir, ponderosa pine, and western larch would be commercially thinned. This parcel is on the interface between the forested areas to the west and the open, non-forested areas to the east, therefore, the proposed thinning may disrupt some movement, however species requiring extensive, connected forested habitats are not likely using this parcel extensively for movements across the landscape. The resultant changes in stand age and density would likely reduce habitats for species associated with old stands, such as American marten and pileated woodpeckers, which have benefited from the increasing stand ages and densities caused by modern fire suppression. In general, habitat conditions would improve for species adapted to the

more open forest condition, while declining for species that prefer dense, mature forest conditions.

Cumulative Effects to Wildlife Species due to Changes in Mature Forested Habitats and Connectivity

No Action Alternative

The surrounding landscape is a mosaic of ownerships subject to a host of management regimes. Past harvesting on private and Confederated Salish and Kootenai Tribe (CS&KT) lands have reduced the amount of the analysis area in mature, forested habitats. Forested stands in the analysis area are extensive enough to maintain landscape connectivity. With this alternative, stands on the state parcel would continue to contribute to the mature forested stands in the analysis area. Losses of individuals and pockets of trees on the state parcel would not likely alter the overall age structure or landscape connectivity within the analysis area. Additionally, stands in the analysis area that have been harvested in the last 30 years will start developing mature forest stand characteristics through time. Under this alternative, continued 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. Limited habitat for old-stand-associated species, such as the American marten and pileated woodpecker, would likely persist.

Action Alternative

Diverse ownership patterns and management regimes within the analysis area have created a mosaic of habitat conditions in the analysis area. Past harvesting has reduced mature forest stands within the analysis area and proposed harvesting would be additive to these past reductions in mature, forested habitats. Besides removing mature trees with a closed canopy, harvesting would alter landscape connectivity within the analysis area, and likely force species requiring forested movement corridors into riparian retention areas or to select habitats on adjacent ownerships. Wildlife species favoring dense stands of shade-tolerant tree species and those species requiring larger areas of mature forests would see a reduction in available habitat while species favoring earlier seral stage habitats would see an increase in available habitats. Habitats for old-stand-associated species would be further reduced in the analysis area.

Issue 2: Snags and Coarse Woody Debris

Snags and coarse woody debris are important components of the forested ecosystems. Five primary functions of deadwood in the forested ecosystems are: 1) increase structural diversity, 2) alter canopy microenvironment, 3) promote biological diversity, 4) provide important habitat for wildlife, and 5) act as a storehouse for nutrient and organic matter recycling agents (Parks and Shaw 1996). Snags and defective trees (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 (Heijl and Woods 1991). The quantity, quality, and distribution of snags affect the presence and population size of many of these species. Larger diameter, taller

snags tend to provide nesting sites, while shorter snags and stumps tend to provide feeding sites for a variety of birds and mammals.

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. Small mammals, such as red-backed voles (*Clethrionomys gapperi*), to large mammals, such as black bears (*Ursus americana*), 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 Canada lynx.

During field visits, 0-6 variably spaced snags per acre and differing quantities of coarse woody debris were observed in the project area. The snags and coarse woody debris in the project area exhibit the range of sizes and decay classes, ranging from small to large and sound to almost fully decayed.

Cumulative effects were analyzed on the combined area of the Hewolf and North Valley watersheds (approximately 20,124 acres, Figure W-1) using field evaluations. Factors considered within the analysis area include the level of harvesting, number of snags and coarse woody debris, and risk level of firewood harvesting. The surrounding landscape is largely managed by the Confederated Salish and Kootenai Tribes with some privately owned parcels and some USFS managed parcels on the south side of Reservation Divide. Within the cumulative effects analysis area, past harvesting and extensive forest product gathering has limited snag and coarse woody debris densities in the accessible portions of the analysis area.

Direct and Indirect Effects on Snags and Coarse Woody Debris

No Action Alternative

No direct changes in the deadwood resources would be expected. 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 would 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 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.

Action Alternative

Under this alternative, present and future deadwood material would be reduced during the timber harvesting. Several snags and snag recruits would be planned for retention within the proposed units. However, some of this material could be lost due to safety and operational concerns. Based on data collected by the USFS on the Lolo National Forest, an estimate of snag loss during harvest activities ranged from 50-100% (Hillis 1993). Recent DNRC monitoring indicates

similar loss of snags, with a greater percentage being lost in the medium size classes than other size classes. Snag loss could continue after the project, especially along the open roads, although the zone near the open road largely lacks appreciable snag numbers due to legal and illegal firewood and forest product gathering. Future snag quality would be enhanced with silvicultural prescriptions that should lead to the re-establishment of western larch and ponderosa pine across much of the project area. Given the 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.

Cumulative Effects on Snags and Coarse Woody Debris

No Action Alternative

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 within the stands due to advances in succession. Snags have been retained during some of the past harvesting on adjacent ownerships. Extensive firewood and forest product gathering in the vicinity has also reduced these deadwood resources near the open roads. Snags and coarse woody debris are largely absent from the non-forested habitats in the analysis area. Wildlife relying on snags and coarse woody debris would be expected to persist across the analysis area.

Action Alternative

Under this alternative, snags and coarse woody debris would be reduced within the project area. Surrounding lands have under gone different management regimes by the differing landowners over 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. Additionally, firewood and forest product gathering in the vicinity has also reduced these deadwood resources near the open roads and skid trails. The losses of snags and coarse woody debris under this alternative would be additive to the previous harvests in the area.

Issue 3: Threatened and Endangered Species

Four species indigenous to Montana are classified as "threatened' or "endangered" under the Endangered Species Act of 1973. The bald eagle, grizzly bear, and Canada lynx are listed as "threatened," while the gray wolf is listed as "endangered."

•Bald eagle *(Haliaeetus leucocephalus)*

The project area is 6-7 miles south of the nearest known bald eagle nest and is separated by large areas of unsuitable habitats. Thus, due to the distance between the nest and project area and habitats present, extensive use by bald eagles would not be expected. Therefore, direct, indirect, and cumulative effects to bald eagles would be minimal and this species will not be discussed further.

•Gray wolf (*Canus lupus*)

The Ninemile wolf pack occupies an area centered approximately 9 air miles southwest of the proposed project area and has been documented as close as 5 miles from the project area. No known den or rendezvous sites are known in the vicinity and landscape features frequently associated with these sites are limited in the vicinity of the project area. Deer and elk, the primary prey species of wolves in Montana, are known to use the proposed project area. Wolves could pass through the area at any time. Since wolves are not using the project area and important wolf habitats (denning and rendezvous sites) would not be affected, no direct, indirect, or cumulative effects would be expected and this species will not be discussed further.

•Grizzly bear (*Ursus arctos*)

Grizzly bears are wide-ranging mammals that use forested upland habitats. Preferred grizzly bear habitats are meadows, riparian zones, avalanche chutes, subalpine forests, and big game winter ranges, all of which provide seasonal food sources. The proposed project is located 14 miles west of the North Continental Divide Ecosystem Recovery Zone (USFWS 1993) and is partially included in "occupied habitat" as mapped by grizzly bear researchers and managers to address increased sightings and encounters of grizzly bears in habitats outside of recovery zones (T. Wittinger, Unpub. Interagency Map). Therefore, grizzly bears could show up in the proposed project area at any time.

Managing human access is a major factor in management for grizzly bear habitats. Presently, open road densities in both the North Fork Valley Creek parcel (approx. 1.79 miles/sq. mile) and the Hewolf parcel (approx. 1.21 miles/sq. mile) are relatively high. Although grizzly bears could use the project area at any time, extensive use is unlikely given the high levels of human disturbance and vehicular traffic coupled with marginal grizzly bear habitat values that exist.

Cumulative effects were analyzed on a 49,260-acre analysis area that is the western portion of the "occupied habitat" map that includes the project area. The analysis area is largely managed by the CS&KT (35,019 acres) with some USFS managed lands (7,415 acres), DNRC managed lands (2,728 acres), privately held lands (3,939 acres), and BIA lands (159 acres). Factors considered within this analysis area include level of human disturbance, availability of timbered stands for hiding cover, and miles of open roads. Portions of the analysis area receive low human use, while other areas experience extensive human use and associated disturbance. The analysis area is a mosaic of forested lands in varying successional stages with intermixed areas of non-forested habitats. Portions of the analysis area have been harvested recently, while others have seen limited or no harvest in the past. Human disturbance levels and level of forest harvesting are both closely tied to road access. Access, particularly open road access, varies across the analysis area, with portions being very accessible while other portions are much less accessible.

Direct and Indirect Effects on Grizzly Bears

No Action Alternative

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

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, should bears occur in the area. No appreciable changes in open road densities would be anticipated under this alternative since all new construction would be restricted after the proposed harvesting. Hiding cover would be reduced on the 596 acres in the proposed harvest units in the short-term, however it would improve with time as shrub and tree regeneration proceeds. Again extensive grizzly bear use of the proposed project area is unlikely, so the effects to grizzly bears would be expected to be minor.

Cumulative Effects on Grizzly Bears

No Action Alternative

Since no direct or indirect effects to grizzly bears would be anticipated, then no cumulative effects would be expected. Motorized access to the area and hiding cover would remain unchanged. Existing forested stands throughout the 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. Very little permanent development exists within the analysis area, and human disturbance is largely limited to timber harvesting and human recreation near existing roads and skid trails; present levels of human disturbance would be expected to continue into the future.

Action Alternative

The increased use of road systems during the proposed project would temporarily increase human disturbance to grizzly bears within the analysis area, should they occur there. Proposed activities would be concentrated in a portion of the analysis area already experiencing human disturbance along the existing open roads, and would be away from the more remote portions of the analysis area. No changes in long-term open-road densities would be expected. No permanent increases in human disturbance level would be expected to result from this project. Reductions in hiding cover would be additive to the reductions from past timber harvesting in the analysis area; however, much of the analysis area is providing hiding cover presently. Early successional stages of vegetation occurring in harvest units could provide foraging opportunities that do not exist in some mature stands.

•**Canada Lynx (*Lynx canadensis*)**

Canada lynx are associated with subalpine fir forests, generally between 4,000 to 7,000 feet in elevation in western Montana (Ruediger et al. 2000). The proposed project area ranges from approximately 3,480 to 7,160 feet in elevation. The North Fork Valley Creek parcel is dominated by Douglas-fir and ponderosa pine, while the Hewolf parcel is dominated by lodgepole pine and subalpine fir. Primary lynx habitats are subalpine-fir types with abundant coarse woody debris for denning; however, lynx will use a mix of species compositions (subalpine fir, lodgepole pine, Douglas-fir, grand fir, and western larch). Lynx generally forage in young coniferous forests with plentiful snowshoe hares. Mature, densely forested cover facilitates movement and provides habitats for red squirrels, which are an alternative prey source for lynx.

The Lynx Conservation Assessment and Strategy (LCAS) was developed to provide a consistent and effective approach to conserving lynx (Ruediger et al. 2000). Lynx Analysis Units (LAUs) were outlined as the basis for this strategy and were created to ensure appropriately scaled analyses and to allow effective monitoring through time. LAUs are designed to approximate the home range size of a female lynx and encompass all seasonal habitats (Ruediger et al. 2000). The project area lies on the west side of the Hewolf and Dixon LAUs.

To assess lynx habitat, DNRC SLI data were used to map specific habitat classes used by lynx. Other parameters (stand age, canopy cover, amount of coarse woody debris) were used in modeling the availability of specific types of lynx habitat in the area (i.e. denning, forage, other, temporarily not available). No lynx habitat was identified on the North Fork Valley Creek parcel, and approximately 635 acres of lynx habitat was mapped on the Hewolf parcel. Much of this habitat was identified as travel/other and mature foraging habitats, with minor amounts of denning habitats. Additionally some young foraging habitats exist where past timber harvesting crossed on to the Hewolf parcel in the last 15 years. The CS&KT also mapped lynx habitats in the project area as part of a larger analysis. Similarly, this map identified most of the Hewolf section as foraging or travel habitats, with a small component of denning habitat. The CS&KT mapping effort also identified 6 acres of the North Fork Valley Creek parcel as travel habitats. The spatial arrangement of these habitats differs to a degree between the mapping efforts, however both indicate extensive foraging and travel habitats in the Hewolf parcel with some denning habitats.

Cumulative effects were analyzed for the Hewolf and Dixon LAUs. Factors considered within each analysis area include the level of human disturbance, amount of each LAU in unsuitable and denning habitats, and landscape connectivity. Currently foraging and forested travel habitats comprise the majority of these LAUs (Table W-1). The LCAS that was adopted by the CS&KT for lynx habitat management puts a 15% limit on the amount of lynx habitat that could be converted to unsuitable habitat in a 15 year time period. Additionally the Conservation Strategy establishes a minimum of 10% of suitable habitat in any LAU should be in denning habitats or projects should not affect denning habitat. Following these guidelines, a maximum of 2,023 and 1,167 acres can be temporarily unsuitable in the Hewolf and Dixon LAUs, respectively. Likewise a minimum of 1,333 and 778 acres in the Hewolf and Dixon LAUs, respectively, need to be in potential denning habitat to meet the Conservation Strategy guidelines. Currently, both LAUs are below the maximum for temporarily unsuitable habitats and the Hewolf LAU is above

the minimum threshold for denning habitat. The Dixon LAU is presently below the denning threshold.

Table W-1.

	Existing Condition		Alternative A		Alternative B	
Lynx Habitat	**Hewolf LAU**	**Dixon LAU**	**Hewolf LAU**	**Dixon LAU**	**Hewolf LAU**	**Dixon LAU**
Permanently Unsuitable	2,633	1,919	2,633	1,919	2,633	1,919
Denning	1,564 **11%**	522 **7%**	1,564 **11%**	522 **7%**	1,528 **11%**	522 **7%**
Foraging	5,361 **40%**	2,549 **33%**	5,361 **40%**	2,549 **33%**	5,094 **38%**	2,517 **32%**
Forested Travel	5,516 **41%**	4,009 **52%**	5,516 **41%**	4,009 **52%**	5,513 **41%**	3,988 **51%**
Temporarily Unsuitable	1,050 **8%**	701 **9%**	1,050 **8%**	701 **9%**	1,365 **10%**	754 **10%**

Acres of lynx habitats for the Hewolf and Dixon Lynx Analysis Units and the proportion each suitable class represents out of all suitable lynx habitats in the LAUs. Since Alternative A includes no actions, the existing condition and the conditions under Alternative A are the same.

Direct and Indirect Effects on Canada Lynx

No Action Alternative

Under this alternative, timber stands would continue to age, die, and gradually move towards shade-tolerant tree species. The existing stands of continuous forested habitats could facilitate lynx movement. Denning, mature foraging, and travel habitats would persist on the Hewolf parcel. The 26-acre patch of young foraging habitat resulting from past harvesting is expected to improve in quality for snowshoe hares through the next few years, then decline in quality as the stand continues to mature. Existing closed roads and skid trails would remain closed; no changes in human-disturbance levels would be expected.

Action Alternative

Approximately 367 acres of lynx habitats would be harvested with this alternative, of which roughly 323 acres occur in the mature foraging and travel/other habitats classes, with minor components in denning and temporarily unsuitable habitats. The proposed harvesting would change these habitats into temporarily unsuitable habitats until tree seedlings and shrubs recover and begin providing habitats for snowshoe hares. This habitat is only a phase and would gradually outgrow usefulness to snowshoe hares in 10-20 years. Areas outside of units contain sufficient denning (>5 acres) and foraging habitats (>64 acres) to meet DNRC's requirements for these habitat attributes (ARM 36.11.435(8)). Use of the general vicinity, by snowmobiles may enable other predators to access some of these upper elevations, potentially increasing competition for available prey. The 3.4 miles of new roads associated with this alternative could allow a slight increase in competitor access to the lynx habitats in the portions of the LAUs in the project area should recreational snowmobile riders use the new roads behind the gates.

Cumulative Effects on Canada Lynx

No Action Alternative

Under this alternative, lynx habitats would not be affected in the near-term. Within the LAUs, the mosaic of habitats would be expected to continue providing snowshoe hare habitats intermixed with mature forested stands that facilitate travel and foraging. Denning habitats would also persist in the LAUs (Table W-1), however the Dixon LAU presently lacks enough denning habitat to meet the Conservation Strategy guidelines. Within the next 2 decades, temporarily unsuitable habitat would be expected to develop into young foraging habitat on much of the 1,050 and 701 acres (Hewolf and Dixon, respectively) in these LAUs. Likewise succession during that same period would be expected to convert young foraging habitats into mature foraging and travel/other habitats. Denning habitat would be expected to persist in the absence of timber harvesting or catastrophic event reducing habitat quality. Use of the general vicinity, by snowmobiles may enable other predators to access some of these upper elevations, increasing competition for available prey. No changes in human access would be expected with this alternative; therefore no changes in competition would be anticipated.

Action Alternative

Within the LAUs, considerable habitat for snowshoe hares interspersed with mature forests would continue to provide habitat for lynx. Reductions in mature foraging, travel, and denning habitats in the proposed units would not be expected to appreciably alter lynx use of the LAUs. The Dixon LAU presently lacks sufficient denning habitat to meet the 10% criteria established in the LCAS, therefore no activities can further reduce this habitat component within the LAU; no activities are proposed for denning habitats in the Dixon LAU. Proposed activities would not reduce the amount of denning habitat in the Hewolf LAU below the 10% threshold (Table W-1). Proposed activities would not cause either LAU to exceed the 15% of suitable habitats in the temporarily unsuitable category (Table W-1). Young foraging habitats within the analysis unit would be expected to decline through time as they age. Within the next 2 decades, temporarily unsuitable habitat would be expected to develop into young foraging habitat on much of the 1,050 and 701 acres (Hewolf and Dixon, respectively) in these LAUs. Likewise succession during that same period would be expected to convert young foraging habitats into mature foraging and travel/other habitats. Denning habitat would be expected to persist in the absence of timber harvesting or some catastrophic event reducing habitat quality. Use of the general vicinity, by snowmobiles may enable other predators to access some of these upper elevations, increasing competition for available prey. Additionally, 3.4 miles of new roads associated with the proposed harvesting could allow a slight increase in competitor access to the lynx habitats in the portions of the LAUs in the project area should recreational snowmobile riders use the new roads behind the gates.

Issue 4: Sensitive Species

When conducting forest-management activities, DNRC gives special consideration to habitat requirements of several sensitive species. These species are sensitive to human activities, have special habitat requirements that might be altered by timber management, or might become listed under the Federal Endangered Species Act if management activities result in continued adverse impacts. Because sensitive species usually have specific habitat requirements, consideration of

their needs serves as a useful "fine filter" for ensuring that the primary goal of maintaining healthy and diverse forests is met.

A search of the Montana Natural Heritage Database documented no sensitive animal species occurrence records in the proposed project area or within 3 miles. Table W-2 shows how each sensitive species was either included in the following analysis or was removed from further analysis due to habitat availability.

TABLE W-2 – LISTED SENSITIVE SPECIES FOR THE NWLO SHOWING THE STATUS OF THESE SPECIES IN RELATION TO THIS PROPOSED PROJECT

SPECIES	DETERMINATION – BASIS
Black-backed woodpecker	No further analysis conducted – No recently (less than 5 years) burned areas are in the project area.
Coeur d'Alene salamander	No further analysis conducted – No moist talus or streamside talus habitat occurs in the project area.
Columbian sharp-tailed grouse	No further analysis conducted – No suitable grassland communities occur in the project area.
Common loon	No further analysis conducted – No suitable lake habitats occur within the project area.
Fisher	**Included** – Potential fisher foraging habitat occurs in the proposed project area.
Flammulated owl	**Included** – Suitable dry ponderosa pine habitats occur in the proposed project area.
Harlequin duck	No further analysis conducted – No suitable high-gradient stream or river habitats occur in the project area.
Northern bog lemming	No further analysis conducted – No suitable sphagnum bogs or fens occur in the project area.
Peregrine falcon	No further analysis conducted – No suitable cliffs/rock outcrops occur in the project area.
Pileated woodpecker	**Included** – Ponderosa pine and Douglas-fir habitats occur in the project area that could provide foraging and nesting habitats.
Townsend's big-eared bat	No further analysis conducted – No suitable caves or mine tunnels occur in the project area.

Sensitive species assessed:

•Fisher *(Martes pennanti)*

The fisher is a medium-sized mammal belonging to the weasel family that uses mature and late-successional habitats, particularly for resting and natal dens. Fishers are generalist predators and use a variety of habitat types, but are disproportionately found in stands with dense canopies. In the Rocky Mountains, fishers appear to prefer late-successional moist coniferous forests (Jones 1991). Such areas typically contain large live trees, snags, and logs, which are used for resting and denning sites and dense canopy cover, which would be important for snow intercept (Jones 1991). Fishers have also been noted to avoid large openings, non-forested habitats, and shrub-seedling stands. Forest-management considerations for fisher involve providing for resting and denning habitats near riparian areas while maintaining a network of travel corridors.

The North Fork Valley Creek parcel ranges from 3,480 to 4,160 feet in elevation, with 1 permanent and a couple of intermittent streams. Some potential fisher denning habitats exist along the North Fork Valley Creek. The uplands on this section are largely mature ponderosa pine types, which are not typically high quality fisher denning habitats, but might be used for foraging and travel. The lodgepole pine and subalpine fir habitat types present on the Hewolf parcel are not considered fisher habitats and the section is largely higher in elevation (5,760 - 7,160 feet) than areas typically used by fishers, therefore little or no use by fisher would be anticipated and this analysis will only focus on the North Fork Valley Creek section.

Trapping is a significant source of fisher mortality. Fishers are easily caught in traps set for martens, bobcats, and coyotes (Powell and Zielinski 1994), and trapping density is generally tied to road density. Currently, several open roads traverse the North Fork Valley Creek parcel, facilitating extensive access to the riparian area, which exposes this area to potential trapping pressure and firewood gathering.

Cumulative effects were analyzed on the 8 surrounding sections (totaling approx 5,726 acres) using field evaluations and aerial photograph interpretation. Factors considered within the analysis area include the level of human disturbance and harvesting, amount of densely forested habitats, and connectivity along riparian habitats. Presently a large portion of the analysis area (or approximately 57%) is forested, however at least 415 acres (or roughly 7%) have been harvested in the last 20-30 years, and is not suitable fisher habitat. Additionally, roughly 2,057 acres (or approximately 36%) are in grassland types, which are also not suitable for fisher. Limited riparian areas exist within the analysis area along the 4 miles of permanent and 13 miles of intermittent steams. Landscape connectivity is limited in the vicinity, but exists in the upper stream reaches where they flow through forested habitats. Several open roads in the analysis area likely provide human disturbance and potential trapping pressure.

Direct and Indirect Effects on Fishers

No Action Alternative

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

Action Alternative

Under this alternative, no appreciable changes to the riparian habitats would be expected. Fisher foraging and resting habitat would be reduced due to the proposed thinning of the overstory in the uplands (approximately 235 acres); but much of the harvesting would avoid habitats typically preferred by fishers. Minor reductions in riparian habitats would occur in unit 1 where the unit boundary follows the existing road and passes within 100 feet of the stream. Since a portion of the habitat has already been removed with the road construction and the majority of the riparian habitats (approximately 78%) would be planned for retention, this minor reduction would have

minor effects on fisher use. No long-term changes in human disturbance or potential trapping mortality would be anticipated with this alternative.

Cumulative Effects on Fishers

No Action Alternative

Under this alternative, fisher denning, foraging, and travel habitats would be retained. Suitable fisher denning habitat appears somewhat limited within the analysis area. Uplands within the analysis area are largely ponderosa pine and Douglas-fir stands that are not typical fisher denning habitats. No changes to fisher habitats or landscape connectivity would be anticipated with this alternative. Road access within the analysis area would not be changed with this alternative; therefore, fisher vulnerability to trapping would remain unchanged.

Action Alternative

Under this alternative, potential fisher foraging and resting habitats in the uplands would be harvested in the proposed units. Clearing and harvesting in the past has reduced forested upland habitats in the analysis area. The proposed harvesting of closed-canopy, forest would add to the losses associated with the past harvesting and clearing. With little or no forested habitats downstream, connectivity is limited, however no barriers to fisher movements in the riparian habitats would be generated, and limited fisher use, if occurring, would persist. Human disturbance and potential trapping mortality would remain relatively unchanged since no appreciable changes in human access to fisher habitats within the analysis area would be realized.

•Flammulated owl *(Otus flammeolus)*

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

Much of the North Fork Valley Creek parcel is dominated by ponderosa pine and Douglas-fir, with some western larch. Meanwhile, the Hewolf parcel is dominated by lodgepole pine and subalpine fir habitats, which are not flammulated owl habitats. Since little or no flammulated owl use of the Hewolf parcel would be anticipated, this analysis will only focus on the North Fork Valley Creek parcel. During field visits, 0 to 6 variably (12+ in dbh) spaced snags per acre were observed in the North Fork Valley Creek parcel.

Cumulative effects were analyzed on the 8 surrounding sections (totaling approx 5,726 acres) using field evaluations and aerial photograph interpretation. Factors considered within the analysis area included the amount of open, mature stands of ponderosa pine and amount of dense, mixed conifer stands. Presently a large portion of the analysis area (approximately 57%) is forested, however modern fire suppression has allowed Douglas-fir in-growth to create denser

stands of ponderosa pine and Douglas-fir across much of the analysis area, which has reduced habitat quality for flammulated owls.

Direct and Indirect Effects on Flammulated Owls

No Action Alternative

Much of the proposed project area is densely forested with few openings; therefore low quality flammulated owl habitats dominate the parcel. No changes to the existing conditions would be expected. In the long term, stands once dominated by ponderosa pine would continue to be converted to Douglas-fir stands through succession, become densely stocked, and exist at high risk to insects, disease and stand-replacement fire. Thus, habitat sustainability and quality for flammulated owls would continue to decline.

Action Alternative

Flammulated owls are tolerant of human disturbance (McCallum 1994), however the elevated disturbance levels associated with harvesting could negatively impact flammulated owls. Proposed timber harvest would open the canopy while favoring ponderosa pine and western larch. Elements of the forest structure important for nesting flammulated owls would be retained, including snags, coarse woody debris, numerous leave trees, and snag recruits. Realistically, however, some snags would likely be removed due to safety and/or logistical concerns, which further affects flammulated owls now and into the future. The more open stand conditions, the retention of fire adapted tree species, and the maintenance of snags would move the proposed project area toward historical conditions, which is preferred flammulated owl habitat. After implementation, most of the stands on the 235 acres would be more open with an increasing percentage of ponderosa pine, which would result in moderate positive benefits to flammulated owls.

Cumulative Effects on Flammulated Owls

No Action Alternative

Under this alternative, flammulated owl habitat would continue to decline in quality within the project area over the long term. Adjacent ownerships have also become increasingly dense and with a larger proportion of shade-tolerant species. Harvesting within the analysis area has occurred in recent years, improving flammulated owl habitats by creating foraging habitats and reversing a portion of the Douglas-fir encroachment, however retention of large ponderosa pine was not a consideration in many of these harvest units; thereby minimizing the benefits to flammulated owls.

Action Alternative

Habitat would be enhanced by removing some of the encroaching Douglas-fir while increasing spacing between mature ponderosa pine and western larch on the state parcel. Adjacent ownerships have also become increasingly dense and with a larger proportion of shade-tolerant

species. Harvesting within the analysis area has occurred in recent years, improving flammulated owl habitats by creating foraging habitats and reversing a portion of the Douglas-fir encroachment, however retention of large ponderosa pine was not a consideration in many of these harvest units; thereby minimizing the benefits to flammulated owls. Proposed treatments would add to the foraging habitats while retaining and spacing ponderosa pine, which would improve long-term habitat quality in the analysis area.

•Pileated woodpecker *(Dryocopus pileatus)*

Pileated woodpeckers excavate the largest cavities of any woodpecker. The cavities are frequently used in subsequent years by many other species of birds and mammals. Preferred nest trees are western larch, ponderosa pine, black cottonwood, and quaking aspen, usually 20 inches dbh and larger. Pileated woodpeckers primarily eat insects, mainly carpenter ants, which inhabit stumps, snags, and large downed logs. Nesting habitat for pileated woodpeckers consists of mature stands generally below 5,000 feet in elevation with 100 to 125 square feet per acre of basal area and a relatively closed canopy (Aney and McClelland 1985). The feeding- and nesting-habitat requirements, including large snags or decayed trees for nesting and large downed wood for feeding, closely tie these woodpeckers to mature forests. Pileated woodpeckers appear to be positively correlated with the amount of dead and/or dying wood in a landscape (McClelland 1979).

The North Fork Valley Creek parcel ranges from 3,480 to 4,160 feet in elevation and is dominated by ponderosa pine and Douglas-fir. Additionally several larger western larch trees exist in the section, which could become suitable nesting sites in the future. During field visits, several feeding sites and 0 to 6 variably (12+ in dbh) spaced snags per acre were observed in the proposed project area. Although large western larch and Douglas-fir exist in the Hewolf section, the section is located too high to receive much pileated woodpecker use and is dominated by lodgepole pine and subalpine fir types, which are not preferred habitats. Therefore little or no use of the Hewolf parcel would be anticipated and this analysis will only focus on the North Fork Valley Creek section.

Cumulative effects were analyzed on the 8 surrounding sections (totaling approx 5,726 acres) using field evaluations and aerial photograph interpretation. Factors considered within the analysis area included the degree of harvesting and the amount of continuous forest within the analysis area. Presently a large portion of the analysis area (approximately 57%) is forested, however at least 415 acres (roughly 7%) have been harvested in the last 20-30 years, and is not suitable pileated woodpecker habitat. Additionally, roughly 2,057 acres (approximately 36%) are in grassland types, which are also not suitable for pileated woodpeckers.

<u>Direct and Indirect Effects on Pileated Woodpeckers</u>

No Action Alternative

No direct effects would be anticipated under this alternative. Ponderosa pine and western larch would continue to grow and die over time, providing nesting and foraging habitat. As these trees die, replacement shade-intolerant trees would be underrepresented in the stand unless other disturbances influence the stands, allowing for their regeneration. Therefore, a reduction in

suitable nesting trees would be likely over time. Pileated woodpeckers typically do not nest in Douglas-fir or grand fir; however, they will forage on the boles of Douglas-fir. Under this alternative, stands once dominated by ponderosa pine would continue to be converted through succession to Douglas-fir stands. Thus, habitat sustainability and quality for pileated woodpeckers would gradually increase through time, and then decline. However, the proposed project area alone would not be expected to be capable of supporting a pair of pileated woodpeckers in the near-term.

Action Alternative

Pileated woodpeckers tend to be tolerant of human activities (Bull and Jackson 1995), but could be temporarily displaced by the proposed harvesting and road-building activities. Elements of the forest structure important for nesting pileated woodpeckers would be retained, including snags, coarse woody debris, numerous leave trees, and snag recruits. Realistically, however, some snags would likely be removed due to safety and/or logistical concerns, which further affects pileated woodpeckers now and into the future. After the proposed harvesting, the 235 harvested acres within the proposed project area would be largely too open to be considered pileated woodpecker habitat. The silvicultural prescriptions would retain healthy western larch, ponderosa pine, and Douglas-fir and promote regeneration of these same species. Retention and recruitment of western larch and ponderosa pine would benefit pileated woodpeckers in the future by providing nesting, roosting, and foraging habitats. However, the proposed project area alone would not be expected to be capable of supporting a pair of pileated woodpeckers in the near-term.

Cumulative Effects on Pileated Woodpeckers

No Action Alternative

Under this alternative, western larch, ponderosa pine, and Douglas-fir trees would continue to grow and die over time in the proposed project area, providing nesting and foraging habitats. Through time, conversion of stands to shade-tolerant species would reduce nesting substrates for pileated woodpeckers. Approximately 3,254 acres (57%) of the 5,726 acres of the analysis area are presently in mature ponderosa pine and Douglas-fir cover types that provide nesting and foraging habitats for pileated woodpeckers. Much of the remaining acreage in the analysis area is in non-forested types or were harvested in the last 30 years and do not possess qualities that make them highly suitable for pileated woodpecker nesting or foraging. It is possible that under this alternative, that the analysis area could support 2-3 pairs of pileated woodpeckers.

Action Alternative

Under this alternative, reductions in pileated woodpecker habitat would be expected. Some existing snags, coarse woody debris, and suitable nesting trees would be retained within the proposed project area. However, the 235 acres included in proposed units would largely be too open for appreciable pileated woodpecker use after harvesting. This reduction would reduce mature, forested habitats within the analysis area to approximately 3,019 acres (53%) and be additive to the past losses associated with timber harvesting and clearing that has occurred in the analysis area. Within those stands harvested in the last 30 years mature, future foraging habitat

is, however, developing and may be suitable in the next 30-50 years. The reductions in forested habitats associated with this alternative would have negligible effects to the carrying capacity of the analysis area, which would still be expected to be able to support a couple of pairs of pileated woodpeckers.

Issue 5: Big Game

•Elk (*Cervus elaphus*) Security

Timber harvesting can increase elk vulnerability by changing the size, structure, juxtaposition, and accessibility of areas that provide security during hunting season (Hillis et al. 1991). As visibility and accessibility increase within forested landscapes, elk and deer have a greater probability of being observed and, subsequently, harvested by hunters. Because the female segments of the elk and deer populations are normally regulated carefully during hunting seasons, primary concerns are related to a substantial reduction of the male segment and subsequent decrease in hunter opportunity.

Dense, large (≥ 250 acres) forest patches at least ½ mile from an open road that would provide elk (and subsequently deer) security (Hillis et al. 1991) are absent from the state parcels; however a small portion of the Hewolf parcel that is far enough from the open road could serve as security cover in conjunction with available habitat on adjacent USFS lands. It is expected that when elk security is substantially compromised, effects to deer can also be expected (albeit to a lesser degree than for elk). Summer use of the proposed project area by deer and elk was documented during field visits.

Cumulative effects were analyzed on the combined area of the Hewolf and North Valley watersheds (approximately 20,124 acres, Figure W-1) using field evaluations and aerial photograph interpretation. Factors considered within the analysis area include amount of the analysis area recently harvested and the level of road access in the area. Within the cumulative effects analysis area, stands are similar to those on state parcels. Stands around the North Fork Valley Creek parcel are largely dominated by ponderosa pine and Douglas-fir in mature age classes. Small areas of regenerating forest are intermixed within this matrix, and non-forested areas,dominate some of the lower elevations. Stands on adjacent ownerships to the Hewolf parcel are also dominated by lodgepole pine and subalpine fir. Stands in the vicinity are a combination of age classes, ranging from recently harvested stands to mature stands. Human access to the analysis area on open and closed roads provides considerable vehicular and foot access; however, there are also areas inaccessible from existing roads.

Direct and Indirect Effects on Elk Security

No Action Alternative

Under this alternative, no changes in elk security cover or hiding cover would be expected. Elk security would still be largely absent from the project area. Timber stands would continue advancing to climax plant species. No changes would be anticipated in disturbance and elk vulnerability due to hunting.

Action Alternative

By definition, no changes in elk security cover would be expected since much of the proposed project area would still remain within ½ mile of an open road, and that portion that is far enough away from the open road is too small to provide elk security habitat. Only negligible amounts (approximately 2 acres) of this potential security habitat would be included in this alternative; therefore no appreciable changes to security habitat would be expected. No changes in motorized access to the state parcel would be anticipated under this alternative, however the new roads proposed to be constructed and closed after use could facilitate an increase in foot traffic. Increased sight distances and the reduction in hiding cover may decrease big game survival in the project area.

Cumulative Effects on Elk Security

No Action Alternative

Under this alternative, no changes would be anticipated in elk security cover, big game hiding cover, or hunter accessibility. Over time, recently harvested stands would mature and hiding cover would improve, but this would likely offset the reductions associated with ongoing harvesting. Temporal shifts in security cover in the analysis area can be expected as successional stages change, but long-term changes would not be expected. Most areas in the analysis area are highly roaded (both open and closed), making access for hunting relatively easy.

Action Alternative

Under this alternative, increased sight distances could reduce big game survival. No appreciable changes in long-term elk security cover would be expected. Proposed road construction could facilitate an increase in foot traffic. Short-term reductions in hiding cover would be also expected with this alternative. Access in the analysis area is relatively easy given the amount of open roads and access points. Portions of the analysis area have been harvested, reducing hiding cover, but appreciable hiding cover exists within the analysis area. In general, negligible effects to big game security cover, hiding cover, or survival at the analysis area level would be expected with this alternative.

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Wildlife Mitigations

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

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

- Manage for snags, snag recruits, and coarse woody debris, particularly favoring western larch and ponderosa pine (ARM 36.11.439(1)(b)).

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

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

- Retain at least 64 acres of lynx foraging and 5 acres of lynx denning habitats pursuant to ARM 36.11.435(8)(a) by deferring upper portions of the Hewolf section.

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

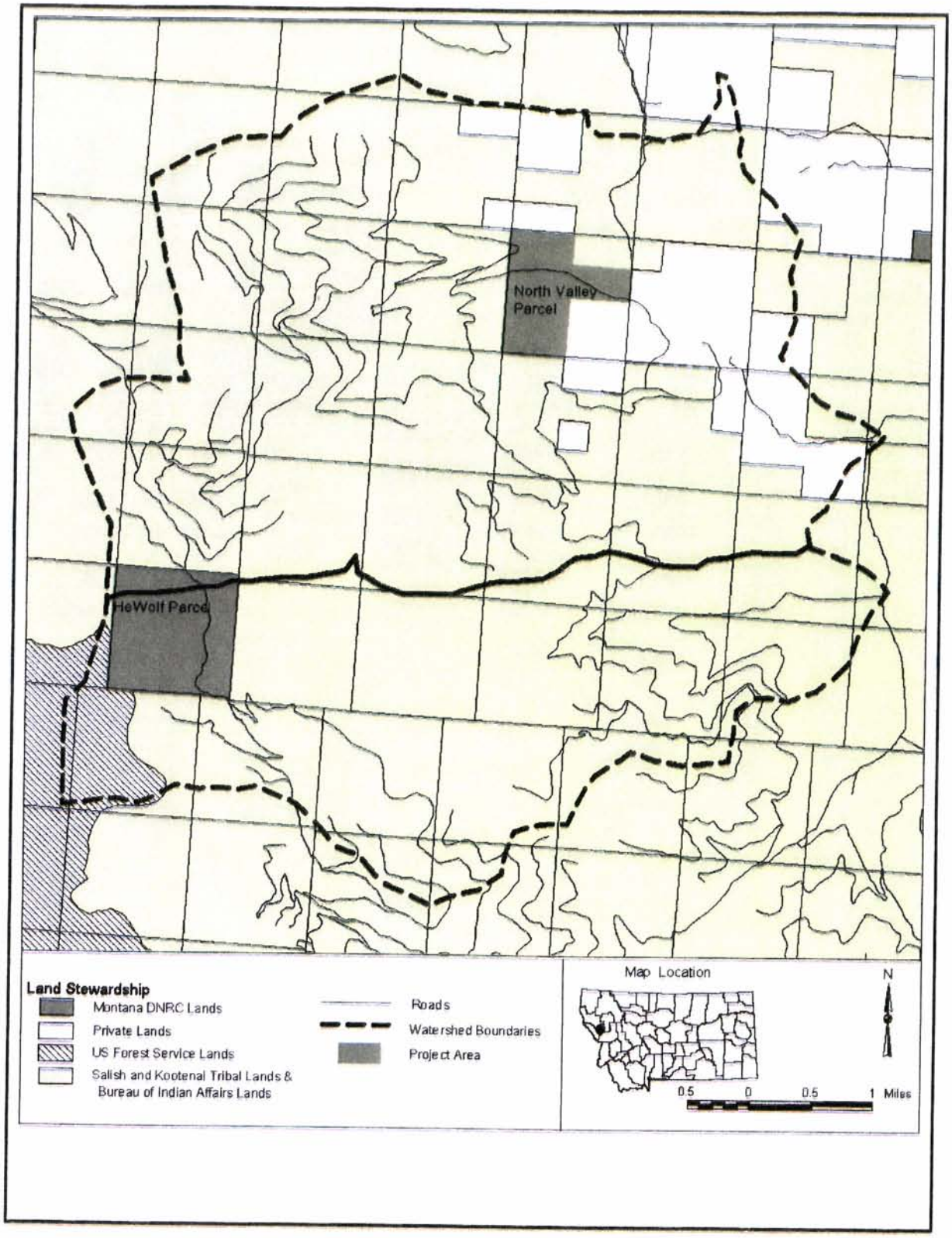

FIGURE W-1: LAND OWNERSHIP PATTERN WITHIN THE COMBINED WATERSHED CUMULATIVE EFFECTS ANALYSIS AREA USED FOR SEVERAL WILDLIFE SPECIES AND ISSUES.

ARCHAEOLOGICAL ANALYSIS

From: Rennie, Patrick
Sent: Thursday, September 29, 2005 10:52 AM
To: Peters, Dale
Subject: RE: Dog Valley Timer Sale

In September of 2005 I inspected the project area. Two cultural resources (a former CC camp road and an irrigation ditch were identified and formally recorded). Although these cultural resources are within the area of potential effect, they will not be physically impacted with proposed timber sale activities. As such, no heritage properties will be effected with the proposed Dog Valley Timber Sale.

Patrick Rennie
DNRC Archaeologist

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Steve Lozar
Elmer "Sonny" Morgeau
James Beaver, Jr.
Ron Trahan

Tribal Preservation Office

Cultural and Historical Sites Review

18-Oct-05

RP #: **05-189** Agency Number: 826-3851 Project Name Hewolf DNRC ownership

Requesting Agency: DNRC-D.Pet Project Type: Timber sale-Harvest,Roads.

Location: Section 36 is located on the V-3000 road, & Section 16 is located on V-5000,5700& rd.5701roads. Both project areas are behind or South of Dixon & Ravalli.

The Tribal Preservation Office recommends the following conditions:

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

Comments: APPROVED for the timber harvest sale of DNRC owned sections of 36 & 16. NOTE: The entire timbered areas of both sections will be harvested.

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

Wain Lefthand
Preservation Specialist

Concurred by

Attachment 3

Prescriptions

⇒ **Footnote:** All Harvest Unit Acreages are close approximations as this proposal has not yet been implemented on the ground.

PROPOSED DOG VALLEY TIMBER SALE

HARVEST UNIT PRESCRIPTIONS

North Fork Valley Creek Section 16, T17N, R21W

****

Harvest Unit: 16 - 1 **Harvest Unit Acres:** 113

Elevation: 3560' – 3900' **Slope:** 5 – 35% **Aspect:** North

Habitat Types: PSME/SYAL

Current Cover Type: Ponderosa Pine
Appropriate Cover Type: Ponderosa Pine

Soil Type: Wildgen gravelly loam, 4 to 30% slopes; 70% of unit
Bigarm gravelly loam, 2 to 8% slopes; 20% of unit

Description of Existing Stand: This unit starts at the SMZ on the south side of North Fork Valley Creek, extends south, up the hill to the proposed new road construction mid-slope. This Ponderosa Pine cover type is approximately 75% Douglas-fir and 20% ponderosa pine.

The dominant and co-dominant Douglas-fir and ponderosa pine average age is 70, ranging from 60-85 years, 14" dbh ranging from 10-24" and 85 feet in height. Several remnant ponderosa pine averaging 125 years old were observed as well as small volumes of other species.

The intermediate stand's average age is 70 ranging from 60-85 years. The Douglas-fir averages 10" dbh ranging from 6-14" and 65 feet in height; ponderosa pine averages 11" dbh ranging from 6-16" and 65 feet in height.

The Douglas-fir has dwarf mistletoe, *Arceuthobium douglasii*, infecting 30% of the trees. Western larch has some dwarf mistletoe, *Arceuthobium laricis.*

Regeneration is almost nonexistent under the closed canopy with pockets of advanced regeneration low on the slope. Fuel loading is moderate.

Treatment Objectives:

- Open up the stand to promote forest health, growth and vigor.
- Promote a healthy stand of timber by significantly reducing the dwarf mistletoe affecting the Douglas-fir.

Prescribed Treatment: 16 - 1

- Commercial thinning. Selection of leave trees by a combination of marking Douglas-fir to leave and cut tree marking of ponderosa pine & western larch. This to be accomplished by spacing out healthy trees with good crown and bark characteristics to accomplish a desired variable spacing, leaving 30-35 trees per acre.

- Retention of snags 14" dbh & greater with a minimum of 2 snags & 2 snag recruits per acre to remain standing, where present, if they are not a safety hazard.

Harvest Method:

- Ground based logging system. Conventional or mechanized systems are acceptable.

Hazard Reduction:

- Hazard reduction would be accomplished through the use of excavator piling and burning of piles.

- Burning of landing piles following harvest activities.

Regeneration/Site Preparation:

- Harvest operations to create adequate spacing to promote growth of the remaining thinned stand.

- Remaining thinned stand to provide seed source for natural regeneration in openings left where healthy trees with good crown and bark characteristics were not available.

- Scarification through harvest operations and while piling.

- Slashing of damaged and stagnant un-merchantable residual prior to piling.

Anticipated Future Treatments:

- During or immediately after harvest, slashing of damaged and stagnant un-merchantable residual.

- Scarification in openings and piling of logging & slashed residual.

- Spot planting in openings immediately after treatment.

- Thinning of desirable existing regeneration.

- Evaluation for a second harvest entry to take place in 10-15 years.

- Stand conditions monitored and evaluated at regular intervals, as per calendar recall. Salvage and/or sanitation operations to occur after evaluation of a site altering event.

PROPOSED DOG VALLEY TIMBER SALE

HARVEST UNIT PRESCRIPTIONS

North Fork Valley Creek Section 16, T17N, R21W

****

Harvest Unit: 16 – 2 **Harvest Unit Acres:** 89

Elevation: 3900' – 4160' **Slope:** 5 – 45% **Aspect:** North & South East

Habitat Types: PSME/SYAL; 60% of unit
PSME/AGSP; 40% of unit

Current Cover Type: Ponderosa Pine
Appropriate Cover Type: Ponderosa Pine

Soil Type: Wildgen gravelly loam, 5 to 30% slopes

Description of Existing Stand: This unit starts at mid-slope above the new road construction, extends south, up over the hill to the south section line. The west section line and the proposed new road construction are also boundaries. This Ponderosa Pine cover type is approximately 55% Douglas-fir and 45% ponderosa pine.

The dominant and co-dominant Douglas-fir and ponderosa pine average age is 70, ranging from 50-90 years, 16" dbh ranging from 14-24" and 85 feet in height. Several remnant ponderosa pine averaging 125 years old were observed

The intermediate stand's average age is 70 ranging from 50-90 years. The Douglas-fir averages 10" dbh ranging from 6-14" and 65 feet in height; ponderosa pine averages 11" dbh ranging from 6-14" and 70 feet in height.

The Douglas-fir has dwarf mistletoe, *Arceuthobium douglasii*, infecting 10%of the trees. The ponderosa pine has some isolated hits of pine beetle, *Dendroctonus spp.*

There is limited regeneration under the closed canopy with pockets of regeneration where the canopy opens up. Fuel loading is moderate.

Treatment Objectives:

- Open up the stand to promote forest health, growth and vigor.
- Promote a healthy stand of timber by significantly reducing the dwarf mistletoe affecting the Douglas-fir & western larch.

Prescribed Treatment: 16 – 2

- Commercial thinning. Selection of leave trees by a combination of marking Douglas-fir to leave and cut tree marking of ponderosa pine & western larch. This to be accomplished by spacing out healthy trees with good crown and bark characteristics to accomplish a desired variable spacing, leaving 50-55 trees per acre.

- Retention of snags 14" dbh & greater with a minimum of 2 snags & 2 snag recruits per acre to remain standing, where present, if they are not a safety hazard.

Harvest Method:

- Ground based logging system. Conventional or mechanized systems are acceptable.

Hazard Reduction:

- Harvest operations to create adequate spacing to promote growth of the remaining thinned stand.

- Remaining thinned stand to provide seed source for natural regeneration in openings left where healthy trees with good crown and bark characteristics were not available.

- Scarification through harvest operations and while piling.

- Slashing of damaged and stagnant un-merchantable residual prior to piling.

Anticipated Future Treatments:

- During or immediately after harvest, slashing of damaged and stagnant un-merchantable residual.

- Scarification in openings and piling of logging & slashed residual.

- Spot planting in openings immediately after treatment.

- Thinning of desirable existing regeneration.

- Evaluation for a second harvest entry to take place in 10-15 years.

- Stand conditions monitored and evaluated at regular intervals, as per calendar recall. Salvage and/or sanitation operations to occur after evaluation of a site altering event.

PROPOSED DOG VALLEY TIMBER SALE

HARVEST UNIT PRESCRIPTIONS

North Fork Valley Creek Section 16, T17N, R21W

****

Harvest Unit: 16 – 3 **Harvest Unit Acres:** 35

Elevation: 3920' – 4080' **Slope:** 5 – 25% **Aspect:** East & South East

Habitat Types: PSME/SYAL; 75% of unit
PSME/AGSP; 25% of unit

Current Cover Type: Ponderosa Pine
Appropriate Cover Type: Ponderosa Pine

Soil Type: Yourame gravelly loam, 4 to 15% slopes; 80% of unit
Wildgen gravelly loam, 15 to 30% slopes; 20% of unit

Description of Existing Stand: This unit is south of the proposed new road construction just below the ridgeline extending south to open grass slopes. This Ponderosa Pine cover type is approximately 60% ponderosa pine and 40% Douglas-fir.

The dominant and co-dominant ponderosa pine and Douglas-fir average age is 75, ranging from 65-85 years, 18" dbh ranging from 14-24" and 80 feet in height.

The intermediate stand's average age is 75 ranging from 65-85 years. Ponderosa pine averages 11" dbh ranging from 6-18" and 65 feet in height; Douglas-fir averages 10" dbh ranging from 6-18" and 65 feet in height;

The ponderosa pine has some pockets of mountain pine beetle, *Dendroctonus ponderosae,* mortality.

There is limited regeneration under the closed canopy with pockets of regeneration where the canopy opens up. Fuel loading is light.

Treatment Objectives:

- Open up the stand to promote forest health, growth and vigor.

Prescribed Treatment: 16 – 3

- Commercial thinning. Selection of leave trees by a combination of marking Douglas-fir to leave and cut tree marking of ponderosa pine & western larch. This to be accomplished by spacing out healthy trees with good crown and bark characteristics to accomplish a desired variable spacing, leaving 45-50 trees per acre.

- Retention of snags 14" dbh & greater with a minimum of 2 snags & 2 snag recruits per acre to remain standing, where present, if they are not a safety hazard.

Harvest Method:

- Ground based logging system. Conventional or mechanized systems are acceptable.

Hazard Reduction:

- Hazard reduction would be accomplished through the use of excavator piling and burning of piles.

- Burning of landing piles following harvest activities.

Regeneration/Site Preparation:

- Harvest operations to create adequate spacing to promote growth of the remaining thinned stand.

- Remaining thinned stand to provide seed source for natural regeneration in openings left where healthy trees with good crown and bark characteristics were not available.

- Scarification through harvest operations and while piling.

- Slashing of damaged and stagnant un-merchantable residual prior to piling.

Anticipated Future Treatments:

- During or immediately after harvest, slashing of damaged and stagnant un-merchantable residual.

- Scarification in openings and piling of logging & slashed residual.

- Spot planting in openings immediately after treatment.

- Thinning of desirable existing regeneration.

- Evaluation for a second harvest entry to take place in 10-15 years.

- Stand conditions monitored and evaluated at regular intervals, as per calendar recall. Salvage and/or sanitation operations to occur after evaluation of a site altering event.

PROPOSED DOG VALLEY TIMBER SALE

HARVEST UNIT PRESCRIPTIONS

Hewolf Section 36, T17N, R22W

****

Harvest Units: 36 – 1,2,3,4,5 **Harvest Unit Acres:** 362

Elevation: 5,700' – 7,000' **Slope:** 5 – 45% **Aspect:** East

Habitat Types:		
	ABLA/MEFE	60%
	ABLA/VAGL	20%
	ABLA/GATR	10%
	TSME/MEFE	10%

Current Cover Type: Lodgepole Pine & Subalpine Fir

Appropriate Cover Type: Lodgepole Pine & Western Larch/ Douglas-fir

Soil Type: Waldbillig/Holloway gravelly silt loam, 8 to 30% slopes; 65% of unit
Holloway/ Waldbillig gravelly silt loam, 30 to 50% slopes; 30% of unit
Phillcher/Rock outcrop gravelly silt loam, 40 to 70% slopes; 5% of unit

Description of Existing Stand: Section 36 is generally an eastern aspect located at a high elevation with the majority of the section dominated by a Lodgepole Pine cover type. It is also the headwaters of Hewolf Creek.

This stand is comprised of two components. The lodgepole pine component is a single story comprised of 70% lodgepole pine, 20% subalpine fir/ Engelmann spruce and 10% western larch/ Douglas-fir. The dominant and co-dominant lodgepole pine average age is 110, ranging from 80-120 years, 8" dbh ranging from 6-16" and 75 feet in height. There is a mosaic of size classes within the lodgepole pine with scattered acreages of post and pole size material that also have pockets of larger saw timber. The western larch and Douglas-fir are randomly scattered throughout the stand. They are of variable size classes with the majority of their crowns dominating over the lodgepole pine canopy.

The subalpine fir component is a single story comprised of 80% subalpine fir/ Engelmann spruce and 20% lodgepole pine. The dominant and co-dominant subalpine fir/ Engelmann spruce average age is 120, 14" dbh ranging from 6-24" and 85 feet in height. Most of this cover type that is to be managed is on the fringe of established SMZ's with isolated pockets scattered within stands of lodgepole pine.

The mountain pine beetle, *Dendroctonus ponderosae*, is active on this parcel affecting 30% to 50% of the merchantable lodgepole pine in varying stages from fresh hits to red needles to dead standing.

36 – 1,2,3,4,5

Regeneration is almost nonexistent under this single story stand. Fuel loading is moderate.

Treatment Objectives:

- Harvest of the merchantable lodgepole pine before it is lost to insect mortality and wildfire.
- Regeneration harvest to promote forest health, growth and vigor.
- Establish new regeneration.

Prescribed Treatment:

- Salvage; Variable Retention
- Selection of leave trees by species designation. All western larch and Douglas-fir are designated to leave to accomplish a variable spacing leaving 1-5 trees per acre. All other merchantable species designated to cut within cutting unit boundaries.
- Retention of snags 14" dbh & greater with a minimum of 2 snags & 2 snag recruits per acre to remain standing, where present, if they are not a safety hazard.
- Non sawlog material may also be removed should conditions prove favorable.

Harvest Method:

- Ground based logging system. Conventional or mechanized systems are acceptable.

Hazard Reduction:

- Hazard reduction would be accomplished through the use of excavator piling and burning of piles.
- Burning of landing piles following harvest activities.

36 – 1,2,3,4,5

Regeneration/Site Preparation:

- Scarification through harvest operations and/or while piling.
- Leave trees to provide seed source for natural regeneration.

Anticipated Future Treatments:

- During or immediately after harvest, scarification in openings and piling of logging slash.
- Spot planting in openings immediately after treatment.
- Unit to be monitored annually to monitor survival of planted trees and for the establishment of natural regeneration. If regeneration fails 5 years after site preparation and planting, additional planting would be scheduled.
- Stand conditions monitored and evaluated at regular intervals, as per calendar recall. Salvage and/or sanitation operations to occur after evaluation of a site altering event.

Attachment 4

Mitigations

Mitigation Measures

Roads: A transportation system minimizing road miles meeting Best Management Practices (BMP's) has been designed by the DNRC. This system proposes the construction of approximately 4 miles of new road, which would remain in place following project activity. After activities have been completed the roads would be grass seeded and closed to use. There would be approximately 0.1 miles of road and existing ford through North Fork Valley Creek that would be abandoned and permanently closed to motorized use. Approximately 11.0 miles of existing BIA and Tribal roads would be incorporated into the transportation plan. Upon completion of roadwork, all haul roads would meet BMP's standards.

Wildlife: The grizzly bear and Canada lynx are classified as "Threatened" under the Endangered Species Act of 1973. The fisher, flammulated owl, pileated woodpecker and the Westslope cutthroat trout are classified as "Sensitive" species. The following mitigation measures would be incorporated into the proposed project.

•Grizzly bear (*Ursus arctos*)

A DNRC biologist would be consulted and additional mitigations would be developed that are consistent with the administrative rules for managing threatened and endangered species. Unnecessary roads and skid trails would be closed after the proposed activities to reduce the potential for motor vehicle disturbance. Contract specifications would require gates and/or earthen barriers to be constructed on all new roads. To meet these requirements, a DNRC Forest officer would monitor skid trail and corridor location and placement. A combination of topography, group retention, and roadside vegetation to reduce views into harvest units along open roads would be implemented. Contractors and purchasers conducting contract operations would be prohibited from carrying firearms while operating on restricted roads These items would be specified in the Timber Sale Contract and monitored by the Forest officer.

•Canada lynx (*Lynx canadensis*)

Deferring upper portions of the Hewolf section would retain a minimum of 64 acres of lynx foraging and 5 acres of lynx denning habitat. In the event a Canada lynx should be encountered, all operations would cease. A DNRC biologist would be consulted and additional mitigations would be developed that are consistent with the administrative rules for managing threatened and endangered species. Unnecessary roads and skid trails would be closed after the proposed activities to reduce the potential for motor vehicle disturbance. Contract specifications would require gates and/or earthen barriers to be constructed on all new roads. To meet these requirements, a DNRC Forest officer would monitor skid trail and corridor location and placement. A combination of topography, group retention, and roadside vegetation to reduce views into harvest units along open roads would be implemented. Contractors and purchasers conducting contract operations would be prohibited from carrying firearms while operating on restricted roads. These items would be specified in the Timber Sale Contract and monitored by the Forest officer.

•Fisher ***(Martes pennanti)***

A combination of topography, group retention, and roadside vegetation to reduce views into harvest units along open roads would be implemented. These items would be specified in the Timber Sale Contract and monitored by the Forest officer.

•Flammulated owl ***(Otus flammeolus)***

Ponderosa pine & western larch are designated to leave unless marked to cut under the prescribed silvicultural prescriptions. Retention of snags 14" dbh & greater with a minimum of 2 snags & 2 snag recruits per acre to remain standing, where present, if they are not a safety hazard. These items would be specified in the Timber Sale Contract and monitored by the Forest officer.

•Pileated woodpecker ***(Dryocopus pileatus)***

The silvicultural prescriptions would retain healthy western larch, ponderosa pine, and Douglas-fir and promote regeneration of these same species. Retention and recruitment of western larch and ponderosa pine would benefit pileated woodpeckers in the future by providing nesting, roosting, and foraging habitats. Retention of snags 14" dbh & greater with a minimum of 2 snags & 2 snag recruits per acre to remain standing, where present, if they are not a safety hazard. These items would be specified in the Timber Sale Contract and monitored by the Forest officer.

•Westslope cutthroat trout (*Oncorhynchus clarkii lewisi*)

No harvesting would occur within 100 feet of any fish-bearing stream, except for the western-most 900 feet of the North Fork Valley Creek parcel. Within the western-most 900 feet of the North Valley parcel, no harvest would occur between the main road and the stream. Merchantable trees outside of the road may be harvested in accordance with the Montana SMZ law and site-specific recommendations from CS&KT resource professionals.

•Big Game; Elk (*Cervus canadensis*) Security

Unnecessary roads and skid trails would be closed after the proposed activities to reduce the potential for motor vehicle disturbance. Contract specifications would require gates and/or earthen barriers to be constructed on all new roads. To meet these requirements, a DNRC Forest officer would monitor skid trail and corridor location and placement. A combination of topography, group retention, and roadside vegetation to reduce views into harvest units along open roads would be implemented. Contractors and purchasers conducting contract operations would be prohibited from carrying firearms while operating on restricted roads These items would be specified in the Timber Sale Contract and monitored.

Soils: Limit equipment operations to periods when soils are relatively dry, (less than 20% soil moisture content), frozen or snow covered to minimize soil compaction and rutting, and maintain drainage features. Check soil moisture conditions prior to equipment start-up. On ground skidding units, the logger and sale administrator would agree to a general skidding plan prior to equipment operations. Skid trail planning would identify which main trails to use, and what additional trails are needed. Trails that do not comply with BMP's (i.e. draw bottom trails) would not be used and would be closed with additional drainage installed where needed or grass seeded to stabilize the site and control erosion. Tractor skidding would be limited to slopes less than 40%. Short steep slopes above incised draws may require a combination of mitigation measures based on site review, such as adverse skidding to ridge or winch line skidding from more moderate slopes less than 40%.

Slash Disposal: Limit disturbance and scarification to 30-40% of harvest units. No dozer piling on slopes over 35%; no excavator piling on slopes over 40% unless the operation can be completed without causing excessive erosion. Consider lop and scatter or jackpot burning on steeper slopes. Accept disturbance incurred during skidding operations to provide adequate scarification for regeneration. Retain 10 to 15 tons large woody debris and a majority of all fine litter feasible following harvest. On commercial thin units where whole tree harvesting is used implement one of the following mitigations for nutrient cycling; 1) use in woods processing equipment that leaves slash on site, or 2) for whole tree harvest, return skid slash and evenly distribute within the harvest area, or 3) cut off tops from every third bundle of logs so that tops are dispersed as skidding progresses. These measures would be specified in the Timber Sale Contract and would be monitored by the Forest Officer.

Hydrology: All timber harvest would be regulated by the SMZ law and prohibit equipment operation within any SMZ. In addition to the resource protection provided by the SMZ law, forestry BMP's would be implemented in all aspects of the proposed timber harvest. Road drainage improvements and reconstruction would be implemented to reduce the potential for sediment introduction from haul routes. The drainage improvements may include adding drive-through drain dips and ditch-relief CMPs, cleaning culvert inlets/outlets and reshaping the road prism. Culverts would be installed in association with new road construction and/or reconstruction. Reclamation of the ford through North Fork Valley Creek and the installation of a temporary bridge over the existing wooden bridge on North Fork Valley Creek in accordance to the CS&KT BMPs and/or state BMPs would substantially reduce and/or eliminate direct long-term sediment delivery to North Fork Valley Creek. Installation procedures would be used during installation including using silt fences, slash filter windrows and rock armor around the inlet and outlet. Prior to installing the stream/draw crossings DNRC would obtain an Aquatic Lands Conservation Ordinance permit from the CS&KT.

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

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

Visual Impacts/Aesthetic Values: The topography of this proposed project area is mountainous and is not readily visible from the major highway corridors or population centers. Prescriptions are designed to mimic historical stand conditions. Harvest unit shapes and residual tree retention patches would follow topographical features such as natural contour breaks and riparian retention zones. The cumulative visual effects of this proposed action in conjunction with current adjacent land management practices would blend into the landscape and soften any hard ownership boundaries.

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

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

Attachment 5

Consultants & References

Document Preparation

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