SHOUP-JONES PROJECT AREAS

Environmental Assessment

Montana Department of Natural Resources and Conservation

Southwestern Land Office

Clearwater Unit

March 2010

SHOUP-JONES
ENVIRONMENTAL ASSESSMENT

COVER SHEET

Proposed Action: The Montana Department of Natural Resources and Conservation (DNRC) is proposing forest management activities on two parcels of forested State Trust Lands: Section 16 of Township 15 North Range 12 West, and a portion of Section 36 of Township 16 North Range 13 West. These parcels are located approximately 2 and 5 miles north of Ovando. The planned activities would include the sale and harvest of up to approximately 3.5 to 4 million board feet of wood products from up to 705 acres of state land. Implementation of the proposed action alternative would begin as early as May 2010.

Type of Document: Environmental Assessment (EA)

Lead Agency: Montana Department of Natural Resources and Conservation,
Southwestern Land Office, Clearwater Unit.

Responsible Official: Craig Nelson
Clearwater Unit
48455 Sperry Grade Rd.
Greenough, MT 59823-9635
406-244-5857

Further Information: Amy Helena
Clearwater Unit
48455 Sperry Grade Rd.
Greenough, MT 59823-9635
406-244-2385

HOW TO READ THIS EA (ENVIRONMENTAL ASSESSMENT)

To read this EA more effectively, carefully study this page. Following State regulations, we have designed and written this document (1) **to provide** the Project Decision Maker with sufficient information to make an informed, reasoned decision concerning the proposed Shoup-Jones Timber Sale Projects and (2) **to inform** members of the affected and interested public of this project so that they may express their opinions to the Project Decision Maker. The finding made by the Project Decision Maker can be found in the back of this EA.

The EA consists of the following chapters:

1 Purpose and Need for Action
2 Alternatives, Including the Proposed Action
3 Existing Environment
4 Environmental Effects
5 References

Chapters 1 and 2 together serve as a summary overview of the Shoup-Jones Timber Sale Projects. These two chapters have been written so that non-technical readers can understand the potential environmental, technical, economic, and social consequences and benefits of **taking** and of **not taking** action.

Chapter 1 introduces the Shoup-Jones Timber Sale Projects. It provides a very brief description of the proposed Shoup-Jones Timber Sale projects and then explains three key things about the larger projects:
(1) the relevant environmental issues,
(2) the decisions that the Project Decision Maker must make concerning this project, and
(3) the relevant laws, regulations, and consultations with which the DNRC must comply.

Chapter 2 serves as the ***heart*** of this EA. It provides detailed descriptions of Alternative A: No Action and Alternative B: Harvest. It also includes a **summary comparison** of the predicted effects of these two alternatives on the human environment, providing a clear basis for choice between the alternatives for the Project Decision Maker and the Public.

Chapter 3 describes the current conditions of the relevant resources in the project area that would be meaningfully affected, establishing a part of the baseline used for the comparison of the predicted effects of the alternatives.

Chapter 4 presents the detailed, analytic potential environmental effects of implementing Alternative A: No Action and Alternative B: Harvest. These effects include the direct, indirect, short term, long term, and cumulative effects of implementing the alternatives.

Chapter 5 lists preparers, references, and abbreviations used.

TABLE OF CONTENTS

COVER SHEET **2**

HOW TO READ THIS EA **3**

TABLE OF CONTENTS **4**

PURPOSE & NEED **7**

CHAPTER 1: PURPOSE & NEED **8**

1.1 DESCRIPTION OF PROPOSED ACTION 8

FIGURE 1: SHOUP-JONES VICINITY MAP **9**

FIGURE 2. SHOUP-JONES PROJECT AREA MAP **10**

1.2 NEED FOR ACTION 11
1.3 OBJECTIVES OF THE SHOUP-JONES TIMBER SALE PROJECTS 11
1.4 COOPERATING AGENCIES AND ENTITIES WITH JURISDICTION AND REQUIRED PERMITS 11
1.5 OTHER RELEVANT ENVIRONMENTAL REVIEWS IN THE AREA 12
1.6 DECISIONS TO BE MADE 13
1.7 SCOPE OF THE ENVIRONMENTAL ANALYSIS 13
1.7.1 History of the Shoup-Jones Planning Process *13*
1.7.2 Issues Studied in Detail *13*
Vegetation *13*
Watershed and Soils *14*
Noxious Weeds *14*
Fisheries *14*
Wildlife *14*
Grazing *14*
Economics *14*
Aesthetics *14*
Air Quality *14*
1.7.3 Issues Not Studied in Detail *15*

ALTERNATIVES **17**

CHAPTER 2: ALTERNATIVES **18**

2.1 INTRODUCTION 18
2.2 DEVELOPMENT OF ALTERNATIVES 18
2.3 ALTERNATIVE DESCRIPTIONS 18
2.3.1 No Action Alternative A *18*
2.3.2 Action Alternative B: Harvest *18*

FIGURE 2-1. JONES PROPOSED HARVEST UNITS AND ROADS **21**

FIGURE 2-2. SHOUP PROPOSED HARVEST UNITS AND ROADS **22**

2.3.3 Mitigation Measures of Action Alternative B *23*
2.4 SUMMARY COMPARISON OF ALTERNATIVES 24

EXISTING ENVIRONMENT **29**

CHAPTER 3: EXISTING ENVIRONMENT **30**

INTRODUCTION 30

GENERAL DESCRIPTION OF THE AREA 30
3.1 VEGETATION *30*
Analysis Area *30*
Analysis Methods *30*
General Forest Vegetation Information *31*
3.1.1 Cover Types, Age Class, and Structure *32*
3.1.2 Native Bunchgrass Prairie *33*
3.1.3 Noxious Weeds *34*
3.2 WATERSHED AND HYDROLOGY 34
3.2.1 Existing Conditions of Water Quality, Quantity and Water Yield *36*
3.3 SOILS 38
3.4 FISHERIES 40
Introduction *40*
Fisheries Analysis Areas *41*
Species *43*
Analysis Methods *44*

FIGURE 3-3. SHOUP JONES TIMBER SALE-SECTION 36 ANALYSIS AREAS 45

FIGURE 3-3. SHOUP JONES TIMBER SALE – SECTION 16 ANALYSIS AREAS 52

3.5 WILDLIFE 53
3.5.1 Threatened and Endangered Species – Grizzly Bear (Federally threatened) *53*
Sensitive Species *53*
3.5.2 Bald Eagle *53*
3.5.3 Pileated Woodpecker *54*
3.5.4 Fisher *54*
3.5.5 Flamulated Owl *54*
3.5.6 Common Loon *55*
3.5.7 Big Game *55*
3.5.8 Great Gray Owl *55*
3.5.9 Northern Goshawk *56*
3.5.10 Red-tailed Hawk *56*
3.5.11 Gray Wolf *56*
3.6 ECONOMICS 57
3.7 AESTHETICS 57
ANALYSIS METHODS 57
EXISTING SCENIC INTEGRITY 57
VISUAL ABSORPTION CAPACITY 58
SCENIC INVENTORY 58
3.8 AIR QUALITY 58

ENVIRONMENTAL EFFECTS 59

CHAPTER 4: ENVIRONMENTAL EFFECTS 60

INTRODUCTION 60
4.1 PREDICTED EFFECTS ON VEGETATION 60
4.1.1 Cover Types, Age Class, and Structure *60*
4.1.2 Native Bunchgrass Prairie *62*
4.1.3 Noxious Weeds *62*
4.2 PREDICTED EFFECTS ON WATERSHED AND HYDROLOGY 63
4.3 PREDICTED EFFECTS ON SOILS 65
4.4 PREDICTED EFFECTS ON FISHERIES 67

4.4.1 Shoup Creek Analysis Area *67*
4.4.2 Dunham Creek Ditch Analysis Area *67*
4.4.3 Dunham Creek and Upper Monture Creek Analysis Areas *68*
4.4.4 Upper Dick Creek Analysis Area *68*
4.5 PREDICTED EFFECTS ON WILDLIFE 70
4.5.1 Threatened and Endangered Species – Grizzly Bear (Federally threatened) *70*
4.5.2 Bald Eagle *71*
4.5.3 Pileated Woodpecker *71*
4.5.4 Fisher *72*
4.5.5 Flammulated Owl *73*
4.5.6 Common Loon *73*
4.5.7 Big Game *73*
4.5.8 Great Gray Owl *74*
4.5.9 Northern Goshawk *74*
4.5.10 Red-tailed Hawk *75*
4.6 PREDICTED EFFECTS TO ECONOMICS 75
4.7 PREDICTED EFFECTS TO AESTHETICS 77
4.7 PREDICTED EFFECTS TO AIR QUALITY 78

REFERENCES 79

CHAPTER 5: REFERENCES 80

5.1 LIST OF PREPARERS 80
5.2 AGENCIES AND PERSONS CONSULTED 80
5.3 LITERATURE CITED 80
5.4 ABBREVIATIONS AND ACRONYMS 85

FINDING 86

FINDING: SHOUP-JONES PROJECT AREAS 87

CHAPTER 1

PURPOSE & NEED

CHAPTER 1: PURPOSE & NEED

1.1 DESCRIPTION OF PROPOSED ACTION

The Clearwater Unit, Montana Department of Natural Resource and Conservation (DNRC) is proposing the Shoup-Jones Timber Sale Projects on State school Trust Lands north of Ovando. The project would include:

- Timber harvesting
- Drainage improvements on existing roads
- 2 miles of road reconstruction and 0.7 miles of permanent new road construction and 0.65 miles of temporary new construction.
- 0.25 miles of road abandonment
- Rehabilitation of an old bridge site
- Slash treatment
- Reforestation activities
- Pre-commercial thinning
- Aspen regeneration

If the action alternative is chosen, an estimated 3.5 to 4 million board feet of timber would be sold and harvested. This volume would be harvested from approximately 705 acres. Existing roads would be improved as needed.

The project area is approximately 1,100 acres, two to five miles north of Ovando (Figure 1, Shoup-Jones Vicinity Map). It is located within Section 16 of T.15N., R.12W., and a portion of Section 36 of T.16N., R.13W. (Figure 2, Shoup-Jones Project Area Map). State Trust Lands within the project area share property boundaries of approximately two miles with United States Forest Service (USFS), one mile with the Montana Forestry & Conservation Experiment Station, and 4.25 miles with private landowners. Several other analysis areas were delineated to assess direct, indirect and cumulative effects of the proposed action. Existing conditions and these predicted effects are described in Chapters 3 and 4.

FIGURE 1: SHOUP-JONES VICINITY MAP

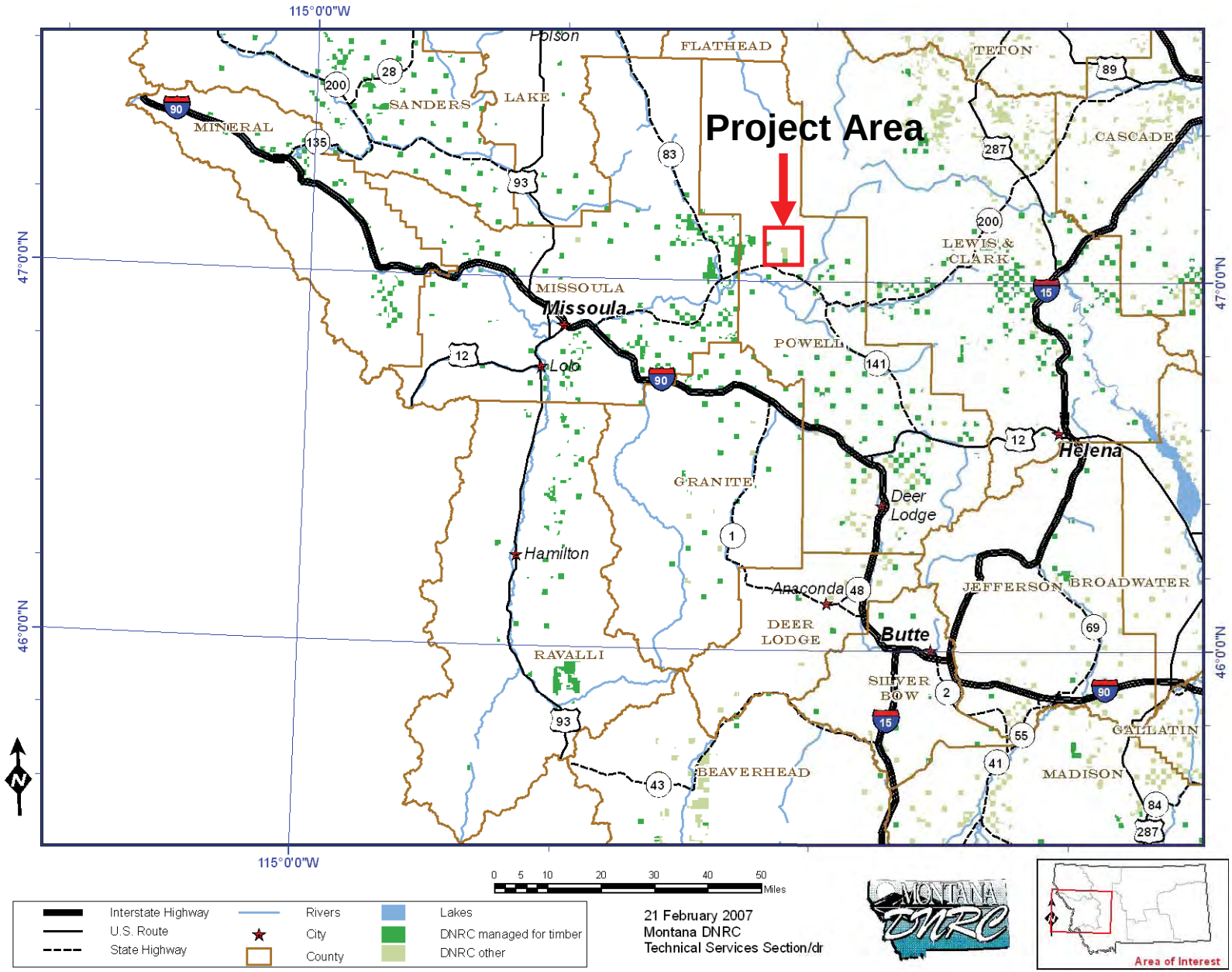
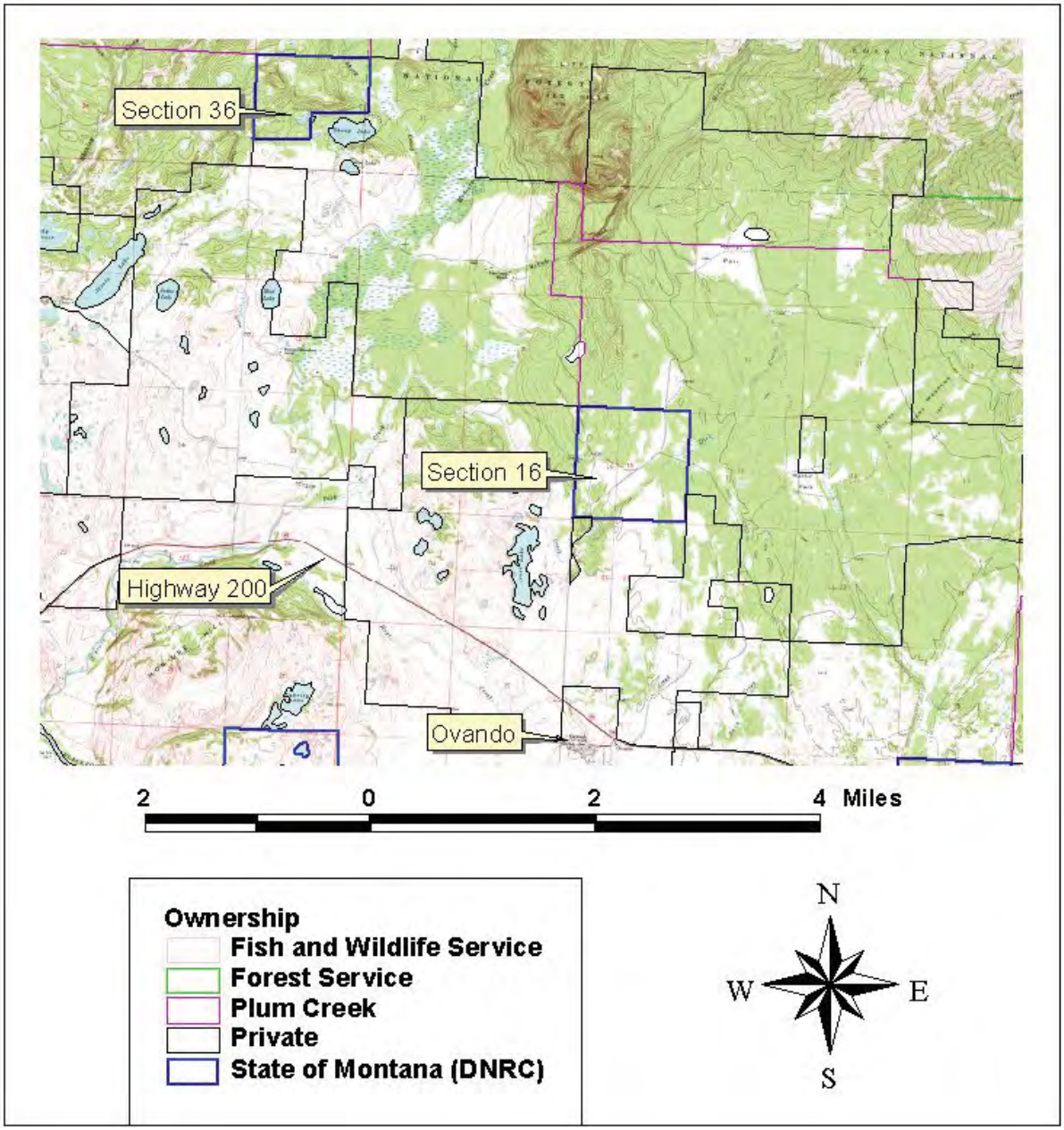


FIGURE 2. SHOUP-JONES PROJECT AREA MAP



1.2 NEED FOR ACTION

Forest management activities are being proposed to address mountain pine beetle activity in the Jones section before it escalates into a salvage situation (mountain pine beetles are currently present in scattered patches impacting all diameter classes of ponderosa pine) and to manage the stands in both sections to move them toward the desired future condition. These management activities would produce revenue for the Common Schools Trust while encouraging future stand conditions and development that reflect programmatic goals of managing for healthy and biologically diverse forests.

The lands involved in the proposed project are held by the State of Montana for the support of specific beneficiary institutions, such as public schools, State colleges and universities, and other State Institutions, such as the school for the deaf and blind (Enabling Act of February 22 1889: 1972 Montana Constitution Article X, Section 11). The Board of Land Commissioners (Land Board) and DNRC 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, Montana Code Annotated (MCA).

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, DNRC 2003). 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.

1.3 OBJECTIVES OF THE SHOUP-JONES TIMBER SALE PROJECTS

In order to meet the goals of the management philosophy adopted through programmatic review, the DNRC has set the following specific project objectives:

Forest Management: Manage for long-term productivity through silvicultural treatments that promote desired future conditions identified for the site and reduce the amount of insect infested or disease infected trees.

Revenue Generation: Generate revenue for the Common Schools Trust and provide a sufficient amount of sawlog volume to contribute to the annual sustainable yield for DNRC, as mandated by State Statute 77-5-222, MCA.

1.4 COOPERATING AGENCIES AND ENTITIES WITH JURISDICTION AND REQUIRED PERMITS

Montana Fish, Wildlife and Parks (FWP): FWP has jurisdiction over the management of fisheries and wildlife in the project area. A Stream Preservation Act Permit (124 Permit) is required from FWP for activities that may affect the natural shape and form of any stream or its banks or tributaries.

- Temporary activities would introduce sediment above natural levels into streams, or
- FWP determines a permit is necessary after reviewing the mitigation measures in the 124 Permit.

Montana Department of Environmental Quality (DEQ):

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

Montana/Idaho Airshed Group: DNRC is a member of the Montana/Idaho Airshed Group, which coordinates burning activities related to forest management among the group's members in order to minimize impacts from smoke generated by those activities. As a member of the Airshed Group, DNRC agrees to burn only on days approved for good smoke dispersion as determined by the Smoke Management Unit in Missoula, MT.

The Blackfoot Community Conservation Area (BCCA): DNRC has acquired a temporary road use permit from the BCCA to access the east side of Dick Creek in Section 16 of the proposed sale area.

United States Forest Service (USFS): DNRC is in the process of obtaining a USFS/State of Montana easement for specific road segments on USFS Roads 89, 477, and spur roads to access Section 36 of the proposed sale area.

1.5 OTHER RELEVANT ENVIRONMENTAL REVIEWS IN THE AREA

In order to address direct, indirect, and cumulative effects on resources, the analysis considers past, present, and related future actions within a determined analysis area. The locations and sizes of the analysis areas vary by resource (watershed, soils, etc.) and species (grizzly bear, Canada lynx, etc.), and are further described by resource in Chapters 3 and 4. Effects from past projects are incorporated into DNRC databases over time and become part of the existing condition that is used in each analysis. Based on the appropriate analysis area, ongoing projects and related future actions are considered for each resource.

The following ongoing and upcoming timber sales are located within the Clearwater Unit administrative boundary:

- Elk Wall is an upcoming sale for which environmental analysis was completed in March 2006. This sale will harvest timber from approximately 400 acres within Sections 10, 14, and 16 of Township 13 North, Range 14 West, approximately 18 miles southwest of the Shoup-Jones project area.
- Buck-Finley is an ongoing sale for which environmental analysis was completed in October 2007. This sale will harvest timber from approximately 300 acres within Section 16 Township 16 North, Range 16 West, approximately 25 miles west of the Shoup-Jones project area.
- Bugchuck Salvage is an ongoing sale for which an environmental analysis was completed on March 2008. This sale will harvest timber from approximately 200 acres within Section 6 Township 14 North, Range 14 West, Section 31 Township 15 North, Range 14 West and Section 36 Township 15 North, Range 15 West. This project is 14 miles west southwest of the project areas.

Several permits, for less than 200 MBF salvage or 100 MBF green, are usually sold on the Clearwater Unit each year. Within the project area, the 2006 Jones permit included harvest of 15 acres of bark beetle infested Douglas-fir, ponderosa pine, and spruce. The environmental assessment for the Jones permit was completed by the Clearwater Unit in January 2006. Firewood permits have also been sold on the section, with an average of one per year.

Several other projects have recently been completed in or near the project area:

- McCabe Creek Bridge Site Restoration: In July of 2007, this project removed bridge debris and stabilized streambanks to reduce the risk of long-term sediment delivery to McCabe Creek at an old road/stream crossing. The project is located in Section 4 of Township 15 North, Range 12 West.
- Dick Creek Diversion Project: Completed in July of 2007, this included the installation of a permanent irrigation ditch diversion, head gate, and fish-screen to replace an existing rock ditch diversion on Dick Creek, in the southeast ¼ of Section 16 of Township 15 North, Range 12 West.
- Jumpstart Jones and Jumpstart Doney: Two jumpstart projects completed near the area, one (Jumpstart Jones) directly north in sections 4 & 9 T15N R12W and the other (Doney) 6 miles to the east in section 16 T15N R11W. Each project removed 100 mbf of saw logs as well as non-sawlog pulp material. Both projects were completed throughout the summer/fall of 2009.

1.6 DECISIONS TO BE MADE

When the environmental analysis is complete, the Clearwater Unit Forest Management Supervisor will determine the following:

- Do the alternatives presented in the Environmental Assessment (EA) meet the project's objectives?
- Which alternative should be selected?
- Would the selected alternative cause significant environmental effects, requiring the preparation of an Environmental Impact Statement?

All interested parties will be notified, and the decisions in the published document would become DNRC's recommendations to the Land Board. The Land Board will make the final decisions regarding implementation of actions.

1.7 SCOPE OF THE ENVIRONMENTAL ANALYSIS

This section defines and explains the scope (boundaries/limits) of the Shoup-Jones Timber Sale Projects. It briefly describes the history of the planning process, identifies the resource issues studied in detail, and identifies the issues eliminated from detailed study.

1.7.1 History of the Shoup-Jones Planning Process

This Environmental Assessment (EA) was prepared in accordance with the Montana Environmental Policy Act (MEPA), which requires State government to include the consideration of environmental impacts in its decision making process. Agencies are also required to inform the public and other interested parties about proposed projects, environmental impacts that may result, and alternative actions that could achieve the project objectives. Planning for this project began in November, 2005.
Public scoping for this project was initiated in November 2005 with a letter to known interested parties. DNRC also placed public notices in the *Missoulian* and *Silver State Post* newspapers. The public comment period for the initial project proposal was open for 30 days.

The Interdisciplinary Team (ID Team), made up of DNRC's wildlife biologist, hydrologist, and several foresters, began compiling the issues and gathering information related to current conditions in the 2005. As a result of the scoping letters and notices in the newspapers, four letters and phone calls were received. In March and April of 2007, DNRC's project leader met with three neighboring landowners in Section 16 of the proposed sale area. The issues and concerns identified through public scoping were summarized and used to further refine the project. DNRC received and incorporated additional input from interested parties throughout the planning process. In 2009 the project leader updated the BCCA (Blackfoot Community Conservation Area) on the progress of the project.

1.7.2 Issues Studied in Detail

The Shoup-Jones ID team carefully considered comments received from DNRC resource specialists, the public, and other agencies. Through the scoping process, concerns were raised about the project's potential impacts on the environment. These comments and concerns were considered by DNRC in the development of project alternatives (see CHAPTER 2). For the purposes of this environmental analysis, issues will be considered actual or perceived effects, risks, or hazards as a result of the proposed alternatives. The ID team determined that the following issues are relevant to the decisions that must be made concerning the Shoup-Jones Timber Sale Projects. Further, these issues directly influenced the technical design of the project. Issues were grouped by general resource area (Vegetation, Watershed, etc.) and are listed below.

Vegetation

- Timber harvesting and associated activities could impact forest stand characteristics including species composition, age class, and structure.

- Timber harvesting and associated activities could impact native bunchgrass prairie in Section 16 of the project area.

Watershed and Soils

- Soil Resources - Timber harvest activities may result in increased erosion and reduced soil productivity due to excessive disturbance, compaction and displacement, or loss of nutrients depending on area and degree of harvest effects.

- Water Quality/Quantity- There is a concern that the proposed forest management activities may cause impacts to water quality as a result of increased erosion and sediment delivery to streams.

- Cumulative Watershed Effects- There is a concern that the proposed timber harvest may cause or contribute to cumulative watershed impacts as a result of increased water yields.

Noxious Weeds

- There is a concern that the proposed forest management activities may introduce or spread noxious weeds.

Fisheries

- The proposed project could adversely affect stream temperatures, stream shading, stream sediments, and recruitable large woody debris in Shoup and Dick creeks.

Wildlife

- The proposed action may negatively impact threatened and endangered species, including Canada lynx and grizzly bears.
- The proposed action may negatively impact sensitive species, including gray wolves, bald eagles, flammulated owls, pileated woodpeckers, black-backed woodpeckers, peregrine falcons, fishers, Townsend's big-eared bats, Coeur d'Alene salamanders, Columbian sharp-tailed grouse, common loons, harlequin ducks, mountain plovers, and northern bog lemmings.
- The proposed action may negatively impact big game.
- The proposed action may negatively impact barred owls, great grey owls, red-tailed hawks, or northern goshawks.
- The proposed action may negatively impact wolverine.

Grazing

- Logging slash created by timber harvest could impact grazing in the Jones Lake section of the project area.

Economics

- Concern has been raised that the proposed project might not be economically viable.

Aesthetics

- There is the concern that this project will change the aesthetic values of the Jones section.
- Recreation use such as hunting and camping may be visually impacted.

Air Quality

- The burning of logging slash may impact air quality.

1.7.3 Issues Not Studied in Detail

The ID team eliminated the following issues from detailed study because they were beyond the scope of this project or because this project would not likely impact certain select resources or such impacts could be reasonably mitigated away. The Project File contains details dealing with these issues. This Environmental Assessment contains no further or minimal information on these eliminated issues.

1.7.3.1 Historical, Cultural, and Archaeological Sites

The DNRC archaeologist requested the State Historic Preservation Officer to conduct a search of the Cultural Resource Inventory System and Cultural Resources Annotated Bibliography System databases. The results of those searches indicated that cultural or paleontologic resources have not been identified in the project area. The State Historic Preservation Office and the DNRC Archeologist concur that there is a low likelihood of cultural resources being in the project area, and no archaeological investigative work was recommended for the proposed timber sale project. If cultural or paleontological resources are found during project activities, work will be halted and the project administrator will contact the DNRC archaeologist to conduct an investigation of the findings before work can resume.

1.7.3.2 Harvesting in Un-harvested Area

The suggestion was made that DNRC should not harvest in Section 16 because it had not been logged before. DNRC records show that two substantial timber sales have occurred within the section in the past. In 1951-1952, approximately 3 million board feet were harvested from within Section 16. In 1978, the Jones Lake Timber Sale included harvest of 1 million feet within the section. In addition, DNRC has sold firewood permits, Christmas tree permits, and small timber permits within the section.

1.7.3.3 Displacement of Hunters During the General Season

The concern was raised that timber harvesting and associated activities may displace hunters during the general season. Due to this concern, the action alternative was modified so that no timber harvest or log hauling would be allowed during the general hunting season (a 5-week annual period ending the Sunday after Thanksgiving).

1.7.3.4 Old Growth

The concern was raised that harvest could affect old-growth in Section 16. DNRC has adopted old-growth definitions based on Green et al. (1992). DNRC manages old-growth to meet biodiversity and fiduciary objectives in the SFLMP, pursuant to state law and the Forest Management Rules, ARM 36.11. 401 through 36.11.450.

Based on DNRC's stand-level inventory, none of the stands in the project area meet DNRC's definition of old-growth. DNRC also measured sample plots within two units that visually looked to have old trees. However, stocking of old, large-diameter trees was insufficient to meet the old-growth criteria. Criteria include minimum age, size, and stocking of trees.

DNRC describes existing conditions and predicted effects to forest stand characteristics in Sections 3.1 and 4.1 of this document. Forest stand species composition, age class, and structure are included in the analysis.

1.7.3.5 Sensitive Plants

The concern was raised that timber harvesting and associated activities could affect the distribution and vigor of sensitive plants. The only sensitive plant found in the project area is Howell's Gumweed (*Grindelia howellii)*(Montana Natural Heritage Program, 2007). This particular plant requires disturbance to germinate; timber harvest and road maintenance would likely create more favorable places for germination. There would not be any herbicide application within 50 feet of the population.

1.7.3.6 Canada Lynx

There is concern that timber harvest activities would negatively impact Canada lynx. Within three miles of the project area, ten lynx were observed or trapped between 1979 and 1999 (Montana Natural Heritage Program database). Although lynx have been located near the project area, neither parcel contains lynx habitat (SLI database 09282006 release). Due to the lack of existing habitat, there would likely be minimal risk of direct, indirect, or cumulative effects to this species from the proposed action.

1.7.3.7 Black-backed Woodpecker

There is concern that timber harvest activities would negatively impact black-backed woodpeckers. The project area is not currently experiencing an outbreak of *Dendrocthonous* beetles, and has not burned recently. Such conditions do not lend themselves to being suitable black-backed woodpecker habitat (Bull et al. 1986). Additionally, nearly 76,684 acres burned on three large fires within 28 miles of the project area in 2007. Thus, these recently burned areas would be more likely to concentrate populations of black-backed woodpeckers. As a result, there would likely be minimal risk of direct, indirect, or cumulative effects to this species from the proposed action.
.

1.7.3.8 Sensitive Species

The following species were considered but eliminated from detailed study due to lack of habitat present: Peregrine Falcon, Harlequin Duck, Townsend's Big-eared Bat, Coeur d'Alene Salamander, Northern Bog Lemming, Mountain Plover, and Columbian Sharp-tailed Grouse.

1.7.3.9 Wolverine

There is concern that timber harvest activities would negatively impact wolverine. Dating back to 1965, at least four wolverine have been encountered within a two mile radius of the project area (Montana Natural Heritage database). Three occurrences are for wolverine that had been trapped, and one record is for tracks in the snow. Wolverine can have home ranges ranging from 100 km^2 to 900 km^2, typically avoiding human development with natal dens dependent upon areas with snowpack occurring into April (Banci 1994). Because of the project area's low elevation, existing levels of recreational use, primarily hunting and camping, and road development, the project area would likely be marginal habitat for wolverine. As a result, there would likely be minimal risk of direct, indirect, or cumulative effects to this species from the proposed action

CHAPTER 2
ALTERNATIVES

CHAPTER 2: ALTERNATIVES

2.1 INTRODUCTION

Chapter 2 describes the alternatives developed and considered for the Shoup-Jones Timber Sale Project. This chapter will introduce a no action alternative and an action alternative. It contains summaries and comparisons of the actions and predicted effects of each alternative, based on the detailed environmental analysis in Chapters 3 and 4.

2.2 DEVELOPMENT OF ALTERNATIVES

An Interdisciplinary (ID) Team was formed in the autumn of 2005 to work on the Shoup-Jones Timber Sale Projects. The role of an ID Team is to summarize issues and concerns, develop management options within the project area, and analyze the potential impacts of a proposed action on the human and natural environments.

DNRC began reviewing resources in this area in 2005. DNRC's Stand Level Inventory provided forest stand data. Field data was collected for resources within the project area to aid in the analyses of wildlife habitat, hydrology, fisheries, vegetation, geology and soils, air quality, transportation systems, and economics. This information was also used to develop mitigations that could be applied to the proposal.

2.3 ALTERNATIVE DESCRIPTIONS

This section describes the elements and mitigation measures of the Action Alternative B, and also includes a description of No Action Alternative A. Actions designed to protect resources during harvesting, road construction, or site preparation activities would be incorporated into a timber sale contract as contract specifications and stipulations. These specifications and stipulations would be applied to the action alternative and are a form of mitigation. Mitigation measures that were designed to reduce impacts on a particular resource are discussed in section 2.3.3 of this chapter and in Chapters 3 and 4 under specific resources.

2.3.1 No Action Alternative A

No Action Alternative A is used as a baseline for comparison to the effects that the action alternative would have on the environment. It is also considered a reasonable alternative for selection.

Timber harvesting as proposed would not occur. Firewood cutting and gathering would continue on an annual basis. Intermittently, small quantities of wood products may continue to be sold and removed from small areas. Fuels mitigation and weed control efforts would continue as funding and priorities allow.

No roads would be built or reconstructed at this time. Maintenance would continue as funding and priorities allow. The Dick Creek stream crossing would not be rehabilitated at this time.

Recreational uses of the area would continue to include hiking, biking, ATV riding, shooting, hunting, horseback riding, Nordic skiing, and snowmobiling. Efforts to curtail vandalism or resource damage associated with unauthorized recreational use would continue as funding and priorities allow.

Forest and plant succession would continue to be mainly influenced by the occurrence of natural events, such as insects and disease outbreaks, windthrow, or wildfire. Understory plant succession and to a lesser degree forest succession on leased sites used for grazing sites would continue to be mainly influenced by these uses in a forested setting.

2.3.2 Action Alternative B: Harvest

The action alternative was designed to meet specific project objectives of:

- Forest Management: Manage for long-term productivity through silvicultural treatments that promote desired future conditions identified for the site and reduce the amount of insect infested or disease infected trees.

- Revenue Generation: Generate revenue for the Common Schools Trust and provide a sufficient amount of sawlog volume to contribute to the sustained yield for DNRC, as mandated by State Statute 77-5-222, MCA.

Proposed roadwork and harvest units for the Jones Section (16) and the Shoup Section (36) are displayed in Figures 2-1 and 2-2. Timber harvesting focuses on mixed conifer and ponderosa pine/Douglas-fir stands. This alternative strives to maintain or promote the establishment of desired forest species, including western larch and ponderosa pine. On the Jones Section (Section 16), an uneven-aged silvilcultural system would be implemented. Individual tree selection would be used to create openings for regeneration of ponderosa pine while also maintaining trees in all age classes for continued growth. On the Shoup Section, primarily even-aged silvicultural systems (overstory removal, shelterwood and seedtree) would utilize regeneration harvests to promote seral species including western larch and ponderosa pine. On both sections, pre-commercial thinning would also be done to favor seral species and reduce competition within stands where advance regeneration is present. Brief descriptions of silvilcultural treatments are listed below.

Silvicultural Treatments :

- ***Individual Tree Selection -*** This treatment is designed to regenerate a new age class of seral species within stands, while maintaining healthy trees in all age classes at a stocking level that provides for continued crown development and diameter growth. Spacing is variable, with a target basal area of 35-50 square feet per acre. Openings in the tree canopy would occur depending on the availability of healthy trees. Ponderosa pine and western larch would be favored for leave trees, and there would also be a component of Douglas-fir.

- ***Shelterwood–*** This treatment is designed to retain healthy western larch, ponderosa pine, and Douglas-fir as a natural seed source for establishment of a new forest stand. Retention would be 10 to 30 trees/acre, depending on availability. Cutting would be followed by site preparation for natural regeneration and hand tree planting seral species such as western larch and ponderosa pine if necessary.

- ***Seed Tree –*** Healthy western larch, ponderosa pine or Douglas-fir would be retained as seed trees, resulting in 1 to 10 trees/acre retained. This treatment is designed to establish a new forest stand with a component of the seral tree species noted above. Cutting would be followed by site preparation for natural regeneration and hand tree planting seral species such as western larch and ponderosa pine if necessary.

- ***Overstory Removal –*** This treatment would remove the widely spaced overstory (seed) trees left from a previous harvest, with the exception of those that would be retained to meet snag and snag recruitment rules. The overstory trees exist above a well stocked stand of conifer saplings that became established after the removal of most of the overstory trees in the previous harvest. The understory stand of conifer saplings would be protected from logging damage and managed to produce wood products and revenue in the future.

In addition to silvicultural treatments designed to promote conifer species, DNRC is considering treatments to regenerate aspen on up to 43 acres within Section 16. This would be carried out by slashing and return skidding of woody debris for spot burning to encourage aspen clones. The aspen project would require an alternative practice for equipment operation in wetland site and is designed to minimize soil impacts consistent with forest management rules. Operations in the wetlands would be limited to frozen or adequately dry conditions to prevent excessive disturbance. The spotty nature of the burn piles would burn off surface vegetation, but is not expected to cause erosion or off-site sedimentation, and should quickly recover, similar to other burn areas surveyed following wildfires.

The action alternative is designed to utilize the existing transportation system as much as possible. DNRC would build approximately 0.7 miles of new permanent road and 0.65 miles of temporary new road in the Shoup section. Road improvements would focus on improving haul roads to meet BMP standards. This would include road grading and improving road drainage. Approximately 2 miles of existing road would require more extensive reconstruction to be safely usable; this would include removing trees in the

right-of-way, road widening and possibly relocation of a short portion of steep road. The action alternative would include approximately 0.25 miles of road abandonment following timber sale and regeneration activities. In addition, the action alternative would include the restoration of an old road stream crossing of Dick Creek that would remove bridge debris and stabilize streambanks.

FIGURE 2-1. JONES PROPOSED HARVEST UNITS AND ROADS

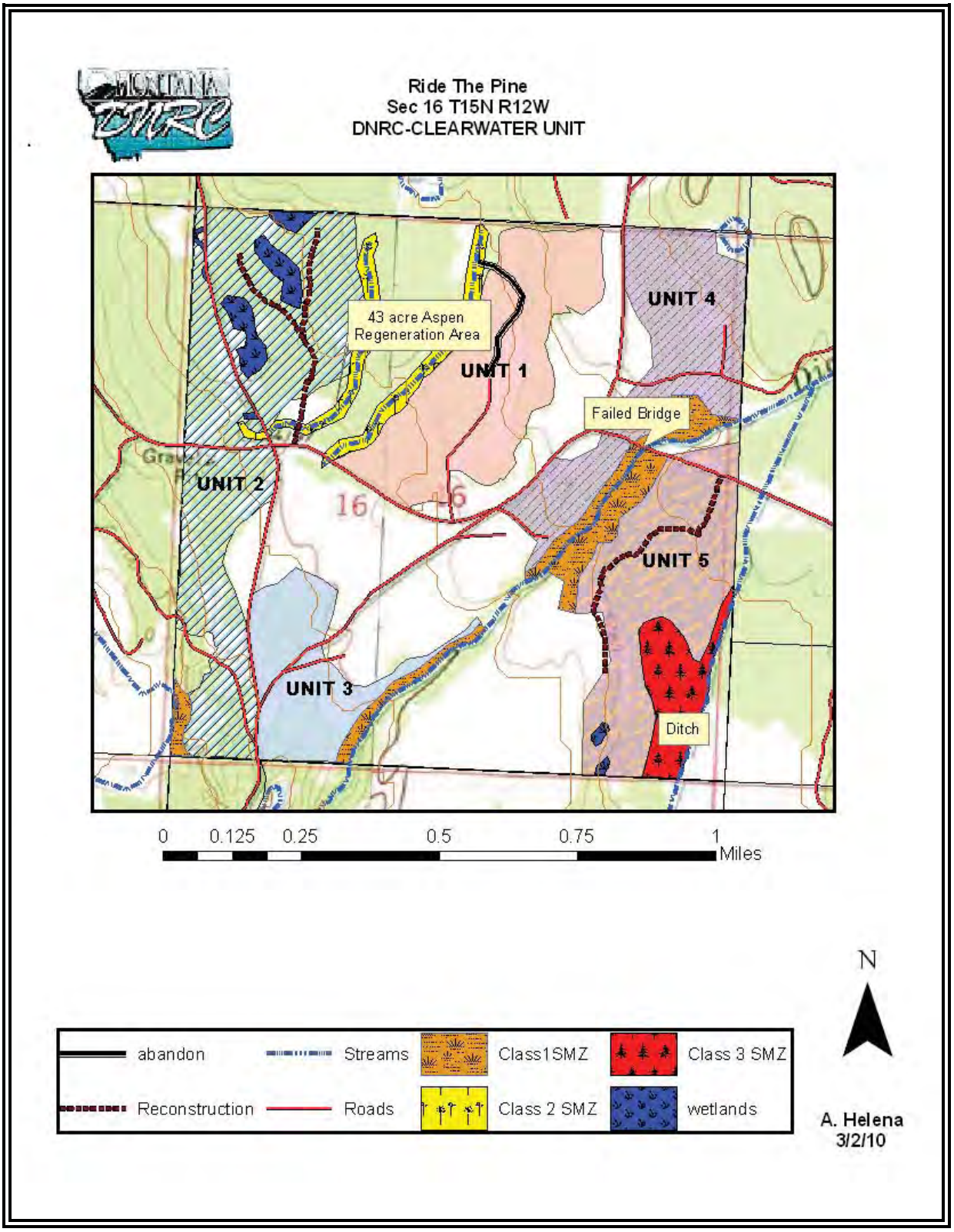
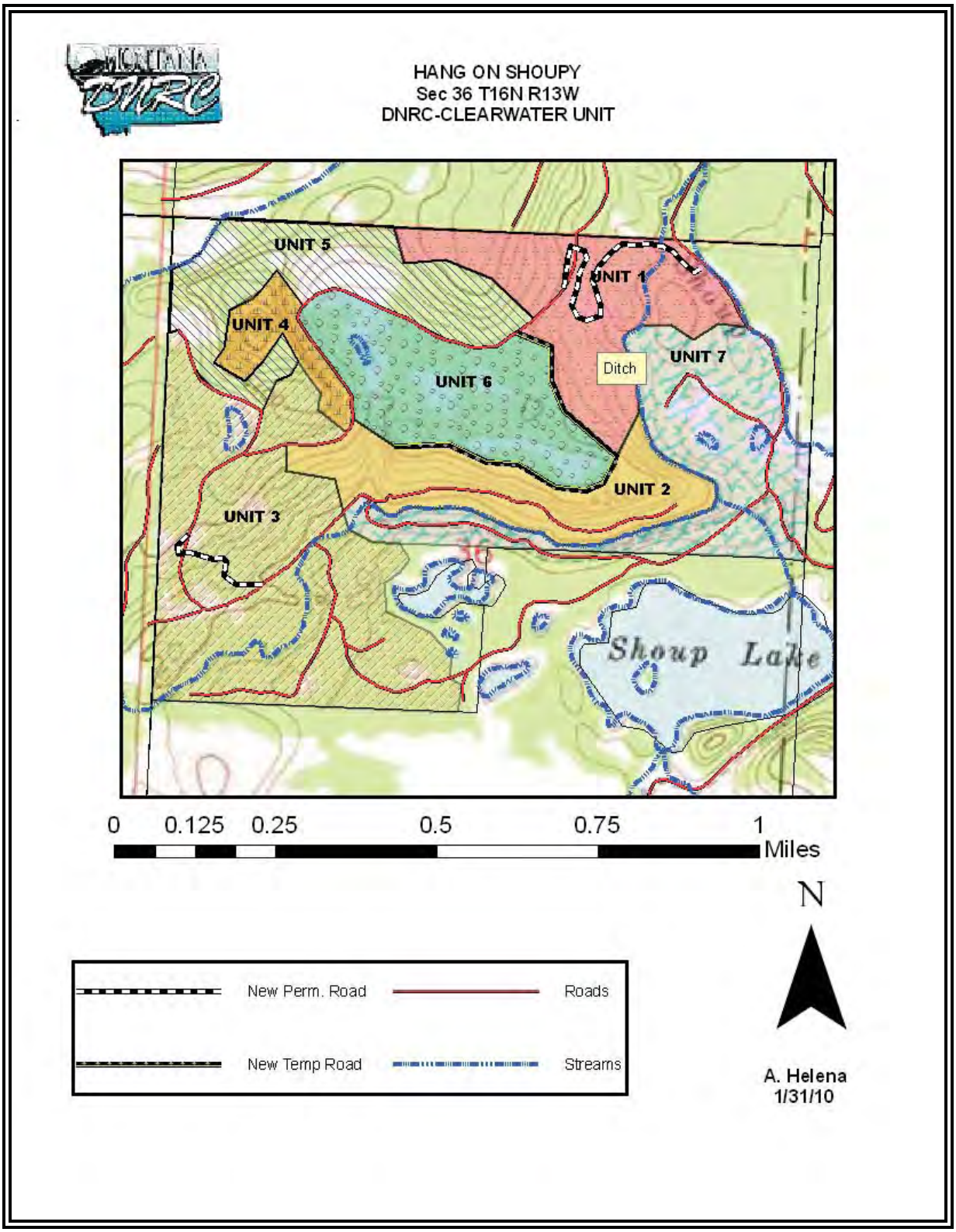


FIGURE 2-2. SHOUP PROPOSED HARVEST UNITS AND ROADS



2.3.3 Mitigation Measures of Action Alternative B

The following mitigations would be required under the action alternative:

Vegetation

- Grass seed new and disturbed roads and landings; spot spray new weed infestations.
- Wash logging equipment prior to use.
- Treat existing weed populations along or within roads with herbicide spray.
- Designate skid trails to minimize crossing native bunchgrass prairie in Section 16.
- Avoid locating log landings in prairie areas of Section 16.
- In units with limited regeneration Return-skid slash to units, build small piles and burn. In all other units whole tree skid and pile slash in conventional landing piles.
- Road reconstruction across the prairie will leave bunch grasses intact and not remove vegetation, as long as a log truck can safely move across the prairie without any road improvements.
-

Watershed and Soils

- DNRC would locate, clearly mark and maintain suitable water resource protection boundaries on Streamside Management Zones (SMZ's). Riparian Management Zones (RMZ's) and Wetland Management Zones (WMZ's) adjacent to streams and wetlands would be designated consistent with State Forest Land Management rules.

- DNRC would implement all applicable BMP's, SMZ's, RMZ's, WMZ's and Montana Administrative Rules for Forest Management and reasonable mitigation and erosion control practices during timber harvest, road maintenance, and road construction and road use activities.

- The logger and sale administrator would agree to a general skidding plan prior to equipment operations on complex terrain or draw crossings. Ground based skidding would be limited to slopes of 45% or less. A skidder with 50 ft. of winch line should be required for removal of trees from within Class 1 and 2 SMZ's to prevent erosion, minimize disturbance and protect the integrity of the SMZ.

- Limit equipment operations to periods when soils are relatively dry, frozen or snow covered to minimize soil rutting, compaction and maintain drainage features. Snow/frozen ground conditions prior to operations would be checked.

- An alternative practice would be required to allow skidders to cross the wetland margins for aspen restoration project and bring in slash up to 25 feet from the stream, from adjacent harvest units. The skidding operations would be limited to periods when soils are frozen or adequately protected to minimize equipment disturbance and prevent excessive compaction, displacement or erosion of the soils in the designated wetlands, consistent with ARM 36.11 426.

- On moderate to densely stocked stands, whole tree skidding can reduce slash hazard, but also remove a portion of nutrients from growing sites. Target woody debris levels are to retain 5-15 tons/acre (old and new) well distributed on site while meeting the requirements of the slash law. On sites with lower basal area, retain large woody debris as feasible since it may not be possible to retain 5 tons/acre and the emphasis will be on providing additional CWD in the future. For fire safety the amount of CWD will be treated to lower levels along a strip of land near main open roads.

- Slash Disposal- Limit scarification to 30-40% of harvest units as needed to meet silvicultural goals. No tractor piling on slopes over 35% in order to minimize displacement. Consider excavator grapple piling, lop and scatter or jackpot burning on steeper slopes to control fuels and promote conifer/aspen regeneration towards silvicultural goals.

- Install or restore adequate road drainage such as drain-dips on existing and new roads as needed to control erosion concurrent with harvest activities. All temporary spur roads will have adequate drainage installed and maintained during use prior to closure. On this gentle ground, slash

distributed on trails or temporary roads should be adequate to control erosion and prevent unauthorized use.

Fisheries

- Apply all applicable Forestry Best Management Practices (including SMZ Law and Rules) and Forest Management Administrative Rules for fisheries riparian management zones to fish-bearing streams in the project area.
    - Dick Creek: Immediately adjacent to proposed harvest units, establish the outside edge of the fisheries riparian management zone at 85 feet from the nearest bankfull edge of the stream channel. Within the fisheries riparian management zone provide adequate large woody debris recruitment and stream shading by implementing the SMZ Law and Rules for Class 1 streams.
    - Apply SMZ Law and Rules to all non-fish bearing streams in the project area.
- Apply the SMZ Law and Rules to all non-fish-bearing streams and lakes.
- Monitor all road-stream crossings for sedimentation and deterioration of road prism.
- All irrigation ditches in the project areas will be treated as class 3 streamside management zones in accordance with the SMZ laws of Montana.

Wildlife

- Maintain a minimum of 1 snag and 1 snag recruitment tree over 21 inches dbh per acre, on average, for all harvest units. If unavailable, retain the next largest size class. Additional snag resources could be retained within the harvest units.
- Eagle:
    - Prohibit mechanized/high-intensity activity from February 1 through August 15 in Unit 2 of the Jones Section.
    - Maintain structural characteristics in southern half of Unit 2 of the Jones section: snags, large trees, multi-storied stand
    - Within 1-2 acres of the nest understory thinning would take place to reduce fuel loads.
    - The next 1-2 acre buffer would be allowed to be harvested at 50% of what is currently proposed, focusing on retaining perch trees and future nest trees. Beyond that visual screening will be retained as necessary.
    - An approved alternative practice will allow Unit 3 to be harvested before August even though it is within ¼ of a territory.
- Grizzly:
    - Retain vegetative screening around riparian areas.
    - Abandon portion of road into Jones Unit 1.
    - Provide 120' of screening along the boundaries of Shoup Units 2 and 4 where regeneration isn't present.
    - Prohibit contractors and purchasers from carrying firearms while operating.
- Fisher
    - Maintain and recruit large CWD in Jones Units 1, 2, and 4 and Shoup Unit 3.
    - Shoup Creek: maintain 75% of area within 100 feet of stream at 40% or greater crown closure.
    - Dick Creek: maintain 75% of area within 100 feet of stream at 40% or greater crown closure.

Aesthetics

- Mark additional trees to leave in areas along travelways and primitive high use campsites, while still meeting silvicutural needs.
- Pre-commercially thin the understory to improve visual appearance in the area.
- Avoid landings in prairies whenever possible
- Grass seed landings and roads that receive extensive use during the timber sales.
- Treat slash in a manner that leaves the timbered areas accessible to foot travel.

2.4 SUMMARY COMPARISON OF ALTERNATIVES

The two alternatives are unique in terms of activities, achievement of project objectives, and effects that would occur. This section presents key characteristics of the alternatives, using tables to display

differences. The following table provides a brief comparison of on-the-ground activities that would occur if Alternative A or B were implemented.

Table 2-1: Summary Comparison of Project Activities for Each Alternative

Alternative	MMBF Harvest	Acres Treated	Road Management (Miles)
No Action Alternative A	0 MMBF	0 Acres	Road Construction: 0 Reconstruction: 0 Maintenance: 0 Abandonment: 0
Action Alternative B: Harvest	~3.5-4 MMBF	~705 Acres	Road Construction: .7 miles permanent .65 miles temporary Reconstruction: 2 Maintenance: 12 Abandonment: .25

The following table provides a comparison of how each alternative would meet the project objectives identified in Chapter 1.

Table 2-2: Summary Comparison of Achievement of Project Objectives

Objective	Indicators	No Action Alternative A	Action Alternative B: Harvest
Manage for long-term productivity through silvicultural treatments that: a) promote the retention and/or regeneration of ponderosa pine, western larch, and other seral species appropriate for the sites, and b) reduce the amount of insect infested or disease infected trees.	Acres managed for seral species Acres treated to improve health and vigor Acres Managed for Aspen regeneration	0 0 0	313 349 43
Generate revenue for the Common Schools Trust and provide a sufficient amount of sawlog volume to contribute to the sustained yield for DNRC.	Total Revenue (dollars) Volume harvested	0 0	$378,000 - $432,000 3.5-4 MMBF

The table (2-3) on the following pages summarizes the environmental effects of each alternative. Additional details of environmental effects can be found in Chapter 4.

Table 2-3: Summary of Environmental Effects

Resource Issue	No Action Alternative A	Action Alternative B
Vegetation: Forest Species Composition	No short-term change. Over time, shade-tolerant species would continue to regenerate, resulting in a shift towards the Douglas-fir and mixed conifer cover types.	1% decrease in mixed conifer cover type, and increase in western larch/Douglas-fir cover type, in the project level. Slight (less than 1%) decrease of mixed conifer and increase of western larch at the landscape scale.
Vegetation: Forest Age Class	No short-term change. Over time, there would be a shift towards older age classes.	20% increase in younger age classes in project area; less than 1% increase in younger age classes at landscape scale.
Vegetation: Stand Structure	No short-term change. Over time, stands would become more heterogeneous.	20% increase in uneven-aged stand structures (from heterogeneous) at project level; 1% increase in uneven-aged stands at landscape scale.
Vegetation: Native Bunchgrass Prairie	Over time, decrease in non-forested, prairie acreage.	Pre-commercial thinning activities will reduce conifer encroachment in the native bunchgrass prairies.
Hydrology: Water Quality	No change from existing condition	There is a moderate risk of short term low impacts associated of sediment delivery with the proposed action and restoration measures to remove fill from the Dick Creek floodplain. SMZ selection harvest is proposed that would not allow equipment operation in the SMZ and presents low risk of sediment delivery. Cumulative sediment loading to downstream waters would be reduced through implementation of the action alternative. Long term reductions in sediment delivery would occur due to installation of BMPs on several existing stream crossings in both project areas, and the restoration treatment to remove fill from a historic bridge failure on Dick Creek.
Hydrology: Water Yield	No change from existing condition	Potential increase of water yield levels would not be measurable and would not be sufficient to cause in-channel adjustments to flows.
Soils:	No change from existing condition	Soil impacts would be minimized Cumulative impacts on 20% or less of harvested areas; in most units impacts would be less than 15%.
Vegetation: Noxious Weeds	Continued encroachment or spread from recreational use on closed and open roads and grazing.	Possible slight reduction in acreage infested with weeds with focused treatment and improved road closure effectiveness

Resource Issue	No Action Alternative A	Action Alternative B
Fisheries: Shoup Creek	**No Change from Existing Conditions**	Use of the haul road across Shoup Creek presents a low risk of low direct and indirect impacts to the sediment component of Shoup Creek. The risks would be mitigated due to the construction of road drain drips and the armoring of the streambank and road prism adjacent to the existing culvert crossing. Depending on whether or not a road-stream crossing is rebuilt as part of the proposed actions, no direct or indirect impacts to connectivity would occur beyond those described in Existing Condition or connectivity would be improved. Considerations for cumulative effects to fisheries include: long-term potential sedimentation to Shoup Creek from the adjacent haul route would be slightly decreased due to the addition of drain dips and armoring, cattle grazing impacts to Shoup Creek adjacent to the haul route would be decreased due the armoring of the streambanks and road prism, and fish habitat connectivity may stay the same or improve. The Action Alternative is expected to have minor to moderate positive cumulative impacts to fisheries in the analysis area.
Fisheries: Dunham Creek Ditch	**No Change from Existing Conditions**	All hauling associated with timber harvest in Section 36 will utilize a haul route that crosses both Dunham Creek and Upper Monture Creek at a single bridge location. Use of the haul road across both creeks presents a low risk of low direct and indirect impacts to the sediment component of both creeks. The risks would be mitigated by implementing any required Forestry Best Management Practices. Considerations for cumulative effects to fisheries include: continued use of both bridges on the haul route as part of a year-round open public road, and a small, temporary increase in the traffic volume (due to timber hauling from Section 36) at the two bridge crossings. The action alternative is expected to have a low risk of low cumulative impacts to fisheries in the analysis area.
Fisheries: Dunham Creek and Upper Monture Creek	**No Change from Existing Conditions**	All hauling associated with timber harvest in Section 36 will utilize a haul route that crosses both Dunham Creek and Upper Monture Creek at a single bridge location. According to the Hydrology Analysis, use of the haul road across both creeks presents a low risk of low direct and indirect impacts to the sediment component of both creeks. The risks would be mitigated by implementing any required Forestry Best Management Practices. Considerations for cumulative effects to fisheries include: continued use of both bridges on the haul route as part of a year-round open public road, and a small, temporary increase in the traffic volume (due to timber hauling from Section 36) at the two bridge crossings. The action alternative is expected to have a low risk of low cumulative impacts to fisheries in the analysis area.

Resource Issue	No Action Alternative A	Action Alternative B
Fisheries: Dunham Creek and Upper Monture Creek (continued from page 24)	No change from Existing Conditions	
Wildlife: Bald Eagle	No change from existing condition.	All requested mitigations will be followed therefore resulting in a low risk of direct, indirect or cumulative effects to bald eagles.
Wildlife: Grizzly Bear	No change from existing condition.	In the short term hiding cover will be reduced especially along the open roads in the Jones section. With all requested mitigations being followed there will be a low risk of direct, indirect and cumulative effects to grizzly bears.
Wildlife: Pileated woodpecker	No change from existing condition.	There would likely be low to moderate risk of direct, indirect and cumulative effects to pileated woodpeckers that occur on the affected parcels from the proposed action due to habitat alterations.
Wildlife: Big game species	No change from existing condition.	The proposed action would reduce thermal cover for wintering deer and elk. As a result there could be a low to moderate risk of direct, indirect and cumulative effects to deer and elk populations.
Wildlife: Fisher	No change from existing condition	All requested mitigations will be followed which will result in low to moderate direct, indirect and cumulative effects.
Economics	Annual grazing revenue of $1,781would continue. None of the estimated revenue for trust beneficiaries or local employment benefits would be realized. Long-term deferral of harvest from this forest would impact harvest patterns state-wide.	In addition to annual grazing revenue, the School Trust income from a sale under Alternative B is estimated to be between $378,000 and $432,000. This sale would be part of the annual harvest of timber from the State of Montana Forest Trust Lands. The net revenue from this sale would add to the trust fund.
Aesthetics	No harvest would take place. Douglas-fir would continue to overpopulate the understory. Ponderosa pine would continue to encroach in native grasslands.	Harvest would take place. Additional trees will be marked to leave in heavy use areas if silvicutural needs can also be accomplished. ***Pre-commercial*** thinning would alleviate current overpopulation as well as encroachment problems. Slash will be treated in a manner that leaves the wooded areas accessible to foot traffic.
Air Quality	No change from existing condition.	Slash piles will be burned. Impacts to air quality will be minimized by following regulations set forth in the Airshed group guidelines (regulated by the DEQ)

CHAPTER 3
EXISTING ENVIRONMENT

CHAPTER 3: EXISTING ENVIRONMENT

INTRODUCTION

This chapter identifies and describes those resources that may be affected by the proposed action, and is organized by general resource categories and their associated issues introduced in Chapter 1. It does not describe any effects of the alternatives; those are described in Chapter 4. The descriptions of the existing environment found in this chapter can be used as a baseline for the comparisons in Chapter 4.

GENERAL DESCRIPTION OF THE AREA

The proposed Shoup-Jones Area Timber Sale Projects are located northwest of Ovando, Montana and include approximately 1,100 acres of State Trust Lands. The projects include Section 16 of T.15N., R.12W., and a portion of Section 36 of T.16N., R.13W. State Trust Lands within the project area share property boundaries of approximately one mile with United States Forest Service (USFS), one mile with the Montana Forestry & Conservation Experiment Station, and 5.25 miles with private landowners (Figure 1, Shoup-Jones Timber Sale Project Vicinity Map). Several other analysis areas were delineated to assess direct, indirect and cumulative effects of the alternatives considered. More specific details about these are contained under each resource heading.

3.1 VEGETATION

The vegetation section describes present conditions of the forest for comparison to the potential effects of proposed alternatives in Chapter 4. Issues expressed during initial scoping by the public and internally are:

- Timber harvesting and associated activities could impact forest stand characteristics including species composition, age class, and structure.
- Timber harvesting and associated activities could impact native bunchgrass prairie in Section 16 of the project area.

These issues will be evaluated by analyzing the current forest conditions in conjunction with the type and location of silvicultural treatments.

Analysis Area

Forest Vegetation Analysis Area: the vegetation analysis area includes 2 geographic scales for assessing potential direct, indirect and cumulative effects on cover types and desired future conditions, age class, and structure:

- ***Direct and Indirect Effects Analysis Area*** - The **Shoup-Jones Project Level Scale** includes the trust lands within the project area: Section 16 of Township 15 North Range 12 West, and a portion of Section 36 of Township 16 North Range 13 West.
- ***Cumulative Effects Analysis Area -*** The **DNRC Clearwater Unit Scale** includes all forested trust land parcels administered by the Clearwater Unit for DNRC. This geographic area is a subset of the above Bitterroot-Blackfoot Climatic Section and includes school trust lands in the vicinity of Seeley Lake, Greenough, and Ovando, Montana.

Native Bunchgrass Prairie Analysis Area: This analysis also utilizes the DNRC Clearwater Unit and Shoup-Jones Project Level scales.

Analysis Methods

Administrative Rules of Montana (ARM 36.11.404) direct DNRC to take a coarse filter approach to favor an appropriate mix of stand structures and compositions on state lands, referred to as a “desired future

condition" (DFC). This analysis will describe stand conditions and compare them with the desired future conditions that DNRC believes to be appropriate for the site. Chapter 4 will describe the changes to vegetation that would be expected under each alternative.

- *Cover Types & Desired Future Conditions:* The DNRC site–specific model (ARM 36.11.405), was used to determine the characteristics of the DFC and to evaluate the potential direct, indirect, and cumulative effects. This model assigns a DFC in terms of cover type for each stand identified in the DNRC's Stand Level Inventory (SLI). At the administrative unit level, the aggregate acreage of each desired future cover type describes a broad picture of the desired future condition for that unit. This provides a basis for comparison of current and desired future conditions at both the project and landscape levels. Conditions are described by DNRC's 2006 SLI for the Clearwater Unit.
- *Age class and structure:* The age and stand structure analyses use DNRC's stand level inventory to describe stand conditions. Predicted changes to age class and structure are based on the type and extent of silvilcultural treatments proposed. Analysis also includes some qualitative discussion the conditions of timber stands, including how various natural and man-caused disturbances and site factors have affected and may continue to affect timber stand development.
- *Climatic Section M332B-* **Bitterroot-Blackfoot Scale** was used in this analysis for comparing historic conditions related to the distribution of forest cover types and age classes to existing conditions within the project area. The Bitterroot-Blackfoot geographic area includes all of Ravalli and parts of Missoula, Mineral, Sanders, Lake, Flathead, Granite, Powell, and Lewis and Clark Counties (*Losensky, 1997)*.
-

Native Bunchgrass Prairie Analysis Methods: During field reconnaissance, DNRC personnel assessed non-forested areas, open timber stands, road locations, noxious weeds, and generally evaluated native prairie extent and location. Occurrences of native prairie were compared to proposed harvest sites and road construction locations for assessing effects and developing mitigation measures.

General Forest Vegetation Information

The existing vegetative types, more specifically forest habitat types and cover types within the Clearwater Unit Landscape and the Shoup-Jones project areas, reflect the varied influences of site factors, fire regimes or disturbance patterns and past management activities. Site conditions vary depending upon the physiographic and climatic factors associated with geographic locations. Soil types, slope aspect and position, length of growing season, and moisture availability influence the type, growth and development of forest vegetation. These site factors are reflected in forest habitat classifications (*Pfister, et al, 1977*), used to generally describe forest vegetation, forest stand development and relative forest productivity associated with the given site and climatic factors.

Approximately 74% of the Shoup-Jones project area is occupied by forest habitat types in the Douglas-fir series, indicating the influence of moderately warm and dry climatic conditions. These habitat types are often occupied with a mixture of species. Major species in the Shoup-Jones stands include ponderosa pine, Douglas-fir, and western larch. Less predominant species include lodgepole pine and Engelmann spruce. Timber productivity varies for these habitat types, with higher productivity generally found in stands dominated by seral species. Partial cutting practices can lead to dominance by Douglas-fir, whereas even-aged management is more favorable for seral species (Pfister et al., 1977). This area falls within climatic section 332B, which was historically about 79% forested. Within the climatic section, the historically dominant cover type was lodgepole pine, followed by Douglas-fir and ponderosa pine on lower slopes (Losensky, 1997).

Historic timber harvest may have occurred throughout the project area prior to recorded harvest activities. In 1951-1953, approximately 5 million board feet were harvested from within Sections 16 and 36. The most recent large timber harvests occurred in 1978, treating approximately 650 acres of the project area.

In the last 2 decades forest management activities have been limited to minor amounts of timber harvest, weed spraying, and incidental cutting of Christmas trees, firewood, or post and rails. Active fire suppression starting in the 1930's has limited the extent of wildfires to small acreages, generally less than ¼ acre in size.

3.1.1 Cover Types, Age Class, and Structure

The project area (Sections 16 and 36) consists primarily of ponderosa pine and western larch/Douglas-fir cover types. Approximately 868 acres (84%) of the 1,100 acre project area is forested (Table 3-1).

Table 3-1: Existing and Desired Future Condition Cover Types for the Shoup-Jones Project Areas

Cover Type	Acres	Percent of Area	DFC Cover Type (Acres)	Percent of Area
Douglas-fir	8	1%	8	1%
Mixed Conifer	50	5%	15	1%
Ponderosa pine	540	51%	846	77%
Western larch/Douglas-fir	289	26%	49	5%
Hardwood	12	1%	12	1%
Non-forested	169	16%	170	15%
Total	**1,100**	**100%**	**1,100**	**100%**

*based on 2006 SLI data

At the larger scale, DNRC lands managed by the Clearwater Unit are approximately 85% forested, mostly in the ponderosa pine and western larch/Douglas-fir cover types. Compared to the desired future condition at this scale, Douglas-fir, subalpine fir, and mixed-conifer cover types are over-represented while ponderosa pine and western larch/Douglas-fir are under-represented (Table 3-2). Overall, however, about 66% of these lands do have a cover type that matches the desired future condition.

Table 3-2: Existing and Desired Future Condition Cover Types for the Clearwater Unit

Cover Type	Current Cover Type (Acres)	DFC Cover Type (Acres)	Current Type Minus (-) DFC Type (Acres)
Douglas-fir	6860	4320	2540
Mixed Conifer	2596	444	2152
Ponderosa pine	16319	23249	-6930
Western larch/Douglas-fir	12409	14450	-2041
Lodgepole	4343	3688	655
Subalpine fir	2956	307	2649
Hardwood	206	215	-9
Non-forested	7093	7215	-122
Noncommercial	703	33	670
Total	53485	53920	--

*based on 2006 SLI data

This cover type shift is not atypical for Montana, but it does represent a change in stand conditions. Active fire suppression since the early 1900's has interrupted wildfire frequencies in conjunction with early logging practices in some areas that favored the removal of commercially valuable western larch, ponderosa pine, and western white pine for railroad ties, mining timbers, and construction lumber. Many open, mature stands dominated by ponderosa pine, western larch and other seral species with patches of immature seral trees in the understory have been replaced with more densely stocked stands in both the overstory and understory. These stands often include a higher percentage of more shade tolerant trees, such as Douglas-fir, as a result of longer intervals between disturbances.

Table 3-3 displays Age Class Distribution on project area and landscape scales. Stands in the seedling-sapling age class are under-represented compared to the historical condition for both the Clearwater Unit landscape and the project area, and the 40-99 and 100-149 age classes are over represented. This deviation from historical conditions can partially be explained by successful fire suppression increasing the interval between fires and logging practices that did not necessarily create a similar disturbance to a wildfire.

Table 3-3: Historic and Current Age Class Distribution

Percent of Analysis Area by Age Class Groups (years):				
Analysis Area	00 - 39	40- 99	100 - 149	150+
Bitterroot-Blackfoot Climatic Section (historic)	29	29	21	21
Clearwater Unit (current)*	6	28	35	26
Shoup-Jones (current)	0	44	49	7

* Approximately 5% of the Clearwater Unit does not have current age class data available

Stand structure indicates a characteristic of stand development and how a stand may continue to develop. Stand structure is classified as single storied, two storied, or multi-storied if there are one, two, or three main canopy layers, respectively: Single-storied stands are most often associated with stand replacement events, such as severe fires or regeneration harvests including clearcutting or seedtree cutting. Stands are simple in vertical structure and are often even aged. Regeneration harvests, such as a seedtree or shelterwood, that retain 10% or more of the upper crown canopy and have a seedling/sapling understory are considered 2-storied stands. Two-storied stands have fairly simple vertical structure and are frequently even aged, although at least two age classes are generally present. The multi-storied condition arises when a stand has progressed through time and succession to the point that lower- and mid-canopy levels are well-established beneath an overstory canopy. Three or more age classes may be present in these stands and vertical structure can be complex. These stands often experience a long interval between disturbances.

The Shoup-Jones Project Area is dominated by multi-storied stands. Across the Clearwater Unit there is a more even distribution of the various stand structure types. Table 3-4 displays the percent of the analysis area (forested portions only) in each stand structure class for the Shoup-Jones and Clearwater Landscape.

Table 3-4: Proportion (%) of Analysis Area by Stand Structure

Stand Structure	**Shoup-Jones Project Area**	**Clearwater Unit**
Single-storied	15%	28%
Two-storied	0%	11%
Multistoried	85%	61%

*based on 2006 SLI data

3.1.2 Native Bunchgrass Prairie

Approximately 16% of the Shoup-Jones project area is non-forested, primarily in Section 16. This drier, non-forested part consists mainly of native grasses. Bluebunch wheatgrass (*Agropyron spicatum*) and rough fescue (*Festuca scabrella*) dominate these areas along with other grasses and sagebrush. Losensky estimated that the historic amount of this cover type was 21% in the Bitterroot-Blackfoot climatic section (Losensky, 1997). Similarly, at the scale of the Clearwater Unit, the non-forested cover type is

slightly underrepresented. The current amount is approximately 7,100 acres, compared to an appropriate amount of 7,200 acres (Table 3-2). Wildfire suppression, tree encroachment, and noxious weeds can all reduce the quality and amount of native bunchgrass prairie.

3.1.3 Noxious Weeds

Noxious weeds infestations are mainly a combination of spotted knapweed, oxeye daisy, thistle and spots of houndstongue which occur along portions of the existing access road system, and rangeland sites within both project sections and on adjacent lands. Roadside herbicide treatments were made in 2009 on all open roads in the Jones Section 16, and adjacent sections 4, 5, 9 to reduce weed seed production and promote site adapted vegetation and native species.

.

3.2 WATERSHED AND HYDROLOGY

Water Resources-Analysis Methods & Areas

The primary concerns relating to water resources within the analysis area are potential impacts to water quality from sediment sources on roads and forest sites that can deliver to stream channels as well as inside the channels. In order to address these issues the following parameters are analyzed for each alternative:

~Miles of new road construction and road improvements
~Potential for sediment delivery to streams
~Potential for water yield increase impacts to stream channel stability

A watershed analysis and field survey was completed by a DNRC hydrologist for the proposed project to determine direct, indirect and cumulative effects to water quality. The water quality evaluation included a review of existing inventories for soils and water resources (NRIS 2009, DNRC 2008), the Blackfoot Restoration Plan (BFC 2005), Watershed Restoration Projects of Lolo N.F, and adjacent landowners in the area and reference to previous DNRC projects, and comparisons of aerial photos combined with GIS analysis to estimate the area of past timber harvest and vegetative recovery. Several field reviews were completed for the proposed harvest units, access roads and associated streams and the observations, information and data were integrated into the watershed analysis and design of project mitigations.

The analysis areas for sediment delivery are limited to the harvest units and roads used for hauling and will focus on the streams described as affected watersheds. This includes in-channel and upland sources of sediment that could result from this project. In-channel areas include the stream channels adjacent to and directly downstream of harvest areas. Upland sources include harvest units and roads that may contribute sediment delivery as a result of this project.

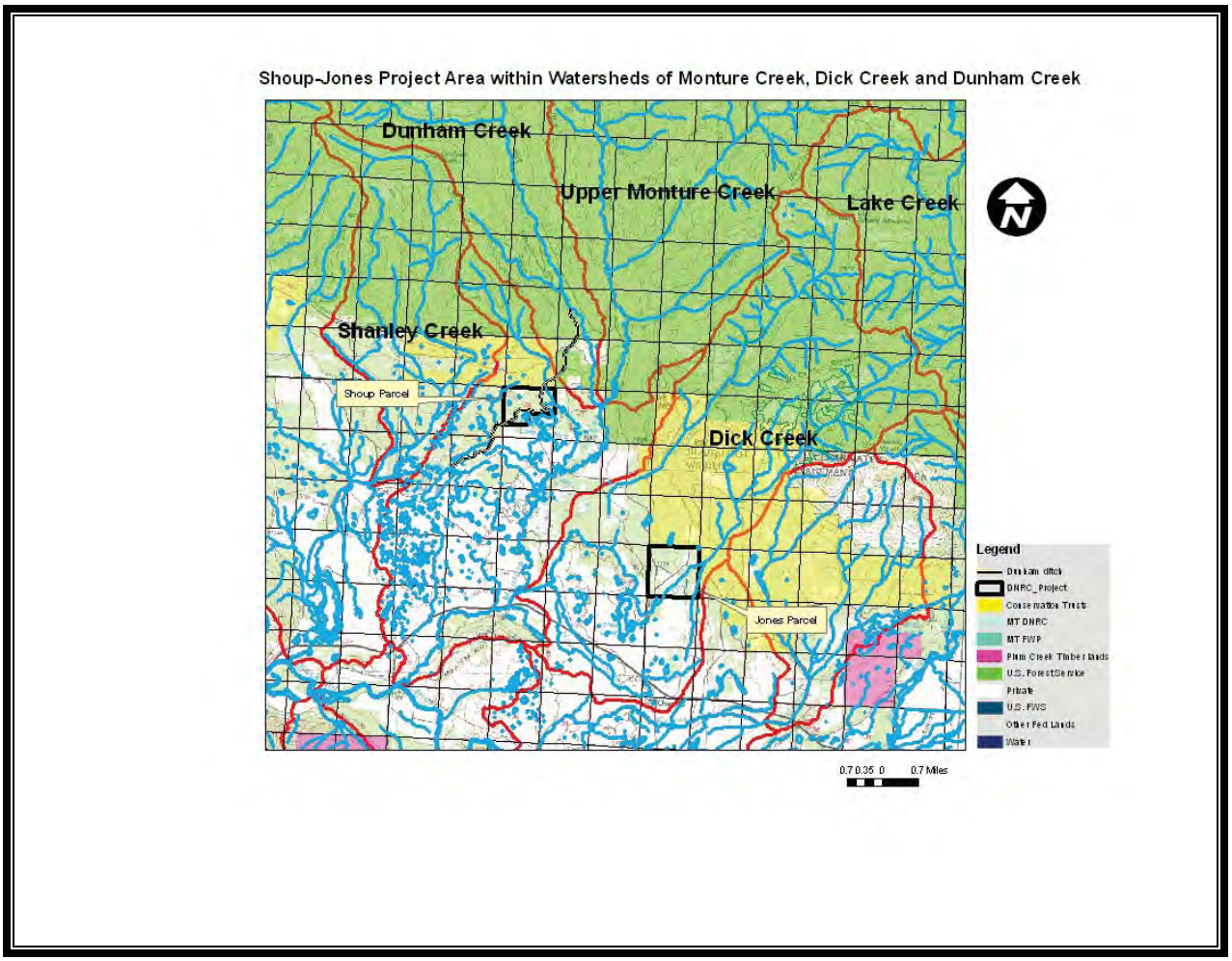
A DNRC hydrologist completed a course filter qualitative assessment of watershed conditions and cumulative effects as outlined in the Forest Management Rules (ARM 36.11.423) concerning watershed management. The analysis areas for watershed cumulative effects include the watersheds that wholly surround the DNRC project sections and the access roads to those parcels.

Affected Watersheds

The analysis areas for Shoup-Jones project were designated using 6th code HUC scale watershed boundaries that include the DNRC Jones Partial Section 16, T 15N, R12W, and Shoup Section 36, T16N, R13W less than 5 air miles north of Ovando, Montana (refer to project watershed map).

The DNRC Jones parcel analysis area is the Dick Creek watershed (HUC 170102030804) that is 20,437 acres in size. Dick Creek originates near the divide with the Scapegoat Wilderness and flows ~14 miles southwest to join lower Monture Creek approximately 3 miles upstream of the Blackfoot River.

The DNRC Shoup parcel is located in the lower Monture Creek watershed (HUC 170102030907) that is 13,772 acres in size. The three water resource areas considered in the Shoup area analysis are Lower Monture Creek, Shoup Creek and Dunham Ditch, that include the haul routes, harvest units and potentially affected downstream water resources.



Water Quality Regulations and Uses

The Monture Creek drainage (including Dick Creek, Shoup Creek and Dunham Creek) is tributary to the Blackfoot River, and is classified as B-1 in the Montana Surface Water Quality Standards (ARM 17.30.623). Waters classified B-1 are suitable for drinking, culinary and food processing purposes after conventional treatment for removal of naturally present impurities. Water quality must also be suitable for bathing, swimming and recreation; growth and propagation of salmonid fishes, and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply (ARM 17.30.623 (1&2)). Among other criteria for B-1 waters, no increases are allowed above naturally occurring concentrations of sediment, (except as permitted in 75-5-318, MCA) which will or are likely to create a nuisance or renders the waters harmful, detrimental or injurious to public health, recreation, safety, welfare, livestock, wild animals, birds, fish or other wildlife (ARM 17.30.623(2)(f)).

Naturally occurring includes resource conditions or materials present from runoff on developed land where all reasonable land, soil, and water conservation practices have been applied. Reasonable practices include methods, measures, or practices that protect present and reasonably anticipated beneficial uses. The State has adopted Forestry Best Management Practices (BMP's) through its Nonpoint Source Management Plan as the principle means of controlling non-point source pollution from silvicultural activities. DNRC provides further protection of water quality and sensitive fish through implementation of the Streamside Management Zone (SMZ) Laws and Forest Management Rules.

Monture Creek is listed as partially supporting fisheries and aquatic life due to sediment and fully supporting other beneficial uses. Monture Creek and its tributaries, Dick Creek, Shoup Creek and Dunham Creek are not listed as impaired on the State's 303(d) list of impaired bodies of water (MTDEQ 2008). Monture Creek and its tributaries including Dick Creek, Shoup Creek and Dunham Creek are

identified as moderate priority for restoration (BFC 2005). Livestock grazing and erosion from roads are the main controllable sources of sediment. The Middle Blackfoot area TMDL recommendations include improving fish passage and reducing sedimentation through grazing management and implementation of Best Management Practices (BMPs) on land management projects.

Downstream beneficial uses in Monture Creek include: domestic surface water rights, fisheries, recreation, irrigation, and livestock watering. Dick Creek, Shoup Creek and Dunham Creek are not part of a municipal watershed. There is an irrigation diversion on Dick Creek in the DNRC Jones section and the Dunham irrigation ditch crosses the DNRC Shoup parcel.

3.2.1 Existing Conditions of Water Quality, Quantity and Water Yield

Jones Section 16, T15N, R12W, Dick Creek

The DNRC ownership is located on the lower footslopes of Dick Creek. Dick Creek flows through mainly Lolo N.F. lands and mixed ownership includes, The Nature Conservancy, BCCA, DNRC and private agricultural lands. Average annual precipitation is 26 inches in the watershed mainly received as snow and the DNRC parcel has an average annual precipitation of 19 inches.

The main stem stream channel of Dick Creek is a class 1 stream that flows across the DNRC Jones parcel within the section. Dick Creek supports westslope cutthroat trout and is within the Monture Creek, bull trout core area which is assessed in the fisheries section. Stream channel stability rating was completed on Dick Creek in 2007 at the site of proposed streamside management zone harvest, using the Stream Reach Inventory and Channel Stability Evaluation Procedure (Pfankuch, 1978). The streambed has a gravel cobble substrate and channel stability was rated as good.

No sediment sources were noted on existing roads in the DNRC parcel. The Monture Road is open year round and the crossing of Dick Creek in Section 21, T15N, R12W is undersized and contributes sediment during runoff events. Sedimentation sources identified in the project section are dispersed grazing use and in the NE corner of the section there is a failed old log bridge crossing where the channel width is restricted and the bridge road fill is a source of sediment.

There is an irrigation diversion in the southeast corner of the DNRC section, and Dick Creek (mile 3.5-6.0) has periods of low in-stream flows from irrigation withdrawals and natural losses in coarse substrates, downstream of the diversion. There are several isolated wetlands and wetlands adjacent to stream channels in both project sections. Aspen riparian vegetation in wetland areas of the Jones parcel are mainly older age class and aspen clones have declined in extent and vigor in wetlands and adjacent riparian areas, which has reduced age distribution, plant diversity and shading.

Existing Cumulative Effects

Cumulative watershed effects can be characterized as impacts on water quality and quantity that result from the interaction of past, current or foreseeable future disturbances, both natural and human-caused. Past, current, and future planned activities within each analysis area have been taken into account for the cumulative effects analysis. Past management activities in the proposed project areas include timber harvest, grazing, road construction, irrigation diversions, ditch failures and fire suppression.

Dick Creek is not a 303d listed stream, yet there are cumulative effects to water quality in the drainage that include locations of, livestock induced stream bank degradation, past dredging, riparian timber harvest, poor road crossings, lack of complex fish habitat (instream wood), dewatering (low flow from irrigation withdraws and natural causes). Dick Creek ranks high on the Middle Blackfoot watershed restoration priority list and a substantial amount of restoration work is planned and has been completed on Dick Creek that includes: stream channel and wetland restoration along with grazing improvements. In 2007, cooperators installed a new headgate and fish screen on a major ditch in lower Dick Creek (DNRC section 16) to prevent fish losses to the ditch, improve water regulation and stream flows. Restoration projects began on Dick Creek in the early 1990's (mainly on the lower 3 miles) and included reconstruction and narrowing dredged channel segments, adding woody debris, restoring wetlands,

improved irrigation diversions and stock watering sites that continue to improve historic conditions on Dick Creek.

Tree canopy reduction by timber harvest activities, tree mortality or wildfire can affect the timing of runoff, increase peak flows and increase the total annual water yield of a particular drainage. Increased water yield can increase stream channel scour and in-stream sediments that impact water quality. Within the project areas, high infiltration rates exceed most precipitation rates on these soils due in part to the low precipitation (18-20”average), yet high intensity thunderstorms can lead to flashy flow response in the perennial stream reaches

The Dick Creek forested area is 30% harvested in the mid to lower elevations, (mainly over 20 years ago) that would indicate a moderate constraint for water yield. Yet increased water yield is not indicated on the several DNRC stream reaches that were evaluated and found to have good stream channel stability in and water yield was not an apparent impact. The low elevation and low precipitation on the DNRC parcel in the watershed and coarse textured, well drained alluvial/outwash soils accent the good condition of stream stability. An exception is the channel scour at the old bridge crossing site that is planned for restoration.

Shoup Section 36, T16N, R13W
This DNRC parcel is 440 acres located on the footslopes of knob and kettle terrain of the lower Monture Creek watershed. The forested parcel is on the rangeland edge of the valley floor and average annual precipitation in the section is low at 19 inches average annual precipitation mainly received as snow. Surface water resources considered in the Shoup area analysis are Shoup Creek, Lower Monture Creek, Dunham Creek and Dunham ditch that includes the haul routes, harvest units and potentially affected downstream water resources. There are many pothole lakes in the area.

Monture Creek and Dunham Creek
The proposed actions that may affect water quality associated with sediment delivery to streams are use of the existing haul roads and crossings. Monture Creek is 4th order tributary to the Blackfoot River and Dunham Creek is a 2nd order tributary of Monture Creek Neither Monture Creek or Dunham Creek flow through the DNRC Shoup parcel. While no DNRC harvests are proposed near Monture Creek, or Dunham Creek, the proposed haul route for the DNRC project sections would use existing roads 89 and 477. The proposed haul route would use a crossing of Monture Creek in Section 29, T16N, R12W and a crossing of Dunham Creek and the Dunham ditch in section 19, T16N, R12W in the lower Monture Creek watershed. The past historic road crossings and the Dunham ditch had failures that affected sedimentation, bank erosion and flows. Upper Dunham Creek was channelized in the 1970’s, which lead to irregular flows on Dunham ditch and ditch failures down ditch to Shoup Creek. Dunham Creek ranks high on the Blackfoot restoration priority list.

In 2001, the Lolo N.F. completed stream rehabilitation and stabilization in the headwaters of Dunham Creek including a new irrigation diversion and fish screen installed in 2006 to reduce fish loss to the ditch and better regulate stream flow/ditch flow. The work included stabilizing stream banks, reconstructing stream meanders, replacing large woody debris materials and re-vegetation. This project should improve channel stability, water quality, reduce fish loss in Dunham Ditch and improve connectivity with lower Monture Creek. The improved current, Monture Creek and Dunham Creek crossings are bridges with elevated approaches and Dunham ditch is a culvert crossing. The current road crossings meet BMP’s for adequate drainage to control erosion and sedimentation. These combined projects should continue to improve overall watershed condition and water quality.

Shoup Creek and Dunham Ditch
Shoup Creek is a relatively short drainage that flows southeast to lower Monture Creek. Shoup Creek flows through mainly Lolo N.F. lands and mixed ownership includes, The Nature Conservancy, BCCA, DNRC and private agricultural lands to join Monture Creek above the Blackfoot River. Shoup Creek is potentially affected by road use and proposed harvest adjacent to the streamside management zone on the west side of Shoup Creek. The main stem stream channel of Shoup Creek flows during the spring approximately 1600 feet through the northeast corner of the DNRC partial section. This segment is

dewatered most of the year due to the irrigation diversion with Dunham ditch just upstream of the DNRC parcel, and coarse alluvial subsoils.

The Dunham Ditch diverts flow from Dunham Creek approximately 2 miles northeast of the DNRC Shoup parcel. The Dunham Ditch flows across Shoup Creek, enters the northeast corner of the DNRC parcel and flows across the parcel and on to a pond several miles southwest of the DNRC parcel. The ditch is on an even grade, approximately 6-8 feet wide and has a fine substrate. The ditch is defined as a class 3 other body of water and there is only a retention requirement for submerchantible trees and shrubs. There is one bridge crossing and a ford of the ditch. Dunham ditch would be marked as a class 3 SMZ, for tree retention, but would not be skidded across

The existing forest access road to the Shoup parcel is gated at road 477 and is in good road surface drainage condition down to the parcel and crossing of Dunham ditch. Interior and connecting roads have not been recently maintained and segments of road do not have adequate surface drainage to meet BMP's. One crossing site has considerable scour and is undersized and several culverts needed inlet maintenance. Most roads are vegetated with grass. One road segment on DNRC intercepts groundwater flow from the ditch and would be closed. Grazing has disturbed segments of stream banks and trampled around culvert inlets, which has increased sediment. Previous selective harvest has regenerated to conifers. There are several isolated wetlands and pothole ponds. Wetlands adjacent to stream channels are shaded by conifers and mixed brush species

Existing Cumulative Effects
Stream sediment in Shoup Creek is moderately impacted by a combination of historic ditch failures, headgate regulation/repairs, dispersed grazing and upstream crossings. It appears that past high flows intercepted by the Dunham ditch contributed to diverted overflow and segments of channel instability prior to repairs. Channel undercutting is moderate and most obvious on the segment of Shoup Creek below the headgate junction with the Dunham ditch. Shoup Creek flows in the spring when groundwater is high and the headgate is open, but dewaters in early summer. Segments of the access road require road maintenance and additional rock armoring to meet BMP's. The access road system is closed year round except for administrative use, which controls road effects.

Water yield is not a constraint for the Shoup watershed analysis areas as compared to studies (MacDonald & Stednik 2003, Romme et al. 2006) that have found no increases in stream flow in watersheds with total annual precipitation of less than 20 inches, when less than 20% of the drainage is harvested. The Lower Monture Creek drainage is over 80% rangeland and past harvest is 17 %.

3.3 SOILS

Soils Analysis Area & Methods
The analysis area for geology and soil resources includes the project sections and the access roads to those DNRC sections proposed for timber harvest. The soils analysis included an evaluation of Powell County soil survey data, air photos, past harvest design and on-site field review by DNRC hydrologist/soil scientist for soil properties and current conditions to assess past and predicted effects compared with DNRC soil monitoring results on previous harvest operations.

Existing Conditions-Geology and Soils
The proposed harvest areas are located on the foothills of Dick and Shoup Creeks that are tributary to Monture Creek. Parent materials are a mixture of deep glacial till, glacial outwash, old valley fill deposits (tertiary age) and alluvium derived from mixed bedrocks of limestone and argillite. The majority of the DNRC project area is located on mainly moderate slopes of 4-35% with lesser areas of 35 to 60%. No especially unique or unstable geology occurs on the proposed project sites. Both project areas are part of broad glacial till and outwash plains that are pitted with numerous small to medium wetlands and ponds. With the exception of the wetland areas, both project sections are relatively dry foothill locations of 18-22" average precipitation/year and include the ecotone transition between forest and drier grassland/sagebrush sites. Soil descriptions are noted in table S-1 and on appendix soil maps.

On the Shoup parcel, Section 36, T16N, R13W primary forest soils are MU 171 C/E Winfall-Rumblecreek deep gravelly loam soils on 2 to 25 % sideslopes. Winfall soils in this area are well drained and have a higher content of gravels and cobbles than typical. The coarse textured well Winfall soils have the longest dry season of use. Rumblecreek soils have a reddish brown, volcanic ash silt loam surface, over deep silty clay subsoils. Both soils have a low to moderate potential for erosion which can be effectively controlled by limiting disturbance and standard drainage practices. Rumblecreek soils tend to remain wet later into the spring and are subject to compaction if operated on when wet. Soil displacement and compaction hazards are moderate for harvest operations and can be mitigated by limiting disturbance and season of use. Within the map unit are glacial potholes and areas of higher clay content subsoils that support seasonal wetlands and patches of aspen. The flat slopes can be frosty, and the deep open graded material leads to seasonally shallow water tables in portions of both project parcels. These localized sites have higher than average subsoil water leads to higher tree growth potential than on comparable soils that do not have seasonal high water tables.

Bignell and Crow soils in the northwest corner of the section have deeper clay rich subsoils that have lower soil strength and are prone to rutting and compaction if operated on when wet. These limitations can be mitigated by limiting operations to relatively dry or frozen conditions. The existing forest access roads to the DNRC project parcels cross segments of clay rich soils that will limit access during spring thaw up to approximately mid-June. Roads will require above average drainage and ditching or turnpiking based on site specific conditions. Erosion potential is moderate to high on short steep slopes> 45%. Displacement potential for ground based operations is high for slopes over 45%. This limitation can be mitigated by cable harvest of slopes over 45%.

On the Jones Parcel Section 16, T 15N, R12W in lower Dick Creek, the primary forest soils are MU 371 Wildgen-Yreka gravelly loams, on flat to moderate slopes of 2 to 25 %. These soils are well drained and have high contents of cobbles and coarse fragments. The moderate slopes are well suited to ground based equipment operations and have a low to moderate potential for compaction and displacement. Within this soil map unit are areas of higher clay content subsoils that support seasonal wetlands and patches of aspen. These sites are subject to rutting if operated on when wet, but generally dry out later in the year and are suitable for ground based equipment operations when dry or frozen.

Map Unit 735 includes poorly drained Tetonville-Blossberg soils that are seasonally flooded during spring runoff support wetland and riparian vegetation. The wetland sites occur adjacent to segments of Dick Creek and has limited areas too small to map. These soils are subject to rutting and compaction except during winter or late season drier periods depending on the rainfall received. These alluvial soils support mainly a complex of riparian shrubs, deep sod with sedges and some aspen and spruce. The deep sod provides a buffer that traps sediment.

A recent 17 acre permit harvest was completed in 2006 mainly on snow in the Jones section and operations were consistent with BMP and resulted in minimal soil impacts on less than 10% of the unit. Historic harvest effects have largely recovered with few major skid trails still apparent on less than 15% of the old units. Historic skid trails were vegetated and no BMP restoration needs for past harvest areas were identified. Previous harvest sites across the project parcels are well regenerated to conifer species. On all sites reviewed, there are moderate levels of existing downed course woody debris across the proposed harvest areas, similar to historic conditions established by Graham et al. (1994)

Soil Interpretations Table S1 Shoup Partial Section 36, T16N, R13W & Jones Section 16, T15N, R12W						
Map Unit	**Mapping Unit Name**	**Soil Description**	**Erosion Potential**	**Displacement hazard**	**Compaction Hazard**	Notes
371 C/E Jones	Wildgen-Yreka gravelly loams, 2 to 25 % slopes	Deep Glacial Till & colluvium	Low / Mod	Mod	Mod	Average season of use,
735 Jones	Tetonville-Blossberg Loams 0-4% slopes Rarely Flooded	Poorly drained, Silty clay loam calcareous subsoils	Mod	Ruts Easily	Severe , winter operation only based on site review	Mark & maintain wetland/SMZ zone as field verified Aspen Recovery site
71C/E Shoup	Winfall gravelly loam, on 2 to 25 % slopes of foothills & mtnsides	16" gr. loam surface over deep gravelly Glacial till & colluvium	Low / Mod	Mod	Mod	Dry site, .Long season of use , High plant competition
171 C/E Shoup	Winfall-Rumblecreek gravelly loams, 2 to 25 % slopes of foothills & mtnsides	Deep glacial till & colluvium Rumblecreek soil has higher clay content subsoils	Low / Mod	Mod	Mod	Long season of use mod-high plant competition, includes some minor wetlands
Map Unit	**Mapping Unit Name**	**Soil Description**	**Erosion Potential**	**Displacement hazard**	**Compaction Hazard**	Notes
486F NW Shoup	Tevis gravelly loam, 35 to 60 % slopes of foothills & mtnsides	4-9" gr loam Volcanic ash surface, over deep ext gr loam till & colluvium	Mod to high on slopes >45%	Mod to high on slopes >45%	Mod when wet	Limit ground skidding to slopes less than 45%. Avoid displacement by season of use skid trail planning
699D NW Shoup	Bignell gravelly loam, 8 to 15 % slopes Old valley deposits	8-13" gr clay loam topsoil over deep vgr clay loams	Low / Mod	Mod	Severe when wet	Average season of use, check soil moisture prior to operations
883F NW Shoup	Crow-Bignell complex, moist, 25 to 50 % slopes Old valley deposits	4-7" clay loam topsoil over deep clay rich subsoils from volcanics	Mod to high on slopes >45%	Ruts Easily	Severe when wet, clayey subsoils. check soil moisture prior to operations	Limit ground skidding to slopes less than 45%.
41B Range	Perma gravelly loam, 0 to 4 % slopes No operations planned	5-10" dark gr loam topsoil over deep vgr loams, 10-50% gravel and cobbles	Mod	Mod	Mod	Moist productive soil Average season of use.
242C Range	Braziel-Perma gravelly loams on 4 to 8 % slopes No operations planned	5-10" dark gr loam topsoil over deep vgr loams, 10-50% gravel and cobbles	Mod to high on slopes >45%	Mod to high on slopes >45%	Mod	Dry site, .Long season of use , High plant competition

3.4 FISHERIES

Introduction

The 'Shoup Jones' Timber Sale project area includes State Trust Lands within T16N R13W Section 36 and T15N R12W Section 16, which lie within the Lower Monture Creek (6th code HUC number 170102030804) and Dick Creek (6th code HUC number 170102030803) drainages, respectively. Up to 577 acres of total harvest area is proposed through 12 different harvest units within the project area. The project area also includes a primary haul routes that lies within the Dunham Creek (6th code HUC number 170102030802) and Upper Monture Creek (6th code HUC number 170102030801) drainages.

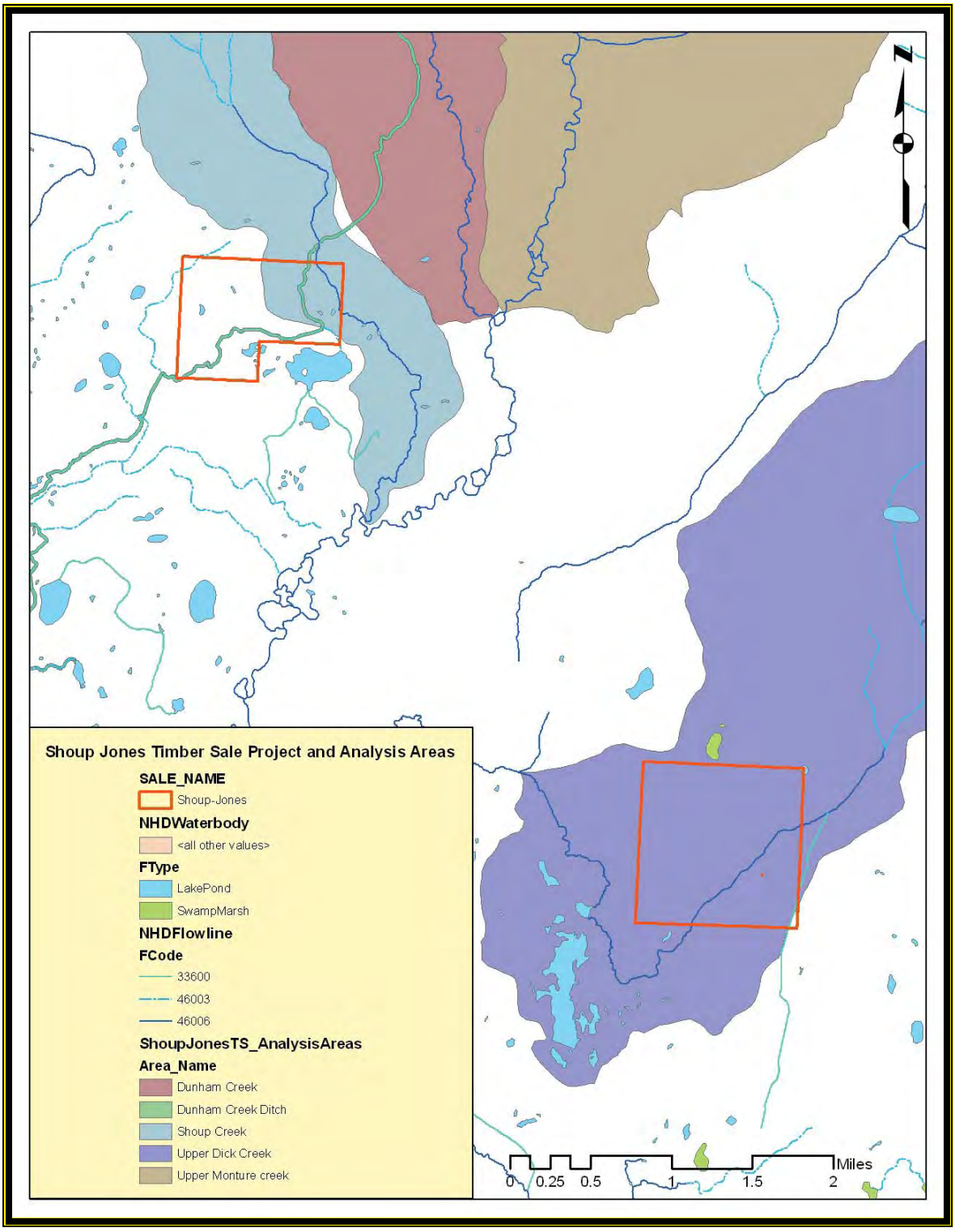
Shoup, Dick, and Dunham creeks adjacent to the project area are not identified on the 2008 Montana 303(d) lists as impaired streams in need of TMDL development. Monture Creek is noted as partially supporting aquatic life and cold water fisheries due to grazing associated impacts.

The Shoup, Dick, Dunham and Monture creek drainages are classified as B-1 in the Montana Surface Water Quality Standards (ARM 17.30.608(b)(i)). The B-1 classification is for multiple beneficial use waters including the growth and propagation of cold-water fisheries and associated aquatic life. Among other criteria for B-1 waters, a 1ºF (0.6ºC) maximum increase above naturally occurring water temperature is allowed within the range of 32ºF to 66ºF (0ºC to 18.9ºC), and no increases are allowed above naturally occurring concentrations of sediment or suspended sediment, which will harm or prove detrimental to fish or other wildlife. In regards to sediment, 'naturally occurring' includes conditions or materials present from runoff or percolation from developed land where all reasonable land, soil and water conservation practices have been applied (ARM 17.30.603(19)). Reasonable practices include methods, measures or practices that protect present and reasonably anticipated beneficial uses (ARM 17.30.603(24)). The State has adopted Forestry Best Management Practices (BMPs) through its Non-point Source Management Plan as the principle means of controlling non-point source pollution from silvicultural activities (Thomas et al 1990).

Fisheries Analysis Areas

Five different analysis areas that contain distinct fisheries distributions were initially identified in order to evaluate the existing and potential impacts to fisheries connected to the project area. These analysis areas are the Shoup Creek watershed, Dunham Creek Ditch, Dunham Creek watershed, Upper Monture Creek watershed and Upper Dick Creek watershed (see Map 1). The initial analysis areas were chosen because they include (1) fish-bearing waterbodies and (2) proposed harvest units and/or associated haul routes. The analysis areas are delineated using 6th code HUC scale or smaller watershed boundaries.

Figure 3-1. Shoup Jones Timber Sale Project and Fisheries Analysis Areas



Species

Native fish species within both the project and analysis areas (see Map 1) include bull trout (*Salvelinus confluentus*), westslope cutthroat trout (*Oncorhynchus clarki lewisi*), and mountain whitefish (*Prosopium williamsoni*). The one introduced, non-native species known to persist within the specific project area is eastern brook trout (*Salvelinus fontinalis*). Other native and non-native species exist in Monture and Dick creeks, but those species are known to persist outside of the identified analysis areas.

The U.S. Fish and Wildlife Service (USFWS) have listed bull trout as "threatened" under the Endangered Species Act. Both bull trout and westslope cutthroat trout are listed as Class-A Montana Animal Species of Concern. A Class-A designation is defined as a species or subspecies that has limited numbers and/or habitats both in Montana and elsewhere in the North America and elimination from Montana would be a significant loss to the gene pool of the species or subspecies ((Montana Fish, Wildlife and Parks (FWP), Montana Natural Heritage Program, and Montana Chapter American Fisheries Society Rankings)). The Department of Natural Resources and Conservation (DNRC) has also identified bull trout and westslope cutthroat trout as sensitive species (ARM 36.11.436).

The fish species that are known to exist within streams or lakes of the five analysis areas are detailed in Table 1.

TABLE 1 – Fish species distribution across analysis areas.

			ANALYSIS AREA				
			Shoup Creek watershed	Dunham Creek Ditch	Dunham Creek watershed	Upper Monture Creek watershed	Upper Dick Creek watershed
SPECIES	native	bull trout			X	X	
		westslope cutthroat trout	X	X	X	X	X
		mountain whitefish				X	
	non-native or introduced	eastern brook trout		X	X	X	X

FISHERIES ISSUES RAISED DURING SCOPING

Issues and concerns, in respect to this environmental analysis, are not specifically defined by either the Montana Environmental Policy Act (MEPA) or the Council on Environmental Quality. For the purposes of this environmental analysis, issues and concerns will be considered actual or perceived effects, risks, or hazards as a result of the proposed alternatives.

Three written comments regarding fisheries resources were raised through public participation during the scoping process. The three written comments are: (1) sediment generating activities should be minimized on Shoup Creek, (2) Dick Creek is impaired, and (3) very sensitive riparian timber harvest measures should be employed on Dick Creek.

Issues raised internally include: the proposed actions may adversely affect fisheries habitat features, including channel forms, stream temperature, and connectivity.

Analysis Methods

The existing conditions of fisheries habitat features will be described for each analysis unit under the *EXISTING CONDITIONS* section of this analysis. The *ENVIRONMENTAL EFFECTS* section will compare the existing conditions in each analysis area to the anticipated effects of the proposed No-Action and Action Alternatives to determine the foreseeable impacts to associated fisheries habitat features.

Analysis methods are a function of the types and quality of data available for analysis, which varies among the different analysis areas. The analyses may either be quantitative or qualitative. The best available data for both populations and habitats will be presented separately for the Shoup Creek watershed, Dunham Creek Ditch, Dunham Creek watershed, Upper Monture Creek watershed and Upper Dick Creek watershed analysis areas. In order to adequately address the issues raised in Section 1.4 (Fisheries Issues Raised during Scoping) the existing conditions and foreseeable environmental effects to fisheries in the analysis areas will be explored using the following outline of issues and subissues. Sedimentation will be addressed through an analysis of effects to channel forms. An issue and subissue will only be analyzed if that variable may be impacted by the proposed actions.

- Fisheries Habitat – Channel Forms
    - Fisheries Habitat – Sediment
    - Fisheries Habitat – Flow Regimes
    - Fisheries Habitat – Large Woody Debris
- Habitat – Stream Temperature
    - Fisheries Habitat – Stream Shading
- Habitat – Connectivity
- Existing Collective Impacts and Cumulative Effects

In terms of the risk that an impact may occur, a low risk of an impact means that the impact is unlikely to occur. A moderate risk of an impact means that the impact may or may not (50/50) occur. A high risk of an impact means that the impact is likely to occur.

A very low impact means that the impact is unlikely to be detectable or measurable, and the impact is not likely to be detrimental to the resource. A low impact means that the impact is likely to be detectable or measurable, but the impact is not likely to be detrimental to the resource. A moderate impact means that the impact is likely to be detectable or measurable, and the impact is likely to be moderately detrimental to the resource. A high impact means that the impact is likely to be detectable or measurable, and the impact is likely to be highly detrimental to the resource.

ALTERNATIVES

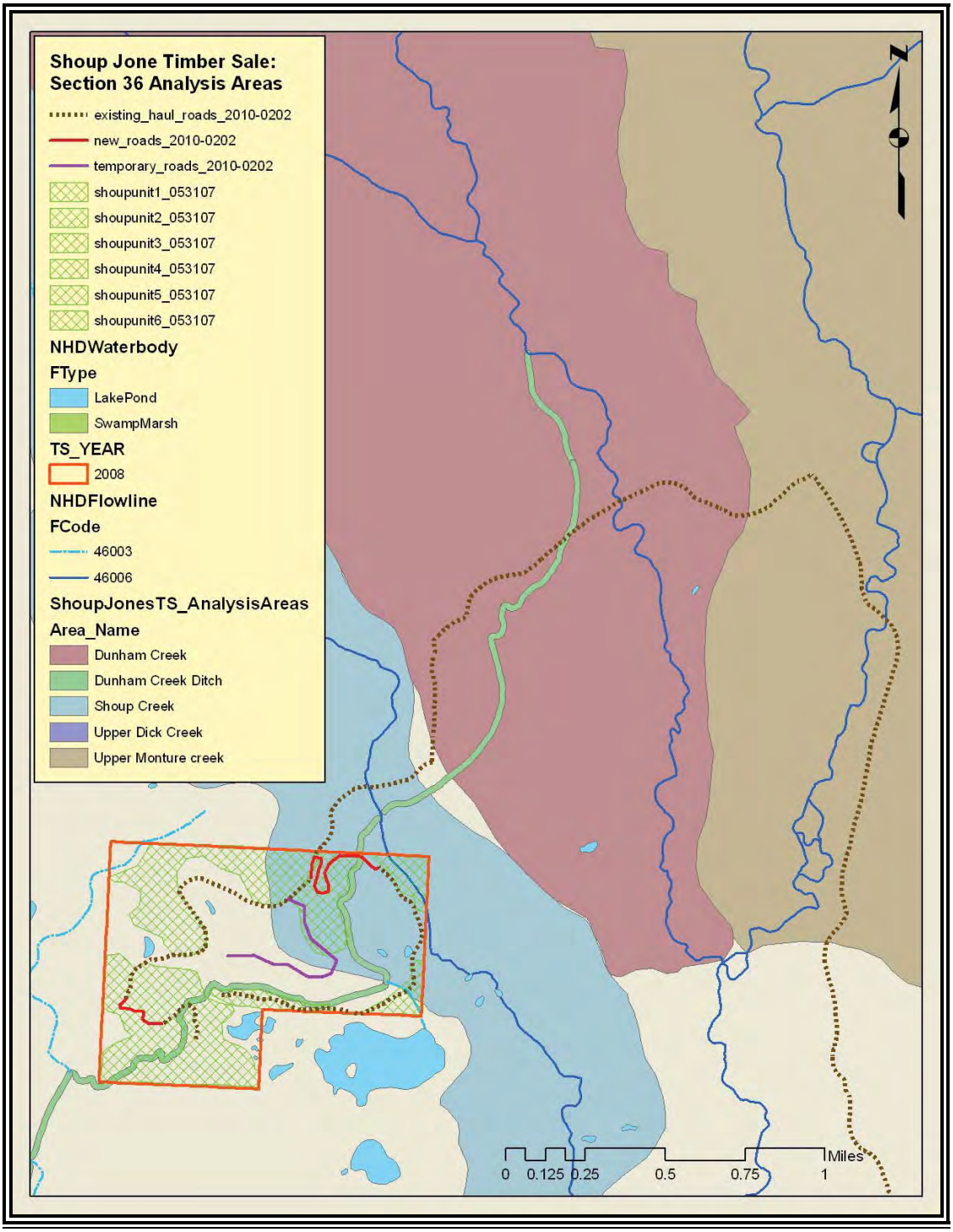
See *CHAPTER II – ALTERNATIVES in the SHOUP JONES TIMBER SALE PROJECT ENVIRONMENTAL ANALYSIS* for detailed information, specific mitigations, and road-management plans pertaining to the No-Action and Action Alternatives.

PROPOSED ACTION ALTERNATIVE AND RELATED MITIGATIONS

The proposed Action Alternative includes approximately 12 harvest units, which are primarily interconnected with the Shoup Creek watershed, Dunham Creek Ditch and Upper Dick Creek watershed analysis areas. Up to 705 acres of total harvest area is proposed within the harvest units.

Fisheries related resource mitigations that would be implemented with the proposed Action Alternative include: (1) applying all applicable Forestry BMPs (including the SMZ Law and Rules) and Forest Management Administrative Rules for fisheries, soils, and wetland riparian management zones (ARMs 36.11.425 and 36.11.426), (2) applying the SMZ Law and Rules to all non-fish-bearing streams and lakes, and (3) monitoring all road-stream crossings for sedimentation and deterioration of road prism.

FIGURE 3-3. SHOUP JONES TIMBER SALE-SECTION 36 ANALYSIS AREAS



SHOUP CREEK ANALYSIS AREA – EXISTING CONDITIONS

Shoup Creek historically contained westslope cutthroat trout throughout perennial streams within the entire watershed. The mainstem of the stream is now entirely intercepted by the Dunham Creek Ditch just north of the NE1/4 NE1/4 T16N R13W Section 36 (see Map 2.) Below the Dunham Creek Ditch

junction all fish habitats of Shoup Creek have been eliminated due to dewatering of the channel. Fish-bearing reaches of Shoup Creek therefore do not exist within the Section 16 portion of the project area. The Dunham Creek Ditch interception creates a very high impact to westslope cutthroat trout fisheries in the Shoup Creek analysis area, and the habitat disruption puts the upstream population at high risk of long-term extirpation.

Non-native eastern brook trout and hybridized westslope cutthroat trout that may be connected to the stream through Dunham Creek Ditch may also pose additional risks to the upstream population of westslope cutthroat trout.

Due to the existing conditions described above, the only proposed actions that may affect westslope cutthroat trout in Shoup Creek are associated with the use of a haul road that crosses Shoup Creek approximately 400 feet upstream of the Dunham Creek Ditch junction. The potentially affected habitat variables include channel forms through modifications of sediment and habitat connectivity.

Shoup Creek between the haul road crossing and the downstream junction with Dunham Creek Ditch has an average bankfull width of 5 feet (range: 3 - 6 feet) and a gravel dominated substrate with smaller amounts of silts, sands and cobbles. Channel gradients range from 2 – 5 percent. Cattle grazing has led to increased streambank instability and consequent abnormally high sedimentation to the stream channel. The sedimentation has led to fine sediment aggradation in fish habitats, which is resulting in decreased quality and quantity of wintering and spawning habitats. Stream channel morphology is also exhibiting some levels of disequilibrium; impacts to fish habitats may be exacerbated by the stream channel changing from a Rosgen F4/G4 channel type back to a B4/B3 channel type. Moderate impacts to sediments translate to moderate existing impacts to channel forms in this affected reaches of the Shoup Creek analysis area.

Approximately five road-stream culvert crossings exist on Shoup Creek upstream of the Dunham Creek Ditch junction. The three lowest culvert crossings are all barriers to juvenile fish passage, and all three crossings either limit adult fish passage to low and/or moderate flows or prevent passage completely. The culvert crossing of Shoup Creek by the haul route is an 18 inch round culvert that limits adults fish passage to low and moderate flows. The limited connectivity within the remaining reaches of available habitat presents a moderate to high existing impact.

Considerations for existing cumulative effects include: major channel habitat dewatering, moderate impacts to channel forms due to grazing, and moderate to high impacts to habitat connectivity. High existing cumulative impacts to westslope cutthroat trout consequently exist in Shoup Creek.

SHOUP CREEK ANALYSIS AREA – ENVIRONMENTAL EFFECTS

- NO-ACTION ALTERNATIVE: No direct or indirect impacts would occur beyond those described in Existing Conditions. No additional cumulative effects would be expected beyond those described in Existing Conditions.

- ACTION ALTERNATIVE: According to the Hydrology Analysis, use of the haul road across Shoup Creek presents a low risk of low direct and indirect impacts to the sediment component of Shoup Creek. The risks would be mitigated due to the construction of road drain dips and the armoring of the road prism adjacent to the existing culvert crossing.

  No direct or indirect impacts to connectivity would occur beyond those described in Existing Condition.

  Considerations for cumulative effects to fisheries include: long-term potential sedimentation to Shoup Creek from the adjacent haul route would be slightly decreased due to the addition of drain dips and armoring. The Action Alternative is expected to have minor positive cumulative impacts to fisheries in the analysis area.

DUNHAM CREEK DITCH ANALYSIS AREA – EXISTING CONDITIONS

Dunham Creek Ditch, as its name implies originates at a diversion on Dunham Creek. The ditch terminates in a small pond approximately 7.0 miles from Dunham Creek. Although the ditch does not provide any functional return flow to fish-bearing waterbodies, the ditch is defined as an 'other body of water' for management purposes.

Westslope cutthroat trout and eastern brook trout inhabit the ditch in low numbers. Fisheries habitat is poor; wintering, spawning and rearing habitats are very limited in quantity and quality. The ditch is designed and maintained as a uniform trapezoidal channel composed of fine substrates in order to efficiently transport water. Channel forms are not an analysis consideration since the ditch sediments are designed to be uniformly fine, flow regimes are regulated, and large woody debris is routinely cleared from the ditch for management purposes.

Due to the existing conditions described above, the only proposed actions that may affect westslope cutthroat trout in the Dunham Creek Ditch are those associated with 'stream' shading removal adjacent to the ditch. The potentially affected habitat variable is 'stream' temperature.

Since the ditch is not a natural watercourse, existing impacts to the fisheries variable of 'stream' temperature are unknown and negligible.

Considerations for existing cumulative effects to fisheries resources are also unknown and negligible. No existing cumulative impacts to fisheries consequently exist in Dunham Creek Ditch.

DUNHAM CREEK DITCH ANALYSIS AREA – ENVIRONMENTAL EFFECTS

- NO-ACTION ALTERNATIVE: No direct or indirect impacts would occur beyond those described in Existing Conditions. No additional cumulative effects would be expected beyond those described in Existing Conditions.

- ACTION ALTERNATIVE: Class 3 SMZ harvest restrictions would be implemented along ~1.3 miles of the Dunham Creek Ditch, or along ~19 percent of the total ditch length. Class 3 SMZ harvest restrictions include the retention of submerchantable trees and shrubs. Since most trees in the affected area within 25 feet of the ditch would be harvested, an estimated 25 – 75 percent of 'stream' shading to the ditch would be removed. This estimated amount of shade removal is expected to lead to an increase in peak seasonal 'stream' temperature in the ditch between 0.1 and 3.0 ºC. This increase in peak seasonal stream temperature is expected to have a moderate risk of low direct and indirect impacts to eastern brook trout and a moderate risk of moderate direct and indirect impacts to westslope cutthroat trout.

  Considerations for cumulative effects to fisheries include: an increase in 'stream' temperature. The action alternative is expected to have a moderate risk of moderate cumulative impacts to fisheries in the analysis area.

DUNHAM CREEK AND UPPER MONTURE CREEK ANALYSIS AREAS – EXISTING CONDITIONS

Both Dunham Creek and Upper Monture Creek provide habitat for westslope cutthroat trout, bull trout and eastern brook trout. Both streams provide wintering, spawning, and rearing habitats for these three species, however, Dunham Creek primarily provides rearing habitat for bull trout. Upper Monture Creek is considered critical habitat for federal bull trout recovery actions.

The proposed action that may affect fisheries and fish habitat in the Dunham Creek and Upper Monture Creek analysis areas is the use of a haul road that crosses each stream at a single location. The potentially affected habitat variable is channel forms through modifications of sediment.

The existing crossing structures on both creeks are bridges. The proposed haul route utilizing the bridges is an open public road that receives a moderate level of year-round vehicle and truck traffic. The existing bridge structures are made of solid decking materials and the raised decks are designed to move water and potential sediment away from the stream channels. A low risk of low existing impacts to stream sediments exists at both bridge crossings.

Considerations for existing cumulative effects include: past and present low impacts to stream sediments exist at both bridge crossings. Low existing cumulative impacts to fisheries consequently exist in the two analysis areas.

DUNHAM CREEK AND UPPER MONTURE CREEK ANALYSIS AREAS – ENVIRONMENTAL EFFECTS

- NO-ACTION ALTERNATIVE: No direct or indirect impacts would occur beyond those described in Existing Conditions. No additional cumulative effects would be expected beyond those described in Existing Conditions.

- ACTION ALTERNATIVE: All hauling associated with timber harvest in Section 36 will utilize a haul route that crosses both Dunham Creek and Upper Monture Creek at a single bridge location. According to the Hydrology Analysis, use of the haul road across both creeks presents a low risk of low direct and indirect impacts to the sediment component of both creeks. The risks would be mitigated by implementing any required Forestry BMPs.

  Considerations for cumulative effects to fisheries include: continued use of both bridges on the haul route as part of a year-round open public road, and a small, temporary increase in the traffic volume (due to timber hauling from Section 36) at the two bridge crossings. The action alternative is expected to have a low risk of low cumulative impacts to fisheries in the analysis area.

UPPER DICK CREEK ANALYSIS AREA – EXISTING CONDITIONS

Upper Dick Creek provides habitat to a population of genetically pure westslope cutthroat trout.
The existing conditions of channel forms in fish-bearing reaches will be addressed by evaluating the collective characteristics of sediment, flow regime, and large woody debris features. Considering stream morphology and type, coarse filter surveys of the fish-bearing reaches have found that relative proportions of substrates comprising stream channel forms appear to be representative of the expected ranges of substrates that would be found in unmanaged watersheds. However, low levels of streambank instability have been observed (see Hydrology Analysis), which appears to have led to low levels of aggradation and associated increases in channel width-to-depth ratios. Impacts to streambeds and streambanks from cattle grazing are apparent in different reaches of Dick Creek on Section 16 and on other land ownerships. Due to the past failures of at least 1 native materials bridge in the analysis area, the Hydrology Analysis has estimated that low to moderate levels of road material are currently contributed to the mainstem channel of Dick Creek in the analysis area. The Hydrology Analysis has determined that there is no existing departure in flow regime in the analysis area.

Riparian stand characteristics have the greatest influence on potential large woody debris recruitment. Two proposed harvest units may have limited riparian timber harvest: Jones Units 3 and 4 (see Map 3). The potentially affected riparian areas of these two units will be the focus of this environmental assessment. The following (1) existing riparian stand characteristics and (2) existing adjacent in-stream large woody debris frequencies were observed:

- JONES UNIT 3
  - basal area = 158.0 square feet per acre
  - trees per acre = 223
  - quadratic mean diameter = 11.4 inches
  - co-dominant tree species = Ponderosa pine, Douglas fir
  - site potential tree height at 100 years = 89 feet

    - average in-stream large woody debris frequency = 35 pieces per 1000 feet
- JONES UNIT 4
    - basal area = 142.7 square feet per acre
    - trees per acre = 265
    - quadratic mean diameter = 9.9 inches
    - co-dominant tree species = Englemann spruce, Douglas fir
    - site potential tree height at 100 years = 75 feet
    - average in-stream large woody debris frequency = 69 pieces per 1000 feet

The zone of recruitable large woody debris is defined in this project as the lateral distance from the streambank to a point equal to the average site potential tree height at 100 years for dominant and co-dominant tree species in the project area. The average in-stream large woody debris frequencies found in reference reaches (Rosgen B channel types) throughout the Helena National Forest and Bitterroot/Lolo National Forest regions are 51 (range: 5 – 190) and 64 (range: 17 – 88), respectively, pieces per 1000 feet (Bower 2009). The existing frequency of large woody debris is below average adjacent to Jones Unit 3 and slightly above average adjacent to Jones Unit 4, and both amounts are within the measured ranges of frequencies.

Considering existing sediment conditions and road erosion, flow regime, and the extent of potential impacts to large woody debris recruitment, moderate overall impacts to channel forms currently exist in the analysis area. These impacts are primarily a result of impacts to existing sediment conditions.

Although many different variables affect the natural fluctuations and ranges of stream temperatures (e.g. groundwater inflows, loss of flow, stream gradient, stream width to depth ratio, volume), stream shading is the variable that typically has the greatest affect on stream temperatures in headwater streams and is also the variable most likely affected by management activities. Existing levels of shade adjacent to the two proposed harvest units were assessed by measuring angular canopy density during June, July and August; the months during which Dick Creek may potentially experience an increase in peak seasonal stream temperatures due to reductions in shade (see Table 2). Adjacent to both of the proposed harvest units average stream shading increases as the summer season progresses, which is also consistent with the track of the sun continuing to be lower in the sky and direct solar radiation increasingly intercepted by riparian vegetation. Average stream shading is slightly lower adjacent to Jones Unit 3 (compared to Jones Unit 4) which also has slightly lower trees per acre.

Existing stream temperatures were also monitored during 2006, 2007 and 2008 adjacent to Jones Unit 4. The highest recorded temperature within the reach was 11.5 ºC during both 2006 and 2007, and the average change in peak seasonal temperature (mean weekly maximum temperature) through the reach was +1.1 ºC. The change in peak seasonal temperature through the reach ranged from +0.6ºC to +1.6 ºC during the three monitoring years.

Based on this assessment, no apparent impacts to stream temperature exist in the analysis area.

TABLE 2 – Percent stream shade adjacent to proposed harvest units in Upper Dick Creek analysis area.

		PERCENT STREAM SHADE					
		JUNE / RANGE	**JUNE / AVERAGE**	JULY / RANGE	**JULY / AVERAGE**	AUGUST / RANGE	**AUGUST / AVERAGE**
ADJACENT PROPOSED HARVEST UNIT	**Jones Unit 3**	44% - 94%	**78%**	49% - 100%	**81%**	64% - 88%	**82%**
	Jones Unit 4	73% - 95%	**86%**	84% - 95%	**89%**	88% - 95%	**92%**

Considerations for existing cumulative effects include: dewatering at multiple irrigation diversions, moderate impacts to channel forms due to grazing, impacts to habitat connectivity from road-stream crossings and irrigation diversions. Moderate existing cumulative impacts to westslope cutthroat trout consequently exist in Upper Dick Creek.

UPPER DICK CREEK ANALYSIS AREA – ENVIRONMENTAL EFFECTS

- NO-ACTION ALTERNATIVE: No direct or indirect impacts would occur beyond those described in Existing Conditions. No additional cumulative effects would be expected beyond those described in Existing Conditions.

- ACTION ALTERNATIVE: According to the Hydrology Analysis, upland and riparian management zone harvest activities adjacent to Jones Units 3 and 4 presents a low risk of low additional direct and indirect impacts to the sediment component of Dick Creek. The risks would be mitigated through application of SMZ Rules and Forestry BMPs.

  A failing native materials bridge in the analysis area would be rehabilitated and stabilized, which will greatly reduce long-term sedimentation from the site to Dick Creek. A short-term increase in sedimentation is expected to occur as an inevitable result of the site rehabilitation process.

  According to the Hydrology Analysis, potential impacts to flow regime in the analysis area are not expected to be detectable or measurable.

  Riparian harvest is proposed along approximately 1900 feet of Dick Creek adjacent to Jones Unit 3 and along approximately 300 feet of Dick Creek adjacent to Jones Unit 4, which is equal to approximately 2 percent of the total linear riparian area adjacent to potential fish-bearing reaches in the analysis area. Following are the potential maximum changes in riparian stand characteristics following the proposed riparian harvest:
    - JONES UNIT 3
      - basal area = 81.5 square feet per acre (48% decrease)
      - trees per acre = 148 (34% decrease)
      - quadratic mean diameter = 10.1 inches (11% decrease)
      - co-dominant tree species= ponderosa pine, Douglas-fir

    - JONES UNIT 4
      - basal area = 51.6 square feet per acre (64% decrease)

- trees per acre = 225 (15% decrease)
- quadratic mean diameter = 6.5 inches (34% decrease)
- co-dominant tree species= Englemann spruce, Douglas-fir

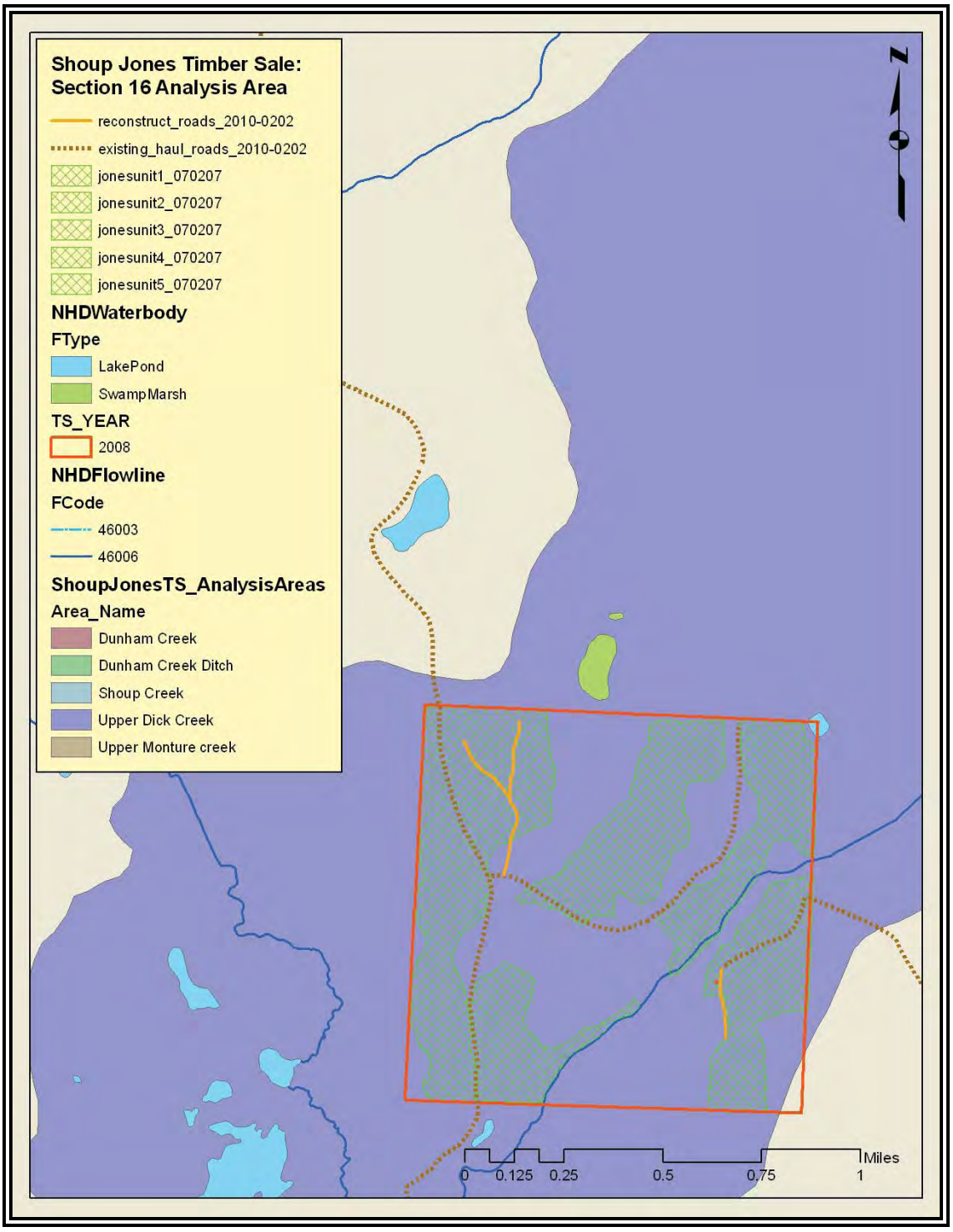
Large woody debris frequencies are expected to fluctuate after implementing the proposed riparian harvest. In the short-term, in-stream large woody debris frequencies may rise due to an expected increase in riparian blowdown. Long-term frequencies are first expected to be lower as potential amounts of recruitable large woody debris are reduced through the proposed riparian harvest and blowdown, but long-term frequencies will also rebound and potentially exceed existing conditions as regeneration within the riparian area may exceed the existing riparian stand characteristics.

Considering impacts from sedimentation, flow regime and large woody debris, a low risk of low impacts to channel forms is expected during both the short- and long-terms.

The proposed riparian harvest would occur on the northwest side of Dick Creek. After an evaluation of potential changes in riparian stand characteristics, stream shading is expected to decrease (short-term) a maximum of 30 percent during the period of peak seasonal stream temperatures. Assuming peak seasonal stream temperatures also rise proportionally across the affected area, a slight increase in peak seasonal stream temperatures may occur in Dick Creek within the project area, but this increase is not expected to exceed water quality standards for B-1 waters (>0.6 ºC). This potential increase in peak seasonal stream temperature is also expected to be within the range of temperatures throughout the historic habitats and distribution of westslope cutthroat trout in the region. Long-term, stream shading is expected to rebound and potentially exceed existing conditions as regeneration within the riparian area may exceed the existing riparian stand characteristics.

Considerations for cumulative effects to fisheries include: long-term potential sedimentation to Dick Creek from a failing native materials bridge site would greatly decrease, cattle grazing impacts to Dick Creek are expected to remain the same or increase, and fish habitat connectivity may stay the same or improve as a result of an irrigation diversion modification in Section 16. Considering all potential effects the Action Alternative is not expected to yield a net positive or negative cumulative impact to fisheries in the analysis area.

FIGURE 3-3. SHOUP JONES TIMBER SALE – SECTION 16 ANALYSIS AREAS



3.5 WILDLIFE

3.5.1 Threatened and Endangered Species – Grizzly Bear (Federally threatened)

Issue: The proposed action may negatively impact threatened and endangered species, including grizzly bears.

Grizzly bears are the largest terrestrial predators in North America, feasting upon deer, rodents, fish, roots and berries, as well as a wide assortment of vegetation (Hewitt and Robbins 1996). Depending upon climate, abundance of food, and cover distribution, home ranges for male grizzly bears in northwest Montana can range from 60 - 500 mi^2 (Waller and Mace 1997). The search for food drives grizzly bear movement, with bears moving from low elevations in spring to higher elevations in fall, as fruits ripen throughout the year. However, in their pursuit of food, grizzly bears can be negatively impacted through open roads (Kasworm and Manley 1990). Such impacts are manifested through habitat avoidance, poaching, and vehicle collisions.

The Shoup parcel is immediately adjacent to the Northern Continental Divide Ecosystem grizzly bear recovery area, while the Jones parcel is approximately 2 miles south of the boundary. Both parcels receive use by this species due to the abundant wetlands on Shoup, and wetlands in the northern portion of Jones. Additionally, the nearby Blackfoot Clearwater Wildlife Management Area (hereafter Game Range) and Baldy Mountain, have had repeated grizzly bear activity in recent years (J. Jonkel, MT FWP, personal communication, 2003). Thus, the proposed project area may be part of one or more grizzly bear home ranges. Therefore, the cumulative effects analysis area for grizzly bears encompasses 199 square miles (127,439 acres), including portions of the Game Range, McCabe and Dunham Creeks.

Grizzly bears are known to be more vulnerable to human interaction in areas with high open road densities or ineffective road closures. Currently there are 0.66 miles of open road per square mile (simple linear calculation; 131 miles of open road), and 2.46 total miles of road per square mile (490 miles of road), within the 199 square mile grizzly bear analysis area. Within the project area, there are approximately 2.61 miles of open road per square mile (project area is approximately 1.61 square miles), all of which are located in the Jones parcel (open road density of 4.2 miles of open road per square mile), and approximately 5.68 miles of total road per square mile (simple linear calculation).

Sensitive Species

Issue: The proposed action may negatively impact sensitive species, including bald eagles, flammulated owls, pileated woodpeckers, fishers, and common loons.

3.5.2 Bald Eagle

Bald eagles typically nest and roost in large diameter trees within 1 mile of open water. They are sensitive to a variety of human caused disturbances, ranging from residential activities to resource use and heavy equipment operation, among others (Montana Bald Eagle Working Group 1994). Bald eagle response to such activities may range from spatial and temporal avoidance of disturbance activities to total reproductive failure and abandonment of breeding areas (MBEWG 1994). While foraging, they typically perch within 500 m of shoreline habitat (Mersmann 1989); and roost in trees ranging in diameter from 12 to 39 inches and 49 to 200 feet in height (Stalmaster 1987). Eagles are generally associated with aquatic foraging habitat. However, roost trees are located away from houses and roads throughout their range (Buehler 2000).

There are two bald eagle territories located near the project area. The James Lake territory has three known nests, with the nearest nest located approximately 650 m southeast of the Shoup parcel. The Dick Creek territory has three nests, with two of the nests located between 600 and 975 m to the west of the Jones parcel, and the third nest is located in the southwest corner of the Jones parcel. Since 1996, the Dick Creek eagles have used three nests, and only two of those nests have been successful at fledging young. In 2004, the eagles on this territory unsuccessfully utilized the nest on DNRC's Jones parcel. Since 2005, the nest on the west side of Jones Lake, approximately 975 m from the Jones parcel, has

been utilized, and has successfully fledged young every year since 2006. The 2004 nest, located on the affected Jones parcel, is located at the bottom of a sharp drop off, amongst a stand of mature ponderosa pine with Douglas-fir and aspen nearby. Additionally, a forest road is located approximately 75 m northeast of the 2004 nest.

3.5.3 Pileated Woodpecker

The pileated woodpecker is one of the largest woodpeckers in North America (15-19 inches in length), feeding primarily on carpenter ants (*Camponotus* spp.) and woodboring beetle larvae (Bull and Jackson 1995). The pileated woodpecker nests and roosts in larger diameter snags, typically in mature to old-growth forest stands (Bull et al. 1992McClelland et al. 1979). Due primarily to its large size, pileated woodpeckers require nest snags averaging 29 inches dbh, but have been known to nest in snags as small as 15 inches dbh in Montana (McClelland 1979). Pairs of pileated woodpeckers excavate 2-3 snags for potential nesting sites each year (Bull and Jackson 1995). Snags used for roosting are slightly smaller, averaging 27 inches dbh (Bull et al. 1992). Overall, McClelland (1979) found pileated woodpeckers to nest and roost primarily in western larch, ponderosa pine, and black cottonwood. The primary prey of pileated woodpeckers, carpenter ants, tend to prefer western larch logs with a large end diameter greater than 20 inches (Torgersen and Bull 1995). Thus, pileated woodpeckers generally prefer western larch and ponderosa pine snags > 15 inches dbh for nesting and roosting, and would likely feed on downed larch logs with a large end diameter greater than 20 inches.

The most abundant habitat type (Pfister et al. 1977) within the affected area is Douglas-fir/dwarf huckleberry (Stand Level Inventory database). Within the affected parcels, there are approximately 339 acres that are predominately ponderosa pine or western larch, with average stand diameter $\geq$ 15 inches dbh that would be considered suitable pileated woodpecker habitat (crown cover $\geq$ 40%; SLI database). Approximately 122 acres are on the Jones parcel, and approximately and approximately 217 acres on the Shoup parcel. The cumulative effects analysis area will encompass the project area and a one mile radius surrounding each affected School Trust parcels. Pileated woodpeckers have been seen and/or heard throughout the project area during several field visits (M. McGrath, Wildlife Biologist, personal observations).

3.5.4 Fisher

The fisher is a medium-sized animal belonging to the weasel family. Fishers prefer dense, lowland spruce-fir forests with high canopy closure, and avoid forests with little overhead cover and open areas (Powell 1978, Powell 1977, Kelly 1977, Clem 1977, Coulter 1966). For resting and denning, fishers typically use hollow trees, logs and stumps, brush piles, and holes in the ground (Coulter 1966, Powell 1977).

Within a 1-mile radius of the project area, there are approximately 1,515 acres of fisher preferred habitat types, with approximately 568 acres on School Trust parcels. Of these acres, approximately 389 acres occur within the project area.

3.5.5 Flamulated Owl

The flammulated owl is a tiny forest owl that inhabits warm-dry ponderosa pine and cool-dry Douglas-fir forests in the western United States and is a secondary cavity nester. Nest trees in 2 Oregon studies were 22-28 inches dbh (McCallum 1994). Habitats used have open to moderate canopy closure (30 to 50%) with at least 2 canopy layers, and are often adjacent to small clearings. It subsists primarily on insects and is considered a sensitive species in Montana. Periodic underburns may contribute to increasing habitat suitability for flammulated owls because low intensity fires would reduce understory density of seedlings and saplings, while periodically stimulating shrub growth. Within the project area there are approximately 764 acres of flammulated owl preferred habitat types.

3.5.6 Common Loon

The common loon is present in the analysis area, with loons nesting in the northwest corner of Shoup Lake. Common loons are sensitive to disturbance during nesting. During incubation, the birds will often leave the nest if people approach (either on land or in boats) within 150 yards of the nest. While the adult is off the nest, the eggs are exposed to heating, cooling, and predators. If repeated disturbance keeps the loons off the nest for more than an hour, the pair would almost always abandon the nest. Additionally, loons are visual hunters, and clear water is essential for their success in an area. Turbidity resulting from eutrophication is a long-term threat to the loon's existence in the analysis area.

3.5.7 Big Game

Densely stocked thickets of conifer regeneration and overstocked mature stands provide thermal protection and hiding cover for deer and elk in winter, which can reduce energy expenditures and stress associated with cold temperatures, wind, and human-caused disturbance. Additionally, extensive (e.g., ≥250 acres) areas of forest cover ≥0.5 miles from open roads serve as security for elk. Areas with densely stocked mature trees are also important for snow interception, which makes travel and foraging less stressful for deer and elk during periods when snow is deep. Dense stands that are well connected provide for animal movements across wintering areas during periods with deep snow, which improves their ability to find forage and shelter under varied environmental conditions. Thus, removing cover that is important for wintering deer and elk through forest management activities can increase their energy expenditures and stress in winter. Reductions in cover could ultimately result in a reduction in winter range carrying capacity and subsequent increases in winter mortality within local deer and elk herds.

The project area contains winter range for white-tailed deer, mule deer, and elk, while lying just outside of mapped critical winter range for elk. Additionally, the northern portion of the Shoup parcel contains summer habitat for elk (Montana Fish, Wildlife & Parks distribution maps for white-tailed deer, mule deer, and elk). Within the approximately 84,661 acre cumulative effects analysis area, as defined by a surrounding contiguous block of elk winter range, there is approximately 84,661 acres of elk winter range, approximately 38,048 acres of which is designated as critical elk winter range. Within the same analysis area, there are approximately 52,976 acres of mule deer winter range, and 26,270 acres of white-tailed deer winter range. Within the project area, the entirety of both parcels contain elk winter range, there are 961 acres of mule deer winter range on both parcels combined (all of Jones parcel, and all but approximately 69 acres of the Shoup parcel), and there are approximately 848 acres of white-tailed deer winter range on both parcels combined (359 ac on Shoup, 489 ac on Jones). Additionally, there is no security cover within the project area due to either an abundance of open roads within the parcel (i.e., Jones parcel) or insufficient area for habitat >0.5 mile away from an open road (i.e., Shoup parcel). Within the project area, there are approximately 824 acres of densely canopied forest (Shoup parcel: 394 ac; Jones parcel: 430 ac), which could provide snow-intercept, and possibly thermal cover for deer and elk. Additionally, grazing has historically occurred on both parcels, with 59 AUMs on the Shoup parcel, and 169 AUMs on the Jones parcel.

3.5.8 Great Gray Owl

Great gray owls forage upon a variety of rodents, including: voles, pocket gophers, shrews, moles, deer mice, and red squirrels (Bull and Duncan 1993). They are primarily a rodent specialist that favors areas near bogs, forest edge, montane meadows, and other openings. Like many other owl species, great gray owls do not build their own nests, they must use existing platforms constructed by other raptors (e.g., northern goshawks, red-tailed hawks) or native materials (e.g., broken-top snags, mistletoe brooms). Because this species must rely upon nests of other species and the availability of natural structures, the habitat surrounding great gray owl nest sites is also variable. However, given habitat needs of red-tailed hawks and northern goshawks, as well as the size of trees necessary to provide the area for a family of owls on a mistletoe broom or broken-top snag, many of the nests (47 of 49; 96%) in a study in northeastern Oregon were located in stands with ≥ 2 canopy layers and a canopy closure > 60% at most nests (Bull, Evelyn L. and Henjum, Mark G. 1990). While not encountered by project personnel, great gray owls have been reported nesting on the Jones parcel by adjacent landowners.

3.5.9 Northern Goshawk

The northern goshawk (hereafter goshawk) is a forest habitat generalist with specific nesting habitat requirements (McGrath et al. 2003, Squires and Reynolds 1997, Reynolds et al. 1992). The goshawk forages on a wide range of species, with the most predominant prey being snowshoe hare, Columbian ground squirrels, red squirrels, blue and ruffed grouse, northern flickers, American robins, gray jays, and Clark's nutcrackers (Squires 2000, Clough 2000, Watson et al. 1998, Cutler et al. 1996, Boal and Mannan 1996, Reynolds et al. 1992). Thus, given the diverse array of prey species, goshawks forage from a diverse array of habitats. However, (Beier and Drennan 1997) found goshawks to forage in areas based primarily on habitat characteristics rather than prey abundance. Beier and Drennan (1997) found goshawks to forage selectively in forests with a high density of large trees, greater canopy closure, high basal area, and relatively open understories. For nest stands, goshawks will nest in pine, fir, and aspen stands on north-facing slopes that are typically in the stem exclusion or understory reinitiation stages of stand development, with higher canopy closure and basal area than available in the surrounding landscape (McGrath et al. 2003, Finn et al. 2002, Clough 2000, Squires and Reynolds 1997, Reynolds et al. 1992). Nests are typically surrounded by stem exclusion and understory reinitiation stands (with canopy closure $\geq$ 50%) within the 74 acres surrounding the nest; higher habitat heterogeneity than the surrounding landscape, and an avoidance of stands in the stand initiation stage of stand development typify habitat in the 205 acres surrounding goshawk nests (McGrath et al. 2003). Goshawk home ranges vary in area from 1,200 to 12,000 acres depending on forest type, prey availability, and intraspecific competition (Squires and Reynolds 1997).

There are two analysis areas for goshawks. The first, surrounding the Jones parcel, is approximately 7,858 acres, and is comprised of approximately 1,772 acres of DNRC, approximately 2,341 acres of Blackfoot Community Conservation Area (BCCA; formerly managed by Plum Creek Timber Company), and the remainder is privately managed. The Shoup analysis area is approximately 12,529 acres, and is comprised of a mixed ownership of U. S. Forest Service (5,694 acres including 2,298 acres formerly managed by Plum Creek), private lands (2,695 ac), DNRC (2,207 ac), the Bandy Ranch (1,821 ac), and the Blackfoot Clearwater Game Range (FWP; 112 ac). Within the Jones analysis area, approximately 1,336 acres would be available for potential nesting habitat (crown cover $\geq$50%, pole or mature forest), with approximately 470 of those acres occurring on the Jones parcel. Previous land management activities by Plum Creek reduced the capacity of the analysis area for potential nest sites. Within the Shoup analysis area, approximately 7,701 acres would be available for potential nesting habitat (crown cover $\geq$50%, pole or mature forest), with approximately 396 of those acres occurring on the Shoup parcel.

3.5.10 Red-tailed Hawk

Red-tailed hawks use nearly every open habitat, from agriculture and grasslands to woodlands and meadows. However, they do not hunt over or beneath closed canopy forests. Breeding begins in March and young are fledged by September. The nest is often high above ground in the tallest tree bordering an open area. Red-tailed hawks feed primarily on small mammals, up to the size of rabbits. Nesting territories range from 0.5 to 3 square miles. While an active nest was not located, based upon the behavioral responses of an adult red-tailed hawk encountered on the Shoup parcel in 2006, a nest is suspected (M. McGrath, DNRC Wildlife Biologist, personal observation).

3.5.11 Gray Wolf

Wolves north of Highway 12 west of Missoula and north of Interstate 90 were removed from protection under the Endangered Species Act on May 4, 2009. Cover, and road and prey densities likely have some influence on wolves. Wolves also have a history of depredating domestic livestock (e.g., cattle, sheep, llamas, etc.). The project area is located near two existing wolf pack territories, the Elevation Mountain pack to the south, and the project area is located within the Ovando Mountain pack's territory. The Elevation Mountain pack's territory is located approximately 10 miles south of the project area, and the number of pack members was reduced through control actions in the summer of 2008 due to a series of cattle depredations on a ranch within their territory. The project area is located within the Ovando

Mountain pack's territory, however, neither affected parcel is located within one mile of the den or rendezvous sites. For cumulative effects analysis, the grizzly bear analysis area will be utilized, which encompasses portions of both packs' territories.

3.6 ECONOMICS

The issue was raised that each of the alternatives may affect revenue to the trust, local industry, and other uses of the area. The Shoup-Jones Project Area is located 2-5 miles north of Ovando, in Powell County. The character of the sale area is rural and the population density of the area is still relatively low. Timber harvest on public and private land has occurred in the area on a regular basis since the 1960's. Three grazing licenses generate annual revenue of approximately $1,781 from the project area. Firewood and other small wood product sales generate additional revenue on a regular basis.

Missoula and Powell Counties have historically provided both manufacturing and recreational pursuits. Manufacturing has historically focused on mining and timber as well as a limited amount of agriculture processing. Recreation has focused on the many lakes and mountains in the region. There are potential purchasers from throughout the state that could be interested in this sale. Missoula County contains one mill that will likely be interested in purchasing timber from this sale. Historically agriculture, ranching, mining and wood manufacturing played a large role in the counties' economic activities. In recent years timber has remained as one of the primary employers. In order to maintain the current level of industry activity, the decreased timber harvest from federal public lands had to be replaced from private timber sources.

3.7 AESTHETICS

Topography within the project area is consistent with valley bottom topography common to the area. The landscapes in the general area are influenced by glaciation with steep glaciated peaks and lower rolling ridges and valleys.

The analysis targeted areas of use such as undeveloped campgrounds and nearby roads to develop the analysis. These areas currently receive the highest amount of public viewing and overall use.

ANALYSIS METHODS

The visual resource analysis was conducted by utilizing methods adapted from the Visual Management System (USDA 1977a, USDA 1977b, USDA 1980a, USDA 1980b), and the Scenery Management System (USDA 1995). Certain select methods from these systems have been used to describe the existing conditions, effects of actions, and mitigations for projects. Information used in this analysis was gathered from field visits, analysis of photographs and area maps as well as the study of landscape patterns in the area.

EXISTING SCENIC INTEGRITY

"Scenic integrity" involves the "state of naturalness or state of disturbance created by human activities or alterations". The project leader has inventoried Section 16 as having a MODERATE scenic integrity level and Section 36 as having a LOW scenic integrity level.

Section 16 is relatively flat with natural openings occurring throughout the section. Ponderosa pine occurs across most of the landscape with scattered western larch and spruce occurring near water features and northfacing slopes. Encroaching Douglas-fir is present in most stands, filling in openings and growing under ponderosa pine. Section 36 consists of benches that are moderately to heavily timbered with occasional wetlands existing in low spots. Generally speaking, timber stands on hillsides facing to the south and west are more open than those facing to the north and east. Slopes range from relatively flat to roughly 70 percent. Section 16 has a county road running east to west through the section. To the north of the county road an open mountain road runs north with lower grade roads forking

off of it. To the south of the county road low grade roads fork off in two different locations. Section 36 is heavily roaded with a primitive road system.

Areas with moderate scenic integrity "appear slightly altered, however, noticeable deviations to the landscape must remain visually subordinate to the overall viewed landscape". Areas with low scenic integrity "appear moderately altered," (likely as a result of past harvests as well as irrigation ditches and the existing roads).

VISUAL ABSORPTION CAPACITY

This area was inventoried to determine its Visual Absorption Capacity or VAC. VAC is defined as the "physical ability of the land to support management activities and to maintain scenic integrity". Factors that aid in determination of the VAC are: the natural forms, lines, colors, and textures; the distance between the project area and the viewpoints; the estimated number of viewers; and the relative sensitivity of those viewers to the scenery around them.

Distance between the project area and the viewpoints is generally categorized into three groups; 1) foreground viewing (distances from the viewer's position out to around mile 2), middle ground viewing (distances from 2- 4 miles from the observer), and background viewing (distances greater than 4 miles from the viewer's position). A subgroup of foreground viewing is the detailed feature landscape within the first few hundred feet of the observer. Positioning the average viewer on the open road system that passes to the north of the Shoup Lake section road system (Section 36) would be classified as middle ground. Positioning the average viewer along the open road system within the Jones Lake parcel (Section 16), harvest units within this section would fall into the foreground viewing class. Many people use this area for camping, hiking, and other recreating.

SCENIC INVENTORY

Often slope impacts the amount of VAC by enhancing any changes in form, line, color, or texture. In the simplest terms, the steeper the slope, the lower the VAC. This means that a harvest prescription that is barely visible on gentle sloping ground can be highly visible when on steep ground.

The inventory gathered includes viewing the project area from the Monture Creek county road. Because the project area lies on gentle slopes and/or a few miles behind locked gates there is minimal opportunity to see the affected area beyond foreground viewing. Therefore it was determined that most of the site has a low VAC.

3.8 AIR QUALITY

Currently small private landowners in the area as well as large public landowners are allowed to burn logging slash. Burning activities conducted by small private burners are monitored by the county where the activity will be carried out. Burning operations conducted by large burners (members of the airshed group) are monitored by the DEQ. Burning activities occur on days where good smoke dispersal has been predicted and burning has been approved by the DEQ/Airshed coordinator. The project area is within airshed 3B.

CHAPTER 4
ENVIRONMENTAL EFFECTS

CHAPTER 4: ENVIRONMENTAL EFFECTS

INTRODUCTION

Chapter 4 describes the environmental effects of each alternative on the resources described in Chapter 3. This Chapter provides the basis for the Summary of Environmental Effects (Table 2-3) in Chapter 2. Cumulative effects from current management and foreseeable future State actions are discussed in this chapter. These include other active timber sales, those in the planning stage, ongoing maintenance, and other uses of the areas being analyzed. Direct, indirect and cumulative effects on the resources being analyzed were considered. Chapter 2 describes the details of each alternative and lists proposed mitigation measures specific to the action alternative.

4.1 PREDICTED EFFECTS ON VEGETATION

4.1.1 Cover Types, Age Class, and Structure

No Action Alternative A – Direct and Indirect Effects to Cover Types, Age Class, and Structure
Under this alternative, there would be no immediate changes to forest species composition, age class, or structure. Natural processes would continue to influence these stand characteristics. In the absence of wildfires, succession would influence both short and long term age class distribution and cover type representation. Small openings would be created in the canopy from periodic bark beetle or other insect and disease mortality in the stands. These are likely to continue to be stocked with younger pole-sized trees. Without duff reduction and soil exposure the regeneration of openings is expected to favor shade tolerant species over seral species. The lack of regeneration under denser canopies would perpetuate the trend of increasing Douglas-fir and mixed conifer cover types over much of the project area. Without fire, the older age classes from 40 years up would continue to dominant the area and no 0-39 age class would be created.

Hardwood cover type stand structure and development would continue to change as a result of damaging agents. Older stands, comprising 56% of the project area, would become more heterogeneous. The mosaic pattern of multi – aged and multi-storied or small even-aged patches are likely to persist with this type of disturbance, resembling the conditions associated with later successional forests.

No Action Alternative A – Cumulative Effects to Cover Types, Age Class, and Structure
Under the No Action Alternative, the Douglas-fir and mixed conifer cover types would continue to increase within the project area and the Clearwater Landscape, at the expense of declining acreage in ponderosa pine and western larch/Douglas-fir cover types. Across the landscape, fire suppression, insect and disease occurrence, and increasing human use may influence cover type and age class distribution to an unknown degree. In the absence of stand replacement fires, variability of age class and cover type distribution would decline.

Alternative B – Direct and Indirect Effects to Cover Types, Age Class, and Structure
As a result of harvesting, site preparation and tree planting activities, desired future condition cover types would be maintained or promoted within the harvest units. With the removal of shade tolerant species (primarily Douglas-fir) combined with retention and regeneration of seral species, ponderosa pine and western larch/Douglas-fir cover types would persist for a longer time. Compared to the existing conditions, this would result in a slight shift towards desired future conditions on the project area.

The average age of all treated stands combined would decrease although some stands would remain in the same age class after harvest, depending on the silvicultural treatment. Units proposed for uneven-aged management would generally move into a younger age class, though all ages of trees would be retained within stands. Units proposed for seed tree or overstory removal would move to the youngest age class. The action alternative would increase the diversity of stand age classes in the project area, adding a young stand component following regeneration harvests. There would be a decrease in the 100-149 and 150+ year age classes (Table 4-1).

Table 4-1: Existing and Predicted Age Class Distribution

Percent of Analysis Area by Age Class Groups (years):				
Analysis Area	00 - 39	40- 99	100 - 149	150+
Shoup-Jones (current)	0	44	49	7
Shoup-Jones (post-harvest)	5	62	27	5
Clearwater Unit (current)*	6	28	35	26
Clearwater Unit (post-harvest)	6	28	35	26

* Approximately 5% of the Clearwater Unit does not have current age class data available

The percentage of multistoried stand structures in the Shoup-Jones area would be reduced from 85% to 83%, Single-storied stands will also be reduced from 15% to 10% and increase the percentage of two-storied stand structures from 0% to 7% (Table 4-2). Overstory tree canopy closure would be reduced on all harvested acres, reducing the percentage of closed canopy stands in the Shoup-Jones area.

Table 4-2: Current and Predicted Proportion (%) of Analysis Area by Stand Structure

	Shoup-Jones Project Area		**Clearwater Unit**	
Stand Structure	***Current***	***Post-Harvest***	***Current***	***Post-Harvest***
Single-storied	15%	10%	28%	28%
Two-storied	0%	7%	14%	11%
Multistoried	85%	83%	61%	61%

*based on 2006 SLI data

Alternative B – Cumulative Effects to Cover Types, Age Class, and Structure

On the Clearwater Unit landscape Alternative B would result in slightly (less than 1% change) decreasing acreage in the mixed conifer cover type and increasing acreage of the western larch/Douglas-fir cover type. Alternative B would increase the proportion of the Clearwater Landscape in the youngest age classes by less than 1% (Table 4-1).

Across the landscape, fire suppression, insect and disease occurrence, and increasing human use may influence cover type, age class, and structure to an unknown degree.

Other ongoing and recently completed timber sale projects on the Clearwater Unit harvest approximately 2,170 acres. Silvicultural prescriptions for these projects were generally designed to retain and promote seral species or to address insect/disease occurrences. The Double Beaver and Buck Finley projects are within the area burned by the Jocko Lakes Fire in 2007. In terms of vegetation management, those sales were designed to mitigate adverse impacts from the fire and restore the forest to its income-generating potential, in addition to capturing the value of dead and dying trees and preventing future value loss. Reforestation activities include the planting of appropriate species for the site (western larch, ponderosa pine, and Douglas-fir) in high-severity burned areas. These projects contributed to the trend toward desirable future conditions across the Clearwater Unit.

4.1.2 Native Bunchgrass Prairie

No Action Alternative A – Direct, Indirect, and Cumulative Effects to Native Bunchgrass Prairie
There would be no immediate change from the current condition of native bunchgrass prairie, described in Chapter 3. Over time, tree species would continue to encroach and reduce the amount of non-forested acreage in the project area. This would contribute to a slight trend of the same kind at the scale of the Clearwater Unit.

Alternative B –Direct and Indirect Effects to Native Bunchgrass Prairie
Harvest of trees within forested stands would not affect adjacent native bunchgrass prairie. Skidding, decking, and hauling logs have the potential to disturb native vegetation and spread noxious weeds. For this reason, mitigations have been designed to minimize risk to these areas. Under the action alternative, DNRC would require that logging equipment be washed prior to use, treat weeds along existing roads, grass seed disturbed roads and landings, and spot spray new weed infestations. In addition, DNRC would designate skid trails to minimize crossing the native bunchgrass prairies and avoid locating log landings in those areas. After the timber sale, pre-commercial thinning would reduce the density of ponderosa pine encroaching on the prairie areas within Section 16. This would benefit the understory species by decreasing competition for light, nutrients, and water.

Alternative B –Cumulative Effects to Native Bunchgrass Prairie
In conjunction with other projects across the Clearwater Unit, alternative B would contribute to minimal change to the amount of native bunchgrass prairie. While fire suppression is likely to continue for the foreseeable future, forest management projects such as thinning may address the encroachment of trees onto these areas.

4.1.3 Noxious Weeds

No Action Alternative A – Direct, Indirect and Cumulative Effects to Noxious Weeds
With no action, noxious weeds will continue to spread along roads and may increase on the drier site habitats. Following disturbance events such as timber harvest activities, fires, or grazing, the establishment and spread of noxious weeds is more prevalent than in undisturbed areas. The grazing licensees would be required to continue weed control efforts consistent with their use.

Alternative B – Direct and Indirect Effects to Noxious Weeds
The action alternative will involve ground-disturbing activities that have the potential to introduce or spread noxious weeds in susceptible habitat types. For the action alternative, an Integrated Weed Management (IWM) approach was considered for treatment of existing and prevention of potential noxious weeds. For this project: prevention, re-vegetation and weed control measures for spot outbreaks are considered the most effective weed management treatments. Prevention measures would require clean off-road equipment. Roadside weed control and re-vegetation would reduce noxious weed density and occurrence compared to no-action. There would be a similar or a potential increase in weed infestation with harvest units due to soil disturbance and decreased tree canopy. Control efforts will promote re-vegetation and emphasize treatment of any new noxious weeds. More weed control would occur compared to no-action alternative.

Herbicide application would be completed to contain spotted knapweed along segments of spot infested road. Herbicide would be applied according to labeled directions, laws and rules, and would be applied with adequate buffers to prevent herbicide runoff in surface. Implementation of IWM measures listed in the mitigations would reduce existing weeds, limit the possible spread of weeds, and improve current conditions, to promote existing native vegetation.

Alternative B –Cumulative Effects to Noxious Weeds
In conjunction with other projects across the Clearwater Unit, alternative B would contribute to the overall objective of minimizing the spread of noxious weeds.

4.2 PREDICTED EFFECTS ON WATERSHED AND HYDROLOGY

No Action Alternative A – Direct and Indirect Watershed Effects

No direct, indirect or cumulative effects to water quality or quantity would be expected to result other than those described under the existing Conditions. Sedimentation will continue at the existing crossings on the lower Monture road, depending on the levels of year round road use and road maintenance. Existing road segments with inadequate surface drainage and the old bridge fill on Dick Creek would continue to impact water quality unless mitigations or remedial actions are taken. Grazing management would continue and should gradually improve over time as inspections and management modifications are made. Recent restoration projects in the drainage are expected to improve stream stability and water quality. Mountain pine beetle attacks to mainly lodgepole pine are increasing mortality and loss of forest canopy in the area. Water yields may increase naturally as a result of continued tree mortality from insects or wildfire, which would be within an expected range of historic conditions.

No Action Alternative A – Cumulative Watershed Effects

Under the no-action alternative, cumulative effects would remain the same as described in existing conditions. The effects would be most likely to decline over time as hydrologic recovery occurs and TMDL measures are implemented.

Alternative B – Direct and Indirect Watershed Effects

The proposed timber harvest and road construction is expected to result in a moderate risk of short term direct or in-direct water quality impacts due to erosion and sediment delivery based on implementation of Best Management Practices and site specific mitigations.

The proposed project would harvest up to 3.5 to 4mmbf from approximately 705 acres of the 1,100 acres within the two parcels as noted in table W1 and described in the vegetation section. The proposed harvest would be a combination of selection, and seed tree harvest prescriptions to improve tree spacing and remove dead, diseased and dying trees.

Table W-1 Action Alternative Harvest and Road Construction on DNRC

Action ALT	Jones Section	Shoup Section	Notes
DNRC Harvest Acres	392 (includes 43 acre aspen regeneration area)	313	705
Proposed Harvest Acres as % of Watershed	Less than 1.8 %	Less than 1.7 %	NA
Proposed SMZ harvest	Part of West bank of Dick Cr., Retain 70%	Part of West bank of Dick Cr., Retain 70%	Part of Dunham Ditch
DNRC Miles New road	.7 miles permanent .65 miles temporary	¼ mile new road	Total ¼ mile road, located away from streams
Stream Crossings	1 temporary crossing	No new stream crossings, 1 ditch crossing	Restore & stabilize old bridge crossing site.

The proposed timber harvest is designed to prevent impacts to water quality from off-site erosion through the implementation of BMP's, protection of adequate buffers and site specific mitigations. Slopes are less than 25% in the Jones parcel and most of Shoup parcel except for short steep slopes. Ground based equipment would be limited to slopes less than 45% to minimize disturbance. Selective harvest is proposed within short SMZ segments of units 3 & 4 along Dick Creek, Shoup Creek and the Dunham irrigation ditch (Class 3). The riparian harvest would be a harvest of less than 30% of existing tree canopy, up to 25 feet from the stream and would be completed in accordance with SMZ requirements of ARM 36.11.302. No ground based harvest equipment would be operated in the SMZ's. Trees would be directionally felled out of the SMZ and recruitable trees leaning towards the stream would be retained.

The intent is to improve tree spacing, maintain a distribution of tree size classes and promote riparian vegetation growth with a minor reduction in shading. The proposed SMZ 's on Dick Creek and Shoup Creek would also have Riparian Management Zone (RMZ's) located in accordance with ARM 36.11.425 to protect soils, prevent sediment delivery to streams and retain adequate long term recruitable trees for large woody debris to stream channels. The proposed SMZ harvest has low risk of low impacts to stream banks or sediment delivery to streams.

The Dunham Creek ditch would be marked as a class 3 SMZ and no new permanent crossings would be constructed. An existing bridge would be used to cross the ditch. Removal of trees near the ditch, would reduce maintenance needs and reduce the potential for ditch bank failure associated with tree windthrow.

The proposed haul routes would use primarily existing roads by completing standard road drainage maintenance on 12 miles of road, and reconstruct 2 miles of road to meet BMP's, to reduce current sediment sources. One temporary crossing of an intermittent stream and one ditch crossing is proposed and there would be no increase in open road density. The proposed action would construct only .7 miles of permanent road, which is located on moderate grades and stable slopes that are well away from surface waters and presents low risk of low impact to sedimentation. An additional .65 miles of temporary new road would be constructed to access line skidding ground.

There is low potential of risks for water yield increase impacts to Dick Creek. On the Jones parcel, selective harvest of trees is proposed on approximately 392 (Includes 43 acre aspen regeneration area) acres within the Dick Creek drainage. The proposed harvest would retain 35 to 60% of the conifer canopy through uneven-age management to improve tree spacing and growth. The proposed selective harvest would occur on less than 1.7% of the watershed and would not measurably increase water yield in Dick Creek. Based on the minor proportion of harvest in the drainage, good average stream channel stability in the DNRC parcel, stable well drained soils and low precipitation zone, there is low potential risks for water yield increase impacts to Dick Creek stream channel stability or sediments.

Restoration Measures

Proposed restoration measures are 1) the removal of old bridge debris and road fill in the floodplain of Dick Creek, that is a chronic source of sediment, 2) stabilize and abandon about ¼ mile of unneeded road and 3) spot piling and burning of slash to promote aspen regeneration.

The restoration on Dick Creek project would remove the old bridge debris and approximately 150 cu. yards of soil from the historic road fill that is currently in the floodplain of Dick Creek. Site specific sediment control measures consistent with 124 permit requirements would be implemented to contain sediment and prompt re-vegetation will be implemented to minimize sedimentation. Removal of the old bridge fill would likely cause a short term, low impact to water quality as a pulse of sediment during the fill removal that should quickly decline. The proposed restoration would reduce a chronic source of sediment, restore floodplain width and should improve water quality.

For riparian vegetation restoration to improve aspen regeneration and biodiversity, a special aspen restoration treatment unit of approximately 43 acres would be designated that includes approximately 12 acres of wetland on the Jones Parcel. The wetland treatment is designed to promote light burning of aspen root crowns and regeneration of aspen clones. The wetland perimeters would be marked and selected aspen would be felled and lopped, followed by bringing in slash that would be spot piled to promote light burning of aspen and regeneration of aspen clones. An alternative practice would be required to allow skidders to cross the wetland margins and bring in slash up to 25 feet from the stream, from adjacent harvest units. The skidding operations would be limited to periods when soils are frozen or adequately protected to minimize equipment disturbance and prevent excessive compaction, displacement or erosion of the soils in the designated wetlands, consistent with ARM 36.11 426. There is a class two stream segment with an adjacent wetland on slopes less than 5%, where a similar aspen treatment would be prescribed. The spot piles of brush that would be burned, would leave disconnected spots of slight to moderate burn intensity and no off site sedimentation is expected. No ground skidding would occur within 25 feet of the stream segment, and we expect minimal disturbance and a positive

vegetative recovery of aspen. The spotty nature of the burn piles would burn off surface vegetation, but is not expected to cause erosion or off-site sedimentation.

In summary DNRC would implement all applicable BMP's and Forest Management Rules to protect water quality. There is moderate risk of short term, low impacts to water quality and beneficial uses associated with the proposed timber harvest and road construction, due to the following reasons: 1) The proposed timber harvest and road maintenance is expected to prevent water quality impacts from erosion and sediment delivery due to buffer distances and implementation of mitigation measures, 2) SMZ and RMZ boundaries will be established to limit disturbance near water resources and protect vegetation to trap sediment, 2) combined mitigation measures for harvest operations and season of use are all directed at minimizing soil disturbance to prevent erosion and sedimentation, 3) no new roads would be constructed adjacent to streams and existing road drainage would be improved to control erosion and sedimentation, 4) streamside snags and recruitable trees would be retained to provide for long term woody debris availability to stream channels and to maintain fisheries habitat. The proposed old bridge fill removal and stabilization will result in moderate risk of short term, low levels of sediment, but is expected to reduce a chronic source of sediments and improve water quality over time.

Alternative B –Cumulative Watershed Effects

Within the cumulative effects analysis area, DNRC has proposed to harvest approximately 705 acres, across parcels in 2 watersheds and construct roads solely in the Shoup section well away from streams. Road density would not be increased and no new stream crossings would be constructed. The proposed action would thin and harvest dead/ diseased lodgepole and ponderosa pine as well as larch and Douglas-fir that contain undesirable growth characteristics, while retaining a seed source of healthy western larch, Douglas-fir and ponderosa pine. The proposed ground based timber harvest and use of existing roads is expected to result in moderate risk of short term, low impacts to sediment and water quality on Dick Creek, Dunham Creek, Dunham Ditch and wetland features from the planned operations DNRC section based on implementation of BMPs and mitigation measures during timber harvest. Sedimentation would not be detectable in Monture Creek. The combination of road drainage improvements, maintenance and restoration measures would reduce existing sediment sources.

There is low risk of cumulative watershed impacts due to water yield increases occurring from this proposal due to the following reasons. Within the 13,772 acre lower Monture creek watershed, approximately 313 acres would be harvested on the Shoup Creek Parcel. Water yield is not a constraint for the Shoup watershed based on the low harvest proposed and 17% existing harvest as noted in the existing conditions. On the Jones parcel, selective harvest of trees is proposed on approximately 349 acres another 43 acres of aspen regeneration harvest would take place within the 20,437 acre Dick Creek drainage. The proposed harvest would retain 35 to 60% of the conifer canopy through un-even age management to improve tree spacing and growth. The proposed selective harvest would occur on less than 1.7% of the watershed and would not measurably increase water yield in Dick Creek. Based on the minor proportion of harvest in the drainage, good average stream channel stability in the DNRC parcel, stable well drained soils and low precipitation zone, there is low potential risks for water yield increase impacts to Dick Creek stream channel stability or sediments.

With no measurable increases in water yield, in-stream sediments and channel form and function would be similar to no-action. Recent irrigation diversion improvements on Dick Creek and Dunham Ditch have also reduced sites of channel instability and would have a long term improvement on channel conditions.

4.3 PREDICTED EFFECTS ON SOILS

No Action Alternative A – Direct, Indirect and Cumulative Effects to Soils

The effects of the no action alternative would be the same as previously described under existing conditions for soils.

Alternative B – Direct and Indirect Effects to Soils
The primary risks to long term soil productivity and hydrologic function are excessive impacts to soil properties caused by rutting, compaction and displacement of surface soils by equipment operation and road construction. Potential effects are a reduction in long-term soil productivity, and regeneration potential as well as impacts to course woody debris distribution and nutrient cycling. Most sensitive soils to operation effects are small areas of steep slopes, erosive soils and wet sites which will be avoided or protected with mitigation measures.

The proposed projects would harvest up to 3.5 to 4mmbf from approximately 705 acres within the two DNRC parcels of 1,100 acres. The proposed harvests would be a combination of selection, shelterwood, overstory removal and seed tree harvest prescriptions to improve tree spacing, salvage lodgepole pine, reduce plant competition and improve growth. Hauling access would primarily use existing roads on the Jones parcel and within the Shoup parcel approximately .7 miles of new permanent road and .65 miles of temp new road would be constructed on moderate grades and stable slopes away from streams to improve the road system within DNRC ownership. Site specific road maintenance and reconstruction requirements will be implemented on existing roads to restore or improve drainage and control erosion. New road segments would be built with adequate road drainage and grass seeded after use.
For the proposed harvest, BMP's and mitigations would be implemented to minimize the area and degree of detrimental soil impacts (displacement, erosion, and compaction). Mitigations include general skid trail planning, limit tractors to moderate slopes, avoiding wetlands and controlling soil disturbance to meet silvicultural goals to promote conifer regeneration. Ground based harvest operations would be limited to slopes less than 45%. Steeper slopes would be harvested by cable/line skidding where needed.

Aspen regeneration would be promoted on about 43 acres of designated wetland sites by slashing and return skidding of woody debris for spot burning to encourage aspen clones. The aspen project would require an alternative practice for equipment operation in wetland site and is designed to minimize soil impacts consistent with forest management rules. Operations in the wetlands would be limited to frozen or adequately dry conditions to prevent excessive disturbance. The spotty nature of the burn piles would burn off surface vegetation, but is not expected to cause erosion or off-site sedimentation, and should quickly recover, similar to other burn areas surveyed following wildfires.

On all proposed harvest areas a portion of old and new course woody debris (CWD>3" dia.) at ~5-10 tons/acre and fine litter (similar to historic ranges) would be retained or return skidded on harvest units. CWD and fine litter act as a mulch to enhance protection of surface soils, maintain soil moisture and provide media for healthy soil fungi and conservation of soil nutrients important to tree growth. Protection of established regeneration and healthy over-story trees would be a priority. Portions of the harvest area would be scarified and jackpot burned to promote tree regeneration.

Based on DNRC soil monitoring on comparable sites (DNRC 2004), implementation of BMP's and the recommended mitigation measures, the proposed harvest and road operations present low risk of detrimental impacts to soils if impacts are restricted to ~15% of the proposed harvest areas. We expect that by protecting ~85% of a harvest area in non-detrimental soil impacts, soil properties important to soil productivity will be maintained. Sale administrators will monitor on-going harvest and road construction activities to meet contract requirements, BMP'S for soil and water protection and silvicultural objectives. For all of these reasons the proposed harvest operations and mitigation measures are expected to maintain soil properties important to plant growth and hydrologic function and present low risk of direct and indirect impacts to soils.

Alternative B – Cumulative Effects to Soils
Cumulative effects to soils can occur from repeated ground skidding entries into the harvest area and additional road construction, depending on area and degree of detrimental impacts. Most harvest sites proposed have been previously entered with selective harvest generally over 20-30 yrs ago, and the areas affected have recovered and left minimal effect on the soils, with few trails still evident. The observed trails have revegetated, with minimal effects to soils and the sites have been regenerated. The roads are mainly shallow excavation with low-moderate cut slopes and vegetated.

There is low risk of cumulative effects to soils with the proposed harvest based on minimal previous harvest effects in the proposed harvest units and implementation of BMP's, and skidding and slash disposal mitigation measures to limit the area impacted. This level of effects is consistent with DNRC soil monitoring (DNRC 2004) to conserve soil nutrients and maintain long term productivity. Any future harvest would likely use the same road system and skid trails and landings to reduce the risk of cumulative effects. Improved tree spacing is expected to reduce competition for nutrients and soil moisture, enhance growth of retained trees, and promote regeneration of conifers.

4.4 PREDICTED EFFECTS ON FISHERIES

4.4.1 Shoup Creek Analysis Area

No Action Alternative A – Direct, Indirect, and Cumulative Effects to Shoup Creek Area
No direct or indirect impacts would occur beyond those described in Existing Conditions. No additional cumulative effects would be expected beyond those described in Existing Conditions.

Alternative B – Direct and Indirect Effects to Shoup Creek Area
According to the Hydrology Analysis, use of the haul road across Shoup Creek presents a low risk of low direct and indirect impacts to the sediment component of Shoup Creek. The risks would be mitigated due to the construction of road drain drips and the armoring of the streambank and road prism adjacent to the existing culvert crossing.

Although all final mitigations have not yet been determined, the road-stream crossing of the haul route may be rebuilt with a new fish passage structure, or the existing road-stream crossing site may be rebuilt with an armored ford. Improved connectivity to isolated habitats would likely be of greater benefit to westslope cutthroat trout in this small stream than not improving connectivity in order to offset the potential adverse effects due to eastern brook trout and/or hybridized westslope cutthroat trout presence. Depending on whether or not the road-stream crossing is rebuilt as part of the proposed actions, no direct or indirect impacts to connectivity would occur beyond those described in Existing Condition or connectivity would be improved.

Alternative B – Cumulative Effects to Shoup Creek Area
Considerations for cumulative effects to fisheries include: long-term potential sedimentation to Shoup Creek from the adjacent haul route would be slightly decreased due to the addition of drain dips and armoring, cattle grazing impacts to Shoup Creek adjacent to the haul route would be decreased due the armoring of the streambanks and road prism, and fish habitat connectivity may stay the same or improve. The Action Alternative is expected to have minor to moderate positive cumulative impacts to fisheries in the analysis area.

4.4.2 Dunham Creek Ditch Analysis Area

No Action Alternative A – Direct, Indirect, and Cumulative Effects to Dunham Creek Ditch Area
No direct or indirect impacts would occur beyond those described in Existing Conditions. No additional cumulative effects would be expected beyond those described in Existing Conditions.

Alternative B – Direct and Indirect Effects to Dunham Creek Ditch Area
Class 3 SMZ harvest restrictions would be implemented along ~1.3 miles of the Dunham Creek Ditch, or along ~19 percent of the total ditch length. Class 3 SMZ harvest restrictions include the retention of submerchantable trees and shrubs. Since most trees in the affected area within 25 feet of the ditch would be harvested, an estimated 25 – 75 percent of 'stream' shading to the ditch would be removed. This estimated amount of shade removal is expected to lead to an increase in peak seasonal 'stream' temperature in the ditch between 0.1 and 3.0 ºC. This increase in peak seasonal stream temperature is expected to have a moderate risk of low direct and indirect impacts to eastern brook trout and a moderate risk of moderate direct and indirect impacts to westslope cutthroat trout.

Alternative B – Cumulative Effects to Dunham Creek Ditch Area
Considerations for cumulative effects to fisheries include: an increase in 'stream' temperature. The action alternative is expected to have a moderate risk of moderate cumulative impacts to fisheries in the analysis area.

4.4.3 Dunham Creek and Upper Monture Creek Analysis Areas

No Action Alternative A – Direct, Indirect, and Cumulative Effects to Dunham Creek and Upper Monture Creek Areas
No direct or indirect impacts would occur beyond those described in Existing Conditions. No additional cumulative effects would be expected beyond those described in Existing Conditions.

Alternative B – Direct and Indirect Effects to Dunham Creek and Upper Monture Creek Areas
All hauling associated with timber harvest in Section 36 will utilize a haul route that crosses both Dunham Creek and Upper Monture Creek at a single bridge location. According to the Hydrology Analysis, use of the haul road across both creeks presents a low risk of low direct and indirect impacts to the sediment component of both creeks. The risks would be mitigated by implementing any required Forestry Best Management Practices.

Alternative B – Cumulative Effects to Dunham Creek and Upper Monture Creek Areas
Considerations for cumulative effects to fisheries include: continued use of both bridges on the haul route as part of a year-round open public road, and a small, temporary increase in the traffic volume (due to timber hauling from Section 36) at the two bridge crossings. The action alternative is expected to have a low risk of low cumulative impacts to fisheries in the analysis area.

4.4.4 Upper Dick Creek Analysis Area

No Action Alternative A – Direct, Indirect, and Cumulative Effects to Upper Dick Creek Area
No direct or indirect impacts would occur beyond those described in Existing Conditions. No additional cumulative effects would be expected beyond those described in Existing Conditions.

Alternative B – Direct and Indirect Effects to Upper Dick Creek Area
According to the Hydrology Analysis, upland and riparian management zone harvest activities adjacent to Jones Units 3 and 4 present a low risk of low additional direct and indirect impacts to the sediment component of Dick Creek. The risks would be mitigated through application of Streamside Management Zone Rules and Forestry Best Management Practices.

A failing native materials bridge in the analysis area would be rehabilitated and stabilized, which will greatly reduce long-term sedimentation from the site to Dick Creek. A short-term increase in sedimentation is expected to occur as an inevitable result of the site rehabilitation process.

According to the Hydrology Analysis, potential impacts to flow regime in the analysis area are not expected to be detectable or measurable.

Riparian harvest is proposed along approximately 1900 feet of Dick Creek adjacent to Jones Unit 3 and along approximately 300 feet of Dick Creek adjacent to Jones Unit 4, which is equal to approximately 2 percent of the total linear riparian area adjacent to potential fish-bearing reaches in the analysis area. Following are the potential maximum changes in riparian stand characteristics following the proposed riparian harvest:

- JONES UNIT 3
  - basal area = 81.5 square feet per acre (48% decrease)
  - trees per acre = 148 (34% decrease)
  - quadratic mean diameter = 10.1 inches (11% decrease)
  - co-dominant tree species = Ponderosa pine, Douglas fir
- JONES UNIT 4
  - basal area = 51.6 square feet per acre (64% decrease)
  - trees per acre = 225 (15% decrease)
  - quadratic mean diameter = 6.5 inches (34% decrease)
  - co-dominant tree species = Englemann spruce, Douglas fir

Large woody debris frequencies are expected to fluctuate after implementing the proposed riparian harvest. In the short-term, in-stream large woody debris frequencies may rise due to an expected increase in riparian blowdown. Long-term frequencies are first expected to be lower as potential amounts of recruitable large woody debris are reduced through the proposed riparian harvest and blowdown, but long-term frequencies will also rebound and potentially exceed existing conditions as regeneration within the riparian area may exceed the existing riparian stand characteristics.

Considering impacts from sedimentation, flow regime and large woody debris, a low risk of low impacts to channel forms is expected during both the short- and long-terms.

The proposed riparian harvest would only occur on the northwest side of Dick Creek. After an evaluation of potential changes in riparian stand characteristics, stream shading is expected to decrease (short-term) a maximum of 30 percent during the period of peak seasonal stream temperatures. Assuming peak seasonal stream temperatures also rise proportionally across the affected area, an increase of 0.5 ºC may occur in Dick Creek within the project area. However, this potential increase in peak seasonal stream temperature is well within the range of temperatures throughout the historic habitats and distribution of westslope cutthroat trout in the region. Long-term, stream shading is expected to rebound and potentially exceed existing conditions as regeneration within the riparian area may exceed the existing riparian stand characteristics.

Alternative B – Cumulative Effects to Upper Dick Creek Area

Considerations for cumulative effects to fisheries include: long-term potential sedimentation to Dick Creek from a failing native materials bridge site would greatly decrease, cattle grazing impacts to Dick Creek are expected to remain the same or increase and fish habitat connectivity may stay the same or improve as a result of an irrigation diversion modification in Section 16. Considering all potential effects the Action Alternative is not expected to yield a net positive or negative cumulative impact to fisheries in the analysis area.

4.5 PREDICTED EFFECTS ON WILDLIFE

4.5.1 Threatened and Endangered Species – Grizzly Bear (Federally threatened)

No Action Alternative A – Direct, Indirect, and Cumulative Effects to Grizzly Bear
No change from current conditions would be expected under the no action alternative.

Alternative B – Direct and Indirect Effects to Grizzly Bear
Under the proposed action, approximately 349 acres would be harvested with an individual tree selection (ITS) prescription on five harvest units on the Jones parcel, favoring ponderosa pine and western larch retention; approximately 313 acres would be harvested on the Shoup parcel, through a variety of shelterwood, overstory removal (OSR), and seed tree prescriptions. Additionally, approximately 43 acres would be treated for aspen restoration, there would be approximately 2 miles of road reconstruction, and approximately .25 miles of road would be closed on the Jones parcel. The proposed road closure would be a mitigation to reduce motorized access into valuable spring grizzly bear habitat. It is also recommended that the proposed new road construction and road reconstruction be effectively closed (e.g., locked gate, Kelly hump, slash, etc.) at the conclusion of the proposed action to reduce any increases in open road density. On the Shoup parcel, there would be approximately 0.7 miles of new permanent road construction and .65 miles of new temporary road construction, and only spot reconditioning on approximately 2.5 miles of existing road. As additional grizzly bear mitigations, there would be visual screening buffers, approximately two chains wide, on portions of Shoup harvest units 1, 3 & 5, where advanced regeneration is not present. It is possible that pre-commercial thinning may occur in areas of heavy existing regeneration. It is recommended that pre-commercial thinning not be conducted between April 1 and June 15 to minimize risk of potential grizzly bear encounters with thinning contractors.

The proposed action would reduce visual screening cover through harvesting primarily Douglas-fir. The effects of this reduction would likely have greater effect for grizzly bears on the Jones parcel because it currently has an open road density of 4.2 miles of open road per square mile, and approximately 5.68 miles total road per square mile. The proposed aspen restoration on the Jones parcel would likely have short term (5 to 10 years) reductions in screening cover in riparian habitat, but once regeneration is established, would likely provide abundant visual screening in the affected riparian area. The effects of the proposed harvest on the Shoup parcel would likely be reduced for grizzly bears because the roads on that parcel are currently closed, and would remain closed following the proposed action. Thus, with implementation of the proposed mitigations, there would likely be low risk of direct and indirect effects to grizzly bears from the proposed actions.

Alternative B – Cumulative Effects to Grizzly Bear
Previous timber harvests have occurred on both parcels in the last 30 years, most notably in 1978, and with a timber permit on the Jones parcel in 2006 that salvaged Douglas-fir on 17 acres. Providing the recommended road closure mitigations would be implemented, there would not be an increase in open road density within the cumulative effects analysis area. The proposed harvest would, however, reduce screening cover along open roads in the Jones parcel. While previous land management practices reduced screening cover on the former Plum Creek Timber Company lands within the analysis area, these reductions were along currently closed roads. Thus, it would be likely that there would be low risk of cumulative effects to grizzly bears from the proposed action, provided recommended mitigations are implemented.

Recommended Mitigations
1.Close approximately 720 feet of currently open road that leads into Jones unit 1, but north of a perpetual camp site.
2.Retain vegetative screening around riparian areas.
3.Provide two chains of screening cover along the boundary of Shoup units 1, 3 & 5, where regeneration isn't present.
4.Effectively close new road construction and road reconstruction following the proposed action.
5.Pre-commercial thinning operations would be conducted between June 16 and March 31 to minimize risk of grizzly bear encounters.
6.Conduct aspen restoration on approximately 43 acres on the Jones parcel to increase visual screening cover within the riparian area through aspen regeneration.
7.Make contractors aware that bears are attracted to oil products and machinery lubricants, hoses and seats.

8.Any food, garbage, and pet food should be stored in bear-resistant containers, should contractors camp on site.

4.5.2 Bald Eagle

No Action Alternative A – Direct, Indirect, and Cumulative Effects to Bald Eagle
No change from current conditions would be expected under the no action alternative.

Alternative B – Direct and Indirect Effects to Bald Eagle
Due to the proximity of the James Lake and Dick Creek nests to the project area, the following mitigations would be implemented to reduce the impact of the proposed action on bald eagles:

1. Providing the bald eagle nest located on the Jones parcel is not occupied, mechanized activities west of the county road and within ¼-mile of the affected nest would be restricted between February 1 and August 15, in accordance with ARM 36.11.429(1)(c)(i);
    a. However, proposed activities east of the county road, but within ¼-mile of the affected nest could occur between June 1 and January 31, provided the nest is not occupied and an Alternative Practice (ARM 36.11.449) to ARM 36.11.429(1)(c)(i) is acquired.
2. In accordance with ARM 36.11.429(1)(c)(ii), the prescriptions in the southern portion of Jones unit 2, and portions of Jones units 4, 5, and 6 would be designed to maintain structural and ecological characteristics, including: ample stocking, large emergent trees, multi-storied canopy, if present, snags, potential nest trees, perch and roost trees, and vegetative screening from areas of both high and low intensity human activity. Specifically,
    a. Within the 1 – 2 acres immediately around the nest, understory thinning would occur to reduce the risk of losing the nest site in the future to fire.
    b. From the 1 – 2 acres immediately around the nest to a flagged area and a ridge east of the nest (approximately 2 acres), harvest volume would be approximately half of what is proposed for the rest of the proposed unit, focusing on retaining large diameter trees for perch and future nest trees.
    c. Beyond the flagging and ridge, visual screening would be retained in areas where the affected nest can be observed from a distance.
3. The proposed action would also install a locked gate on the road that passes near the affected nest at a location near the county road that would provide for an effective closure and still reduce mechanized activity after the proposed timber sale is completed.
4. In accordance with ARM 36.11.429(1)(d)(ii), the prescriptions in the southern portion of Jones unit 2, and portions of Jones units 4, 5, and 6 would be designed to maintain structural and ecological characteristics, including: ample stocking, large emergent trees, multi-storied canopy, if present, snags, potential nest trees, perch and roost trees, and vegetative screening from areas of both high and low intensity human activity.

With implementation of the aforementioned mitigations, there would likely be low risk of direct and indirect effects to bald eagles from the proposed action.

Alternative B – Cumulative Effects to Bald Eagle
In both bald eagle territories, there is a long history of livestock grazing and farming. With implementation of the aforementioned mitigations in the project area, there would likely be a low risk of cumulative effects to bald eagles from the proposed action.

4.5.3 Pileated Woodpecker

No Action Alternative A – Direct, Indirect and Cumulative Effects to Pileated Woodpecker
No change from current conditions would be expected under the no action alternative.

Alternative B – Direct and Indirect Effects to Pileated Woodpecker
The proposed action would treat approximately 235 acres of the 339 acres of potential pileated woodpecker habitat within the project area. Approximately 129 acres of the proposed treatment would likely make the affected habitat unsuitable for pileated woodpecker nesting through treatments including seed tree, shelterwood, and overstory removal harvesting. These treatments would occur on the Shoup parcel. The remaining 106 acres that

would be treated, on the Jones parcel, would likely remain suitable for use by pileated woodpeckers because the affected areas would be treated with an individual tree selection prescription that would retain between 40% and 60% canopy closure. Thus, post-harvest, approximately 104 acres of potential pileated woodpecker habitat would remain untreated, and approximately 106 acres of potential pileated woodpecker habitat would have been treated, but would likely be of marginal suitability due to reductions in canopy cover. As a result of the proposed harvest, potentially suitable pileated woodpecker habitat would be reduced from approximately 217 ac to 88 ac on the Shoup parcel, and with 106 ac of the 122 ac on the Jones parcel with reduced habitat suitability. There would likely be low to moderate risk of direct and indirect effects to pileated woodpeckers that occur on the affected parcels from the proposed action due to habitat alterations.

Alternative B – Cumulative Effects to Pileated Woodpecker
Within the one mile radius of the affected parcels, there is much grassland on private lands, and many of the lands formerly managed in an industrial setting were managed to seed tree or shelterwood densities, making those forests presently unsuitable habitat for pileated woodpeckers. The proposed harvest on the Shoup parcel would likely contribute to negative cumulative effects for this species due to the conversion of potentially suitable habitat to unsuitable conditions. As previously stated, the proposed harvest on the Jones parcel would likely reduce potentially suitable habitat to marginally suitable habitat. Thus, there would likely be a low to moderate risk of cumulative effects to pileated woodpeckers inhabiting the cumulative effects analysis area from the proposed action.

4.5.4 Fisher

No Action Alternative A – Direct, Indirect and Cumulative Effects to Fisher
Under this alternative, no changes in the current habitat are expected.

Alternative B –Direct and Indirect Effects to Fisher
The proposed action would harvest approximately 272 acres of the approximately 389 acres of fisher preferred habitat types within the project area. Approximately 185 acres would be treated on the Shoup parcel, and approximately 87 acres on the Jones parcel. To mitigate the effects of the proposed harvest on fisher, the following mitigations would be implemented:

1. In accordance with ARM 36.11.440 (1)(b)(iii), large coarse woody debris would be maintained and/or recruited in Jones units 1, 2, and 4, and Shoup unit 3.
2. In accordance with ARM 36.11.440 (1)(b)(i) and (i)(A), along class 2 streams on the Shoup parcel, the proposed action would maintain 75% of the area within 50 ft of the stream in >40% crown closure.
3. In accordance with ARM 36.11.440 (1)(b)(i) and (i)(A), along Dick Creek, a class 1 stream, in the Jones parcel, the proposed action would maintain 75% of the area within 100 ft of the stream in >40% crown closure.

The proposed harvest units in the Shoup parcel would likely have more of a deleterious effect on fisher habitat than those on the Jones parcel because the Shoup prescriptions would be seed tree and shelterwood harvests, which typically remove more of the overstory than individual tree selection harvests. With the Shoup parcel located adjacent to more contiguous forest with greater canopy cover, there would likely be low to moderate risk of direct or indirect effects to fisher that may use this parcel. Because the Jones parcel is located adjacent to lands that have been treated with seed tree and shelterwood harvests, and grasslands to the south, there would likely be a lower likelihood of fishers extensively utilizing this parcel. As a result, there would likely be a lower risk of direct and indirect effects from the propose action to fishers on the Jones parcel.

Alternative B –Cumulative Effects to Fisher
Within the one mile radius cumulative effects analysis area, the proposed harvest in the Shoup parcel may fragment a more contiguous corridor of fisher preferred habitat types due to the extent of canopy removal (range of 70% to 80% canopy removal in affected fisher habitat types). However, the landscape surrounding the Shoup parcel has other potential corridors that could ameliorate habitat lost to the proposed action. Within the analysis area surrounding the Jones parcel, much of the fisher habitat on adjacent sections has already been degraded by past harvest activity, with one corridor running from the

center of the section north of the Jones parcel into habitat southeast of, and through, the affected parcel. The proposed action would partially fragment this corridor in the Jones parcel. As a result, there would likely be low to moderate risk of cumulative effects to fishers from the proposed action.

4.5.5 Flammulated Owl

No Action Alternative A – Direct, Indirect and Cumulative Effects to Flammulated Owl
Under the no action alternative, much of the project area would remain unchanged, with canopy closure >60%, which may be too dense for flammulated owls. As a result, there would likely be low risk of direct, indirect, or cumulative effects to this species from the no action alternative.
inhabit the cumulative effects area.

Alternative B – Direct, Indirect and Cumulative Effects to Flammulated Owl
The proposed action would treat approximately 515 acres of the 764 acres of flammulated owl preferred habitat types within the project area, including 205 acres on the Shoup parcel and 310 acres on the Jones parcel. Similar to the effects on fishers, the harvest prescriptions on the Jones parcel would likely be more beneficial to flammulated owls because more canopy would be retained post-harvest, predominately in ponderosa pine and western larch, and the resulting partial reductions in canopy closure would stimulate regeneration and shrub growth, which are conducive to flammulated owl habitat. The harvest prescriptions on the Shoup parcel would remove 70% to 90% of the canopy, which would not be conducive to flammulated owl nesting habitat because it is too open. Flammulated owls tend to use stands with moderate canopy closure (30% to 50%) with at least two canopy layers. Overall, approximately 172 acres of flammulated owl preferred habitat types on the Shoup parcel would remain untreated, and 310 acres would be improved over 10 to 15 years post-harvest on the Jones parcel through shrub growth and forest regeneration. Thus, there would likely be low risk of direct, indirect, and cumulative effects to flammulated owls from the proposed action.

4.5.6 Common Loon

No Action Alternative A – Direct, Indirect and Cumulative Effects to Common Loon
No change from current conditions would be expected under the no action alternative.

Alternative B – Direct, Indirect and Cumulative Effects to Common Loon
The proposed action would not construct new or permanent roads within a 500 ft radius of the loon nest on Shoup Lake. However, mechanized activity may occur within the 500 ft radius of the nest site in portions of Shoup units 3 and 7, but would not occur between April 15 and July 15, in accordance with ARM 36.11.441(1)(a)(ii). Additionally, the proposed action would not occur along water bodies that have input into Shoup Lake, and thus, would not increase turbidity in the lake. With implementation of the aforementioned ARM, the proposed action would likely have low risk of direct, indirect, or cumulative effects to loons nesting on Shoup Lake.

4.5.7 Big Game

No Action Alternative A – Direct, Indirect and Cumulative Effects to Big Game
No change from current conditions would be expected under the no action alternative.
Alternative B – Direct and Indirect Effects to Big Game
The proposed action would reduce the amount of available snow intercept/thermal cover on both parcels for elk, mule and white-tailed deer. This cover would be reduced from 430 ac to 76 ac on the Jones parcel, and from 394 ac to 172 ac on the Shoup parcel. For mule deer, this would affect approximately 345 acres of 636 acres of winter range on the Jones parcel, and approximately 215 acres of the 324 acres of winter range on the Shoup parcel. For white-tailed deer, this would affect approximately 256 acres of 489 acres of winter range on the Jones parcel, and approximately 197 acres of the 359 acres of winter range on the Shoup parcel. Such action would serve to drive down the ability of each parcel to provide shelter to wintering elk, mule deer, and white-tailed deer. As a result, there could be low to

moderate risk of direct and indirect effects to wintering elk, mule deer, and white-tailed deer through reductions in snow intercept/thermal cover.

Alternative B – Cumulative Effects to Big Game
Throughout much of the analysis area, snow intercept/thermal cover is relatively intact, with the exception of approximately 4,500 acres of critical elk winter range northeast of the Jones parcel. This area also includes mule deer winter range. Most of those affected acres were previously managed in an industrial forestry setting using seed tree and shelterwood silvicultural prescriptions. As a result, very little overstory canopy has been retained. The proposed harvest on the Jones parcel is located < 1 mile west of the compromised mule deer and critical elk winter range. As a result, winter range habitat on the Jones parcel may have greater significance to mule deer and elk. However, the proposed harvest would likely retain 40% to 60% canopy closure, with primarily ponderosa pine in the post-harvest overstory. As a result, the post-harvest winter range on the Jones parcel would be degraded, but may retain some utility for wintering mule deer and elk. Thus, there may be low to moderate risk of cumulative effects to mule deer and elk from the proposed action.

4.5.8 Great Gray Owl

No Action Alternative A – Direct, Indirect and Cumulative Effects to Great Gray Owl
No change from current conditions would be expected under the no action alternative.
Alternative B – Direct and Indirect Effects to Great Gray Owl
With the exception of the Dick Creek riparian area, the proposed action and the 2005 bug salvage will have treated the forested portions of the Jones parcel. However, because the proposed harvest would be individual tree selection, retaining primarily ponderosa pine, larch, spruce and some Douglas-fir, the forested areas may still maintain marginal utility to great gray owls. During the planning phase of the proposed action, heavier retention levels were discussed for Jones units 1, 4, and 5 as a mitigation for this species. However, it was determined that such retention would limit the forest regeneration objectives of the proposed action. In accordance with ARM 36.11.411, the proposed action would retain and recruit snags in the aforementioned units. As a result, there may be a loss of forest structure associated with nesting habitat, and consequently, there may be low to moderate risk of direct and indirect effects to great gray owls from the proposed action.

Alternative B – Cumulative Effects to Great Gray Owl
As previously stated, the proposed action would likely marginalize habitat for great gray owls on the Jones parcel. The Jones parcel currently provides good habitat for this species because there is a fair amount of forest edge, several grasslands, and a wetland area; all of which would provide a diversity of rodent species. The same can be said about private land in the section west of the Jones parcel. With older forest, associated wetlands, and interspersed grasslands, the adjacent parcel could provide comparable habitat for great gray owls. The proposed action would further reduce, or marginalize, potential nesting habitat within a one mile radius of the parcel, but potentially suitable habitat likely exists to the west of the affected parcel. Thus, there would likely be moderate risk of cumulative effects to great gray owls from the proposed action.

4.5.9 Northern Goshawk

No Action Alternative A – Direct, Indirect and Cumulative Effects to Northern Goshawk
No change from current conditions would be expected under the no action alternative.

Alternative B – Direct and Indirect Effects to Northern Goshawk
The proposed action would harvest approximately 349 acres through individual tree selection on the Jones parcel, thereby reducing the overstory canopy from 40% to 60% in the affected stands. Such action would likely reduce the suitability of the affected stands for nesting by goshawks, but may increase the suitability of the same stands for foraging due to subsequent regeneration and shrub growth which would provide habitat for prey species. To date, no goshawk nest has been reported for the Jones parcel. On the Shoup parcel, the proposed action would harvest approximately 313 acres, primarily through seed tree and shelterwood harvesting, which would remove between 70% and 90% of the overstory. As such, the affected acres would likely have minimal suitability for persistent nesting by goshawks, while increasing competition for prey with red-tailed hawks. As a result, there would likely be low to moderate risk of direct and indirect effects to goshawks that may utilize the affected parcels until overstory crown closure returns to current values in approximately 30 to 50 years

Alternative B – Direct and Indirect Effects to Northern Goshawk
Within the Jones analysis area, the proposed action would treat approximately 27% of the potential nesting habitat, and approximately 4.5% of the analysis area. Similar to the great gray owl, much of the remaining potential nesting habitat in the Jones analysis area would be on private lands to the west and to the southeast of the Jones parcel. As a result, there could be moderate cumulative effects to goshawks within the Jones analysis area.

Within the Shoup analysis area, the proposed action would remove approximately 2.9% of the potential nesting habitat in approximately 1.8% of the analysis area. Unlike the Jones analysis area, much more potential nesting habitat is available within the Shoup analysis area, and thus, there would likely be low risk of cumulative effects to goshawks in the Shoup analysis area.

4.5.10 Red-tailed Hawk

No Action Alternative A – Direct, Indirect and Cumulative Effects to Red-tailed Hawk
No change from current conditions would be expected under the no action alternative.

Alternative B – Direct, Indirect and Cumulative Effects to Red-tailed Hawk
This species is common and it utilizes a wide variety of open habitats. However, it is also protected under the Migratory Bird Treaty Act. As such, the nest tree cannot be knowingly cut down while nesting is ongoing. Despite suspicions regarding the presence of a nest on the Shoup parcel, one has not yet been located. Should a nest be located prior to commencement of harvest activities, it would be recommended that:

1. Operations should be conducted between August 1 and April 1 to minimize effects to nesting birds.
2. The nest tree should be retained.
3. Several perch trees should be retained within 100 yards of the nest tree for use by roosting adults and fledglings.

Should a nest not be located until after the proposed action's commencement, then harvest activities should be halted until a DNRC wildlife biologist could be consulted to develop specific mitigations, given the ongoing harvest operations.

Post-harvest, should the nest tree and several perch trees be retained, there would likely be low to moderate risk of direct and indirect effects to a pair of red-tailed hawks from the proposed action. There would likely be low risk of cumulative effects because the proposed action would open the forest, creating increased foraging opportunities.

4.6 PREDICTED EFFECTS TO ECONOMICS
Two options are being analyzed in this Environmental Assessment: Alternative A) No Action, and Alternative B) which includes a harvest of an estimated 21,000-24,000 tons of timber. The following estimates are intended for relative comparison of alternatives and not intended to be absolute estimates of returns, taxes, employment or wages.

No Action Alternative A – Direct Effects to Economics
If the no action alternative were followed, none of the estimated employment, income, or Trust Fund effects that result from the action alternative would occur. Grazing licenses would continue to generate approximately $1,781 of revenue per year.

No Action Alternative A – Cumulative Effects to Economics
The DNRC has a statewide sustained-yield annual harvest goal of 53.2 million board feet. If timber from this project is not sold this volume could come from sales elsewhere, however, the timber may be from other areas and not benefit this region of the state. Long-term deferral of harvest from this forest will impact harvest patterns, changing both the region in which the trees are harvested and the volumes taken. This will impact other areas of the state where these changes occur.

Alternative B –Direct Effects to Economics

The proposed timber harvest would generate additional revenue for the Common Schools Trust. The estimated return to the trust for the proposed harvest is $378,000 to $432,000 based on an estimated harvest of 3.5-4 million board feet and an overall stumpage value of $108.00 per thousand board feet (MBF) ($17.00 per ton, based on similar recent timber sales). Costs related to the administration of the timber sale program are only tracked at the Land Office and Statewide level. DNRC doesn't track project-level costs for individual timber sales. An annual cash flow analysis is conducted on the DNRC forest product sales program. Revenue and costs are calculated by land office and statewide. These revenue-to-cost ratios are a measure of economic efficiency. The most recent revenue-to-cost ratio of the Southwestern Land Office was 1.16. This means that, on average, for every $1.00 spent in costs, $1.16 in revenue was generated. Costs, revenues, and estimates of return are estimates intended for relative comparison of alternatives. They are not intended to be used as absolute estimates of return. The table below illustrates the changes in revenue-to-cost from 2001-2009. Poor market trends have driven the cost-to-ratio value down to its current number.

	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009
SWLO	2.69	2.57	1.61	2.74	2.43	2.17	1.32	2.55	1.16
State	1.62	1.75	1.75	1.82	2.44	2.31	1.46	2.22	1.68

In addition to stumpage revenue a Forest Improvement fee is collected from the purchaser as part of their bid. Activities funded under this program include site preparation, tree planting, thinning, roadwork, right-of-way acquisition, etc. The current Forest Improvement fee for the Southwestern Land Office area is $31.31 per MBF.

Because there is no timber harvest impact associated with the "no action" alternative, the rest of the analysis will focus on the action alternative.

Timber Related Employment

Timber harvesting generates employment. Keegan et al (1995) estimate that on average 10.58 jobs are conserved for every million board feet of timber harvested.

Alternative B –Indirect Effects to Economics

Indirect economic impacts are much broader than those identified above. Some of these impacts are the result of the money from the sales "recycling" through the economy several times. For example, the money spent for groceries by the employee of the timber mill in part goes to pay the salary of the grocery store employee, the grocery store employee's use that money to purchase groceries for themselves. This in turn generates more income for the grocery store employees, etc. Unfortunately, a model of the county that could be used to demonstrate secondary effects is not available. In a broader statewide context, money paid to wood industry workers results in increased state income tax collections as well as increased purchases in other areas of the State. Taxes on indirect wages would add to this tax amount. Since the state revenue is spent on projects statewide, the entire state shares, in part, in the benefits that result from the timber sale. In particular, Montana trusts benefit additionally by the being able to use these revenues to fund schools throughout the state.

Social Impact

The area has a substantial presence in the wood processing industry and as a result has institutions established to handle the social requirements associated with this industry. The timber sale is unlikely to add sufficient pressures to these institutions to require their modification. Logging and milling activities associated with the timber sale are not anticipated to have any long-term impact on the population of the region or the State of Montana.

Most of the economic impacts associated with this sale are short term. If no other trees were available for harvest after these sale(s), the tendency would be to return to a lower level of economic activity. A short-term impact that might occur as the local economy contracts might be an increase in unemployment as local employers adjust to the lowered production levels.

Alternative B - Cumulative Effects to Economics
This sale would be part of the annual harvest of timber from the State of Montana Forest Trust Lands. The net revenue from this sale would add to the trust fund. Annual Trust Fund contributions have varied widely over the years, because the actual contribution to the trust is more a function of harvest than of sales. Harvest levels can vary substantially over time; sales tend to be more consistent. The net contribution to the trust fund is also affected by the annual costs experienced by the DNRC for program management, which varies year to year. The DNRC should continue to make net annual contributions to the trust from its forest management program.

4.7 PREDICTED EFFECTS TO AESTHETICS

Alternative A No Action Alternative – Direct, Indirect, and Cumulative Effects
Over time, tree growth would be expected to fill in current, naturally occurring openings and openings resulting from past timber harvest. As timber stands become denser, stand health could decrease thereby exacerbating the potential for high endemic insect infestations which may eventually result in openings caused by dead and dying trees throughout the sections. Additionally, an increase in forest fuels may promote the potential for wildfire events which may also result in small to very large openings throughout the section. The aforementioned events may introduce or ameliorate patchiness as seen from key observation points in and around the project area.

Alternative B Action Alternative: -Direct, Indirect, and Cumulative Effects
Disturbances caused by improvement work to roads and the harvest of trees may have an impact on the visual resource. This impact is caused by contrasts created between the natural landscapes and managed landscapes. The extent to which the activities would affect the visual resource varies with how much they contrast in form, line, color, and texture. These differences are often subjective and are based on individual human perception.

Methods described primarily as partial retention and modification would be used for timber management and road improvement work. Visual effects generated by timber management activities would vary in duration and intensity according to the silvicultural treatment prescribed and the logging method used to achieve the silvicultural goals. Road improvement work would expose areas of light colored soils creating high color contrasts. Over time, roads would re-vegetate and begin to blend with the natural landscapes.

Immediately after harvest, retained slash may contrast with the natural setting and be very visible throughout the harvest units especially as seen from the foreground of key observation points. As the slash cures, needles would change to a reddish color that contrasts sharply to the natural greens, grays, and browns of a forest setting. Over time, the needles would fall and the slash would begin to conform to rather than contrast with the surrounding setting.

Due to the varying topography and the amount of area with low Visual Absorption Capacity (VAC) within the project area, much of the proposed action could remain “hidden” to the casual observer. An experienced observer or someone who resides in the area would notice the changes due to the decrease in stand density.

Where possible, much of the proposed cutting would be light to moderate in intensity. As many of the largest trees would be left, and a random, natural spacing would be used, it would be easier to decrease contrast in form, line, color, and texture between treated and untreated stands. Silvicultural treatments would blend in extensively with the natural grassy openings and only slightly affect the texture of the seen areas. Likewise, silvicultural treatments near areas of dense forest would borrow from the higher tree numbers and general stand characteristics (species, size, etc.). Along with silvicultural objectives, certain trees and clumps of trees would be selected to leave in these areas in an attempt to manage VAC.

Past forest management activities would contribute to the cumulative effects to the project area landscape. The risk of cumulative effects would be expected to be low as disturbances from past forest

management activities have mostly re-vegetated. A minimal amount of cumulative effects would be expected from the continued increase in vegetative growth due to the long period of time involved.

4.7 PREDICTED EFFECTS TO AIR QUALITY

Alternative A No Action Alternative – Direct, Indirect, and Cumulative Effects

Small private landowners and large public landowners would continue to burn on approved burn days. None of the proposed management activities would take place and no slash would be generated on either section included in the project areas.

Alternative B Action Alternative: Direct, Indirect, and Cumulative Effects

Under the Action Alternative, slash piles consisting of tree limbs and tops and other vegetative debris would be created throughout the project area during harvesting. These slash piles would ultimately be burned after harvesting operations have been completed. Burning would introduce particulate matter into the local airshed, temporarily affecting local air quality. Over 70% of emissions emitted from prescribed burning is less than 2.5 microns (National Ambient Air Quality PM 2.5). High, short-term levels of PM 2.5 may be hazardous. Within the typical column of biomass burning, the chemical toxics are: Formaldehyde, Acrolein, Acetaldehyde, 1,4 Butadiene, and Polycyclic Organic Matter.

Burning within the project area would be short in duration and would be conducted when conditions favored good to excellent ventilation and smoke dispersion as determined by the Montana Department of Environmental Quality and the Montana/Idaho Airshed Group. Prior to burning a “Prescribed Fire Burn Plan” would be done for the area. The DNRC, as a member of the Montana/Idaho Airshed Group, would burn only on approved days. Thus, direct and indirect effects to air quality due to slash pile burning associated with the proposed action would be minimal.

Burning that may occur on adjacent properties in combination with the proposed action could potentially increase cumulative affects to the local airshed. Thus, cumulative effects to air quality due to slash pile burning associated with the proposed action would also be expected to be minimal. Cumulative effects to air quality would not exceed the levels defined by State of Montana Cooperative Smoke Management Plan (1988) and managed by the Montana Airshed Group. Prescribed burning by other nearby airshed cooperators (for example Plum Creek Timber Company) would have potential to affect air quality. All cooperators currently operate under the same Airshed Group guidelines. The State, as a member, would burn only on approved days. This should decrease the likelihood of additive cumulative effects.

CHAPTER 5
REFERENCES

CHAPTER 5: REFERENCES

5.1 LIST OF PREPARERS

Sarah Lyngholm	Forest Products Sales Supervisor DNRC, Forest Management Bureau, Missoula, MT
Mike McGrath	Wildlife Biologist DNRC, Southwestern Land Office, Missoula MT
Jeff Collins	Hydrologist DNRC, Southwestern Land Office, Kalispell MT
James Bower	Fisheries Biologist DNRC, Forest Management Bureau, Missoula MT
Amy Helena	Management Forester DNRC, Clearwater unit, Greenough MT

5.2 AGENCIES AND PERSONS CONSULTED

Patrick Rennie	Archaeologist DNRC, Agriculture and Grazing Management Bureau, Helena, MT

5.3 LITERATURE CITED

Banci, V. 1994. Wolverine. Pages 99-127 in L. F. Ruggiero, K. B. Aubry, S. W. Buskirk, L. J. Lyon, and W. J. Zielinski, Technical Editors. The Scientific Basis for Conserving Forest Carnivores: American Marten, Fisher, Lynx, and Wolverine in the Western United States. USDA Forest Service, Ft. Collins, CO.

Beier, P. and J. E. Drennan. 1997. Forest structure and prey abundance in foraging areas of northern goshawks. Ecological Applications 7:564-571.

Blackfoot Challenge (BFC), MT FWP, Trout Unlimited, Hydrometrics. 2005. A Basin-Wide Restoration Action Plan for the Blackfoot Watershed, MTDNRC Renewable Resource Grant Publication.

Boal, C. W. and R. W. Mannan. 1996. Prey sizes of male and female northern goshawks. Southwestern Naturalist 41:355-358.

Bull, E. L. and J. R. Duncan. 1993. Great Gray Owl (Strix nebulosa). Pages 1-16 in The Academy of Natural Sciences; The American Ornithologists' Union, Philadelphia, Pennsylvania.

Bull, E. L. and M. G. Henjum. 1990. Ecology of the great gray owl. USDA Forest Service, Pacific Northwest Research Station. PNW-GTR-265.

Bull, E. L., S. R. Peterson, and J. W. Thomas. 1986. Resource partitioning among woodpeckers in northeastern Oregon. E. L. Bull, S. R. Peterson, and J. W. Thomas (Resource partitioning among woodpeckers in northeastern Oregon. U. S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, Oregon. Research Note PNW-444.

Buehler, D. A. 2000. Bald eagle (*Haliaeetus leucocephalus*). Pages 1-40 *in* The Academy of Natural Sciences; The American Ornithologists' Union, Philadelphia, Pennsylvania.

Callahan, Paul. 2000. Forest Road Sedimentation Assessment Methodology. Land and Water Consulting, Inc.

Clem, M. K. 1977. Food habits, weight changes and habitat use of fisher Martes pennanti during winter. M. S. Thesis, University of Guelph, Guelph, Ontario.

Clough, L. T. 2000. Nesting habitat selection and productivity of northern goshawks in west-central Montana. University of Montana, Missoula, Montana.

Coulter, M. W. 1966. Ecology and management of fishers in Maine. Dissertation, Syracuse University, Syracuse, New York.

Cutler, T. L., R. J. Steidl, and S. DeStefano. 1996. Diets of northern goshawks in Oregon. Arizona Cooperative Fish and Wildlife Research Unit, Tucson, Arizona.

Department of Natural Resources and Conservation (DNRC). 1996. State forest land management plan. Montana Department of Natural Resources and Conservation, Missoula, MT.

DNRC. 2003. Montana Administrative Rules for Forest Management. Montana DNRC Trust Land Management Division, Forest Management Bureau. Missoula, MT. 87p.

DNRC. 2004. Montana DNRC 2004 Annual Report, Trust Land Management Division. http://www.dnrc.state.mt.us/04annualreport/chapters/pdf%20files/04TLMD.pdf

Finn, S. P., J. M. Marzluff, and D. E. Varland. 2002. Effects of landscape and local habitat attributes on northern goshawk site occupancy in western Washington. Pages 249-258 in S. DeStefano and R. G. Haight, eds. Forest Wildlife-Habitat Relationships. Society of American Foresters, Bethesda, Maryland, USA.

Graham, Russell T.; Harvey, Alan;, Jurgensen, Martin; Jain,T.; 1994. Managing Coarse Woody Debris in Forests of the Rocky Mountains. Res. Paper INT-RP-477. Ogden, Utah: U.S.D.A., F.S., Intermountain Research Station, 12, 13p.

Green, P., J. Joy, D. Sirucek, W. Hann, A. Zack, and B. Naumann. 1992. Old-Growth Forest Types of the Northern Region. USDA Forest Service, Region 1. Missoula, MT.

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

Hewitt, D. G. and C. T. Robbins. 1996. Estimating grizzly bear food habits from fecal analysis. Wildlife Society Bulletin 24:547-550.

Johnson, S. 1984. Home range, movements, and habitat use of fishers in Wisconsin. M.S. Thesis, Univ. Wiscon, Stevens Point. 78pp.

Jones, J.L. 1991. Habitat use of fisher in northcentral Idaho. M.S. Thesis, Univ. Idaho, Moscow, ID. 147pp.

Kasworm, W. F. and T. L. Manley. 1990. Road and trail influences on grizzly bears and black bears in northwest Montana. International Conference on Bear Research and Management 8:79-84.

Keegan, Charles et al, 1995, Montana's Forest Products Industry, A Descriptive Analysis, 1969-1994.

Kelly, G. M. 1977. Fisher (*Martes pennanti*) biology in the White Mountain National Forest and adjacent areas. Dissertation, University of Massachusetts, Amherst, Massachusetts.

Liknes, G.A. and P.J. Graham. 1988. Westslope Cutthroat Trout in Montana: life history, status, and management. American Fisheries Society Symposium 4:53—60.

Losensky, J. 1997. Historical vegetation of Montana. Contract #970900. Montana DNRC. Missoula, MT. 109pp.

Mattson, R. Dirzo, H. Arita, S. Ryan, E.A. Norse, R.F. Noss, and D. Johns. 1999. Corridors: Reconnecting fragmented landscapes. Pages 129-170 in M.E. Soule and J. Terborgh, eds. 1999.

Continental Conservation: Scientific foundations of regional reserve networks. Island Press, Washing, D.C.

McCallum, D. A. 1994. Flammulated owl (Otus flammeolus). Pages 1-24 in The Academy of Natural Sciences; The American Ornithologists' Union, Philadelphia, Pennsylvania.

McClelland, B.R. 1979. The pileated woodpecker in forests of the Northern Rocky Mountains. Pages 283-299 in Role of insectivorous birds in forest ecosystems. Academic Press.

McClelland, B. R., S. S. Frissell, W. C. Fischer, and C. H. Halvorson. 1979. Habitat management for hole-nesting birds in forests of western larch and Douglas-fir. Journal of Forestry 77:480-483.

MacDonald, L.H., and J.D. Stednick. 2003. Forests and water: A state-of-the-art review for Colorado. Completion report No.196. Colorado Water Resources Research Institute, Fort Collins, CO, 65 pp

McGrath, M. T., S. DeStefano, R. A. Riggs, L. L. Irwin, and G. J. Roloff. 2003. Spatially explicit influences on northern goshawk nesting habitat in the interior Pacific Northwest. Wildlife Monographs 154:1-63.

Mersmann, T. J. 1989. Foraging ecology of bald eagles on the northern Chesapeake Bay with an examination of techniques used in the study of bald eagle food habits. M. S. Thesis, Virginia Polytechnic Institute and State University, Blacksburg, Virginia.

Montana Bald Eagle Working Group. 1994. Montana bald eagle management plan. Montana Bald Eagle Working Group (Montana bald eagle management plan. U. S. Department of Interior, Bureau of Land Management, Billings, Montana.

MBTRT (Montana Bull Trout Restoration Team). 2000. Restoration plan for bull trout in the Clark Fork River basin and the Kootenai River basin, Montana. Report prepared for Governor Marc Racicot. Montana Fish, Wildlife and Parks, Helena, MT.

MBTSG (Montana Bull Trout Scientific Group). 1996. Swan River drainage bull trout status report (including Swan Lake.) Report prepared for the Montana Bull Trout Restoration Team. Montana Fish, Wildlife and Parks, Helena, MT.

MBTSG (Montana Bull Trout Scientific Group). 1998. The Relationship Between Land Management Activities and Habitat Requirements of Bull Trout. Report prepared for the Montana Bull Trout Restoration Team. Montana Fish, Wildlife and Parks, Helena, MT.

Montana Department of Environmental Quality. "1996 TMDL Query System." 12 December, 2005. http://nris.state.mt.us/wis/tmdlapp/tmdl96.asp .

Montana Department of Environmental Quality. "2004 TMDL Query System." 12

December, 2005. http://nris.state.mt.us/wis/environet/2004Home.html

MTDEQ (Montana Department of Environmental Quality). 2006. Montana 2006 305(b) Report. Helena, MT. "Clean Water Act Information Center", Reference 2009 web search http://cwaic.mt.gov.

MTDEQ & Confluence Consulting. 2004. Blackfoot Headwaters Planning Area Water Quality and Habitat Restoration Plan and TMDL for Sediment. Helena, MT.

MTDNRC. 2003 Montana Administrative Rules for Forest Management on DNRC Forested Lands. MT DNRC. Trust Lands Management Division. Helena, MT.

MTDNRC, Clearwater Unit, 2005, Dick Creek Timber Permit Environmental Assessment Trust Land Management Division, Forest Management Bureau, Missoula, MT.

MTDNRC, Clearwater Unit, 1978, Shoup Lake Timber Sale Environmental Assessment Trust Land Management Division, Forest Management Bureau, Missoula, MT.

MTDNRC 2004, DNRC Compiled Soil Monitoring Report on Timber Harvest Projects 1988-2004., Report by Collins, Jeffry. Trust Land Management Division, Forest Management Bureau, Missoula, MT

MTDNRC 2008 Montana Forestry BMP Audit Report. Forestry Division. Missoula, MT.

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

MNHP (Montana Natural Heritage Program). 2007. Animal Species of Concern. Montana Natural Resource Information System.

Nation Audubon Society. 2001. The Sibley guide to bird life and behavior. C. Elphick, JB Dunning, Jr., and DA Sibley, eds. Chanticleer Press, Inc, NY. 588pp.

NRIS (Natural Resource Information System). 2004. Westslope Cutthroat Trout Distribution, Swan Drainage, HUC Num: 17010211 (map). Montana State Library, Helena, MT.

NRIS, Montana Natural Resources Information System. 2009., Internet database search for water, water rights, soils, http://nris.state.mt.us/interactive.html

NRIS, 2009, Internet database search MFISH (Montana Fisheries Information System). Montana Fish, Wildlife and Parks, http://nris.state.mt.us/interactive.html

Pfankuch, D. 1978. Stream Reach Inventory and Channel Stability Evaluation - A Watershed Management Procedure. U.S. Department of Agriculture - Forest Service, Missoula, MT. 26 pp

Pfister, R., B. Kovalchik, S. Arno, and R. Presby. 1977. Forest habitat types of Montana. USDA For. Serv. Gen. Tech. Rep. INT-34. Intermountain For. and Range Exp. Sta. Ogden, UT.

Powell, R. A. 1977. Hunting behavior, ecological energetics and predator-prey community stability of the fisher (Martes pennanti). Dissertation, University of Chicago, Chicago, Illinois.

Powell, R. A. 1978. A comparison of fisher and weasel hunting behavior. Carnivore 1:28-34.

Reynolds, R. T., R. T. Graham, M. H. Reiser, R. L. Bassett, P. L. Kennedy, D. A. Boyce Jr., G. Goodwin, R. Smith, and E. L. Fisher. 1992. Management recommendations for the northern goshawk in the Southwestern United States. U. S. Department of Agriculture, Forest Service, Rocky Mountain

Romme et.al.2006. Recent Forest Insect Outbreaks and fire Risk in Colorado Forests: A brief Synthesis of Relevant Research. CSU Extension.

Rosgen, David L. 1996. Applied River Morphology. Wildland Hydrology,

Pagosa Springs, CO.

Squires, J. R. 2000. Food habits of northern goshawks nesting in south central Wyoming. Wilson Bulletin 112:536-539.

Squires, J. R. and R. T. Reynolds. 1997. Northern goshawk. Pages Pp. 1-32 in A. Poole and F. B. Gill, The Birds of North America. The Academy of Natural Sciences, Philadelphia, PA.

Stalmaster, M. V. 1987. The bald eagle. Universe Books, New York, New York.

Thomas, JW, ed. 1979. Wildlife habitat in managed forests: the blue Mountains of Oregon and Washington. USDA For. Serv. Agr. Handbook No. 553. Pacific For. and Range Res. Sta. Portland, OR. 512pp.

Thomas, J., K. Sutherland, B. Kuntz, S. Potts. 1990. Montana Nonpoint Source Management Plan. Montana Department of Health and Environmental Sciences, Water Quality Bureau, Helena, MT.

U.S. Fish & Wildlife Service, Montana Prairie Region, Restoration Projects, 2009 Internet database search, http://www.fws.gov/mountain-prairie/pfw/montana.

United States Forest Service. Landscape Aesthetics. Agriculture handbook Number 701. Visual Resource Management System (USDA 1977a, USDA 1977b, USDA 1980a, USDA 1980b), and the Scenery Management System (USDA 1995).

Waller, JS and RD Mace. 1997. Denning ecology of grizzly bears. Chapter 4 in Mace, R.D and J.S. Waller. 1997. Final Report: Grizzly bear ecology in the Swan Mountains. Montana Fish, Wildlife and Parks, 1920 6th Ave. East. P.O. Box 200701, Helena, MT 59620-0701.

Waller, J. S. and R. D. Mace. 1997. Grizzly bear habitat selection in the Swan Mountains, Montana. Journal of Wildlife Management 61:1032-1039.

Watson, J. W., D. W. Hays, S. P. Finn, and P. Meehan-Martin. 1998. Prey of breeding northern goshawks in Washington. Journal of Raptor Research 32:297-305.

Young, Stephen L. 1989. Cumulative Watershed Effects. Lassen National Forest.

5.4 ABBREVIATIONS AND ACRONYMS

ARM	Administrative Rules for Montana
BMP	Best Management Practices
DBH	Diameter at Breast Height
DEQ	Department of Environmental Quality
DF	Douglas-fir
DFC	Desired Future Conditions
DNRC	Department of Natural Resources and Conservation
EA	Environmental Assessment
FWP	Montana Fish, Wildlife, and Parks
ID	Interdisciplinary
LP	Lodgepole pine
MBF	Thousand Board Feet
MC	Mixed conifer
MCA	Montana Code Annotated
MMBF	Million Board Feet
MEPA	Montana Environmental Policy Act
PP	Ponderosa pine
R	Range
SAF	Subalpine fir
Rules	State Forest Land Management Rules
SMZ	Streamside Management Zone
T	Township
TMDL	Total Maximum Daily Load
USDA	United States Department of Agriculture
USFS	United States Forest Service
WL	Western larch

FINDING

FINDING: SHOUP-JONES PROJECT AREAS

An Environmental Analysis (EA) has been completed for the proposed Department of Natural Resources and Conservation (DNRC) Shoup-Jones project areas. After a thorough review of the EA, project file, public correspondence, Department policies, standards and guidelines, Bald Eagle Alternative Practice for the Ride the Pine Timber Sale (part of the Shoup-Jones project area), and the Administrative Rules for Forest Management (ARM 36.11.401-450),

1.0 ALTERNATIVE SELECTED

Two alternatives were presented and were fully analyzed in the EA: the No Action Alternative, which includes existing activities, but does not include the timber sales, pre-commercial thinning, aspen regeneration, or bridge removal; and the proposed action (Action Alternative), which proposes harvesting up to 4 million board feet of timber from 1,100 acres and the other activities listed above. Given the analysis of these alternatives, I have made the following decisions:

For the following reasons, I have selected the **proposed action, Action Alternative**:

a. In my opinion, the proposed action provides the best opportunity to manage for long-term production and integrity of the forest stand (*EA 1.3*). The proposed treatments have been shown in the analysis *(EA 2.3.2, EA Table 2.2 and 2.3,and EA 4.1.1)* to increase the realized productivity of the timber stands, reduce the amount of insect or disease prone trees, provide for the long-term use, and to make a general change to seral species.

   It also meets the objective of realizing the economic value that is present for the Common Schools Trust (*EA 2.3.2*). This would include a sufficient amount of sawlog volume to contribute to the sustained yield for DNRC, up to 4 million board feet (*EA 1.1*), as mandated by State Statute 77-5-222, MCA. This was analyzed in *EA 2.4*, *EA 3.6,* and *EA 4.6.* The additional amount of $378,000.00 to $432,000.00 predicted by the analysis is an obvious benefit. Given the current mountain pine beetle infestation, the possibility of a large loss within the pine species could be quite large. This would remove a large portion of this volume from its current valuable state.

b. The analysis of identified issues did not reveal information compelling the DNRC to not implement the proposed action.

c. The proposed action includes activities to address environmental concerns expressed by DNRC staff and the public. For example, it provides bridge restoration (*EA 2.3.2, Table 2-3, EA 3.2.1, and EA 4.4.4*), and aspen regeneration (*EA 2.3.2, EA 2.3.3,Table 2-3, EA 3.2.1, EA 4.2, and EA 4.5*).

2.0 SIGNIFICANCE OF IMPACTS

For the following reasons, I find that the proposed action would not have significant impacts on the human environment:

<u>*Vegetation*</u>: This EA describes how the proposed timber harvesting and associated activities could potentially impact forest stand characteristics including species composition, age class, and structure. In *EA 4.1.1*, potential effects are described showing minimal or negligible changes and the slight shift toward seral species appears apparent given the various tables. The concern for the native bunchgrass prairie appears to show the potential to be promoted given the Integrated Weed Management plan (*EA 4.1.2*) and contract restrictions on potential decking areas and skid trails (*EA 2.3.3*). Noxious weeds concerns were addressed in *EA 4.1.2 and 4.1.3*, and should be manageable with the increased weed control (including the work done by the existing grazing lessee.

Watershed and Soils: This EA looks at two separate areas that are dispersed. The Jones Lake area (Section 16 T15N R11W) will involve the aspen regeneration and the bridge removal. Both of these activities will be within areas that could concern hydrologic, and soil concerns. These were shown to be of minimal long term concern and would possibly show some minimal impact to water quality. Both would produce long term benefits however. The water quality and quantity also appears to show low effects. Regarding cumulative effects, it was stated within *EA 4.2*, "*With no measurable increases in water yield, in-stream sediments and channel form and function would be similar to no-action.".*

The soil concerns appear to be mitigated by proper harvest timing and BMP application, course woody debris requirements, soil displacement restrictions, and steepness operated on ground harvest units. If past sales can provide an idea of what can be expected, 15% or less of the ground within this project area will see effects "greater" than the low effects predicted for the harvest areas. The risk of cumulative effects is predicted to be low, and as was stated in the EA "Most harvest sites proposed have been previously entered with selective harvest generally over 20-30 yrs ago, and the areas affected have recovered and left minimal effect on the soils, with few trails still evident." This also assures me that losses on this soil are not permanent and will recover.

Wildlife:

Grizzly Bear: The grizzly bear is the only federally threatened species of concern known to occasionally inhabit this project area. Given special mitigations for the grizzly bear listed in *EA 4.5.1*, and the harvest and road planning, all effects (direct, indirect, and cumulative) are expected to be low.

Bald Eagle: An unused nest occurs in the southwest part of the section. Special mitigations were also instituted and are found in *EA 4.5.2*. With the implementation of these mitigations (and the "Bald Eagle Alternative Practice), all effects (direct, indirect, and cumulative) are expected to be low.

Pileated Woodpecker: Given the predicted reduction of pileated woodpecker habitat from 339 to 194 acres across this project area, the predicted effects are low to moderate (*EA 4.5.3*). Cumulative effects are also predicted to be low to moderate as much of the surrounding area has been harvested previously or are open grasslands.

Fisher: Given the forest types that are to be managed by this project, the effects on the fisher are low to moderate on the Shoup section and low on the Jones Lake parcel. Although the treatments within the Shoup section would have "a deleterious effect on fisher habitat", the surrounding area (more contiguous forest with a greater canopy cover) will help deter many of those concerns. Cumulative effects are predicted to be low to moderate across the project area (*EA 4.5.4*).

Flammulated Owl and Common Loon: All effects are predicted to show low direct, indirect, and cumulative effects (*EA 4.5.5 and 4.5.6*).

Big Game: The planned reduction in cover by harvest units is predicted to cause direct, indirect, and cumulative effects to low to moderate (*EA 4.5.7*).

Great Grey Owl: The treatment of heavier forested areas, especially in the Jones Lake section, is predicted to create low to moderate direct and indirect effects. Cumulative effects are also likely to show a moderate cumulative effect (*EA 4.5.8*).

Northern Goshawk: The reduction in canopy closure will likely reduce locations to nest in both parcels of this sale. There will also be an increase in areas that may provide areas for foraging. Both parcels can expect direct and indirect effects to show a low to moderate effect. Cumulative effects again show the difference regarding neighboring

landowners and past treatment. Within the Jones parcel, cumulative effects are expected to be moderate, the Shoup section is predicted to show low risk (*EA 4.5.9*).

Red-tailed Hawk: This species is common but is managed by the Migratory Bird Treaty Act. Given the restrictions within this law, direct and indirect effects are expected to be low to moderate. Cumulative effects are predicted to be low (*EA 4.5.10*).

Fisheries: This project stated a concern that it could adversely affect stream temperatures, stream shading, stream sediments, and recruitable large woody debris in Shoup and Dick creeks. It was predicted that Shoup Creek would show a low increase in direct and indirect effects. Given the installation of rolling dips as part of this project, a minor to moderate *positive* cumulative effect would be seen (*EA 4.4.1*). Within the Dunham ditch, the analysis has stated that the effect on the introduced Brook trout would be a low to moderate. Cutthroat trout however would show a moderate direct and indirect risk. This would also show that it could show that it is a moderate risk cumulatively (*EA 4.4.2*), although it is a man made feature. Dunham and Upper Monture Creeks are predicted to show low direct, indirect, and cumulative risk (*EA 4.4.3*). The upper Dick Creek area includes the bridge removal and restoration of the crossing. Given this proposed action, and potential SMZ harvest, there may be an increase in the peak seasonal temperature. This increase, 0.5º C, is within the range common for westslope cutthroat trout. Cumulative effects are expected to very near the no action alternative (*EA 4.4.4*).

Economics, Grazing, and Other Human Concerns
As was described in the first part of this finding, the economics of this sale indeed are predicted to suffice the raised concern (*EA 4.6*). The DNRC grazing lessee has been in contact with the DNRC throughout the planning of this sale. He has been involved with ideas concerning the fuel treatment on this sale. Aesthetics were also analyzed, and some minor changes to "the way areas will look" is expected in the immediate future. The user of unimproved campsites within the area will also see a change in the location over the short run, but with changes of the fuels treatment in many areas, these concerns should show a low direct, indirect, and cumulative effect.

3.0 SHOULD THE DNRC PREPARE AN ENVIRONMENTAL IMPACT STATEMENT (EIS)?

Based on the following, I find that an EIS does not need to be prepared:

a. The EA adequately addressed the issues identified during project development and displayed the information needed to make the decisions.

b. Evaluation of the potential impacts of the proposed timber sale indicates that no significant impacts would occur.

c. Sufficient opportunities for DNRC staff and public review and comment during project development and analysis were provided. DNRC staff and public concerns were incorporated into project design and analysis of impacts.

/s/ Craig V. Nelson
Supervisory Forester
Clearwater Unit
Southwestern Land Office
April 1, 2010

MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

CLEARWATER UNIT
BOX 48455 SPERRY GRADE ROAD
GREENOUGH, MT.
59823-9635

(406) 244-5857

Persons with disabilities who need an alternative, accessible format of this document should contact the DNRC at the above address or phone number.

30 **copies of this document were published at an estimated cost of $19.00 per copy.**
The total cost includes $17.00 for printing/binding and $2.00 for distribution.