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Cool Flat 4X4 Timber Sale

Environmental Assessment

Montana Department of Natural Resources and Conservation

Southwestern Land Office

Lincoln Field Office of the Clearwater Unit

July 15, 2005

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FINDING
COOL FLAT 4X4 TIMBER SALE

An Environmental Analysis (EA) has been completed for the proposed Department of Natural Resources and Conservation (DNRC) Cool Flat 4x4 Timber Sale. After a thorough review of the EA, project file, public correspondence, Department policies, standards and guidelines, and the State Forest Land Management Rules (SFLMR), I have made the following 3 decisions:

1. ALTERNATIVE SELECTED

Two alternatives are presented and were fully analyzed in the EA: the No-Action Alternative, which includes existing activities, but does not include a timber sale *(EA, 2.2.1)*, and the proposed action which proposes harvesting up to 2.0 million board feet of timber from 470 acres *(EA 2.2.2)*.

For the following reasons, I have selected the proposed action without additional modifications:

a. In my opinion, the proposed action best meets the purpose and need for action and the specific project objectives listed in the EA in 1.3 ***Project Objectives***. The environmental effects of the proposed action are acceptable as compared with the no action alternative. Silviculturally, this timber sale would promote tree regeneration of seral species and any risk of blowdown of the residual stand would be minimal. The proposed project would decrease the susceptibility of remaining trees to insect and disease infestations, and increase tree vigor. The action alternative would reduce the threat of catastrophic wildfire and its potential impact upon areas to the east of Lincoln, MT. within the Blackfoot River valley floor. The aesthetics of this proposed project have been analyzed and are predicted to see only short-term impacts. There are not any sensitive plants located on the sale area given DNRC surveys and the Montana Natural Heritage Program. Noxious weeds would be treated with an accepted manner of treatment. No major losses or unacceptable effects to water or soil, or the hydrologic makeup of watercourses would be predicted to occur. No losses in habitat, or unacceptable effects to Threatened, Endangered, or Sensitive species, big game, or fisheries would be expected to occur under the proposed action. There are no known historic or pre-historic cultural resources at this site. The proposed action generates more return to the school trust than the no action alternative.

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

c. The proposed action includes activities to address environmental concerns expressed by DNRC staff and the public.

d. All proposed mitigations are adequate and feasible.

2. SIGNIFICANCE OF IMPACTS

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

a. Forest Health

The action alternative is designed to bring stands back to an historic condition and the age classes and would not be outside the natural range of variability *(EA 4.3.1.1)*. Primarily, the silvicultural treatments used would remove less vigorous Douglas-fir and lodgepole pine. The changes made through the treatments should improve forest health and growth on the forested DNRC acres *(EA 4.3.1.1)*.

Vigor and health in almost all of the stands is currently poor to good but here is an increasing rate of insect activity currently with more expected in the near future due to the age of many stands within this project *(EA 3.2.1.2)*. There are also areas of *Armellaria spp.* root rot within section 16 *(EA 3.2.1.2)*. By leaving trees of higher vigor, and trees of species that are less susceptible to the rot, it is planned that these stands will improve their vigor *(EA 4.3.1.2)*. Blowdown may occur after the harvest. Immediately, these trees could serve as "feeding sites" for bark beetles in the area. These trees would be salvaged if it was economically feasible as part of this project. Generally, harvest would be expected to reduce insect and disease outbreaks in the area *(EA 4.3.1.2)*.

b. Fire Hazard

Much of this project area is made of the Douglas-fir habitat types. Within these areas, the fire interval would range between 5 and 42 years *(EA 3.2.1.3)*. Due to the past history of fire suppression, the stands in these areas have changed immensely and many would now burn as a stand replacement fire as opposed to the low to moderate severity fires of the past *(EA 3.2.1.3)*. The thinning and removal of forest fuels and canopies would decrease the general fire intensity and thereby improve the ability to control these fires. Immediately after the harvest, the fresh slash caused by that harvest would temporarily increase the fireline intensity, but that effect would decrease within a few years *(EA 4.3.1.3)*. It can be assumed that this harvest and the decrease in long-term fire behavior would be a benefit to the surrounding landscape and to DNRC cabin leases within the project area *(EA 4.3.1.3)*.

c. Aesthetics

Much of the project area can be seen from Highway 200, the cabin site lease lots, and the subdivision on the 4x4 Road *(EA 4.3.1.4)*. Immediately after harvest, slash would be evident after harvest *(EA 4.3.1.4)*. The overall proposed activities should blend with the current natural mosaic and past activities on the surrounding landscape *(EA 4.3.1.4)*. Effects are expected to be more pronounced in the short-term (following harvest) but should lessen as stands regenerate and grow *(EA 4.3.1.4)*.

d. Sensitive Plants
No sensitive plants have been identified *(EA 4.3.1.6)*.

e. Noxious Weeds
The project area has several small areas and pockets of noxious weeds *(EA 3.2.1.7)*. Increases of ground disturbance often cause increases the areas that weeds can inhabit. By using Integrated Weed Management (IWM) which includes: requiring cleaned equipment, treating existing weed patches with herbicide and insects, and grass seeding new roads *(EA 4.3.1.7)*, Protection of water quality will be done by following label descriptions and not applying it near streams and areas where runoff could reach streams *(EA 4.3.1.7)*.

f. Soils
The primary risk to soils and their productivity are compaction and erosion *(EA 4.3.2)*. The project has been designed to leave tops, limbs, and unusable pieces of trees within the units to be recycled and return nutrients into the soils and provide coarse woody debris for microorganisms and small mammals *(EA 4.3.1.3)*. To restrict compaction, harvesting would only be done when the forest officer approves soil moisture, skid trail design has been approved (less than 15% of unit area), or frozen ground or 18" of snow (loose) exist *(EA 4.3.2)*.

g. Hydrology and Fisheries
The Blackfoot River is the main waterbody within this project area *(EA 3.2.3.1.1)*. The Blackfoot River has a large number of fish species that it supports, and includes the Bull trout (threatened) and the West Slope Cutthroat (Species of Concern)*(EA 3.2.3.2)*. The Blackfoot River within section 22 is listed on the 1996, 2000, and 2002 303d list of impaired waterbodies *(EA 3.2.3.2)*. A 100 to 150 foot "no-cut" buffer zone *(EA 4.3.3.1.1)* will help increase large woody debris recruitment for existing and future channels *(EA 4.3.3.2)*. There are no streams near where road construction will occur *(EA 4.3.3.1.2)*.

h. Wildlife: Threatened and Endangered Species
Grizzly Bears: This project area is within the Northern Continental Divide Ecosystem (NCDE) recovery area and has been used recently *(EA 3.2.4.1.1)*. Historically, this area has been a problem for grizzly bears as they have been re-located or removed *(EA 3.2.4.1.1)*. Reductions in open road mileage on DNRC sections *(EA 3.2.4.1.1)*, and the silvicultural prescriptions used *(EA 4.3.4.1.1)* help reduce human and grizzly bear interactions. The timber sale has been designed to use existing topography and visual screening to block the view of grizzly bears *(EA 4.3.4.1.1)*. Much of the habitat was changed by the Snow Talon Fire *(EA 4.3.4.1.1)*. Currently, harvest will change the vegetative cover, but it is assumed that the stands will regenerate. As these stands "fill in" the visual screening cover will increase. It is expected that these will all decrease the chance of any effect to the grizzly population to low levels *(EA 4.3.4.1.1)*.

i. Wildlife: Sensitive Species

Pileated Woodpecker: The Pileated woodpecker is one of the largest woodpeckers in North America *(EA 3.2.4.2.1)*. Pileated woodpeckers require nest snags that average 29 inches DBH (but have nested in snags of 15 inches) *(EA 3.2.4.2.1)*. Many of the stands within the project do not have trees in the 27 inch size *(EA 3.2.4.2.1)*. Much of the harvest would reserve the trees within this size class (generally ponderosa pine or healthy Douglas-fir) from cutting *(EA 4.3.4.2.1)*. The proposed project would provide low to moderate risk of direct and indirect effects, and would most likely re-distribute any Pileated woodpeckers *(EA 4.3.4.2.1)*.

Fisher: Fishers are a medium-sized animal belonging to the weasel family. They prefer dense lowland spruce-fir forests with high canopy closure *(EA 3.2.4.2.2)*. The proposed project would harvest approximately 90 acres of the 223 acres of fisher habitat *(EA 4.3.4.2.2)*. Retention of these 133 acres would not sustain fisher during a breeding season *(EA 4.3.4.2.2)*. The project is expected to have low effects on fishers *(EA 4.3.4.2.2)*.

Flammulated Owl: The flammulated owl is a tiny forest owl that inhabits warm-dry ponderosa pine and cool-dry Douglas-fir forests and is a secondary nester *(EA 3.2.4.2.3)*. Approximately 408 acres of 926 acres of predicted flammulated owl habitat is proposed to be harvested *(EA 4.3.4.2.3)*. A large portion of the potential flammulated owl habitat is not usable due to high crown density and canopy closure *(EA 4.3.4.2.3)*. Where ponderosa pine is present it would be the preferred leave tree species. The existing silvicultural prescription would reduce canopy closure and reduce the density of shade tolerant species *(EA 4.3.4.2.3)*. It is expected that harvest would increase the habitat for flammulated owl, and this project would have a low risk of effects *(EA 4.3.4.2.3)*.

Harlequin Duck: Harlequin ducks require white water streams with boulder and cobble substrates. They often dive up to 3 to 5 feet under the surface to search for food; so therefore, water quality is of concern *(EA 3.2.4.2.4)*. There are no existing records of harlequin ducks nesting within the project area or along the Blackfoot River and Keep Cool Creek in that area *(EA 3.2.4.2.4)*. The most major impact to any potential harlequin ducks downstream will be sediment from the Snow Talon Fire, and this project would be minor in comparison *(EA 4.3.4.2.4)*. It is expected that this project would have minor impacts *(EA 4.3.4.2.4)*.

j. Wildlife: Big Game

White-tailed Deer: White-tailed deer are quite common in the project area. The densely stocked areas provide for thermal protection and hiding cover for the deer in the winter. There are approximately 406 acres of densely canopied forest within the project area *(EA 3.2.4.3.1)*. Given harvest plans with the project there would be a 52% reduction in snow-intercept cover and a reduction of 210 acres of winter range cover *(EA 4.3.4.3.1)*. This area is close to Lincoln, Montana, and receives a low level of archery hunting pressure *(EA 3.2.4.3.1)*. It is predicted that the white-tailed deer population would see low risk from this project *(EA 4.3.4.3.1)*.

Elk: Elk generally avoid roads, but will become more tolerant of closed roads over time. Given the normal calculations to calculate elk security cover, there is no elk security cover within the project area *(EA 3.2.4.3.2)*. There may be a creation of more nutritious and highly palatable forage after the harvest *(EA 4.3.4.3.2)*. Along the travel route between summer range and winter the elk will be under hunting pressure *(EA 4.3.4.3.2)*. Given the number of roads and houses within the project area, risk is low *(EA 4.3.4.3.2)*.

Moose: The location of the project area (near Highway 200) and the houses in and around the project area, moose may only utilize this area as the transition from the Blackfoot River to more northerly destinations *(EA 3.2.4.3.3)*. For the occasional moose that may utilize the project area, the project would have low to moderate risk *(EA 4.3.4.3.3)*.

k. Archeology

No historic and prehistoric cultural resources have been located on the project area *(EA 3.2.5)*.

l. Economic Analysis

Currently there are cabin site leases and grazing leases on these sections. These do provide income, and will continue to do so, during and after the project *(EA 2.2.1, and EA 4.3.6.1 Table IV-4)*. Given projected timber receipts *(EA 4.3.6.1 Tables IV-3 and IV-4)* to the State of $528,000.00, no other action currently meets those needs. This project achieves the project goal and maximizes return on the current timber resource *(EA 4.3.6.2)*.

m. Human Environment

It is my decision to move forward with this project. Through everything that has been studied in this Environmental Assessment, there are not any concerns or known impacts that would have a significant impact on the human environment.

3. SHOULD 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.

Craig V. Nelson
Supervisory Forester
Clearwater Unit
Southwestern Land Office
July 13, 2005

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ABBREVIATIONS

Ac	Acres
ALP	Alpine Fir
ARM	Administrative Rules for Montana
AUM	Animal Unit Month
BAER	Burned Area Emergency Rehabilitation
Bdft	Board Feet
BLM	Bureau of Land Management
BMP	Best Management Practices
BMU	Bear Management Unit
CO	Colorado
CWD	Coarse Woody Debris
DBH	Diameter at Breast Height
Dept	Department
DEQ	Department of Environmental Quality
DF	Douglas-fir
DNRC	Department of Natural Resources and Conservation
E	East
EA	Environmental Analysis
ECA	Equivalent Clearcut Acres
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FI	Forest Improvement
FS	Forest Service
FWP	Fish, Wildlife, and Parks
HRA	Hazard Reduction Agreement
HW	Hardwood
ICRB	Interior Columbia River Basin
IWM	Integrated Weed Management
LP	Lodgepole Pine
MBF	Thousand Board Feet
MC	Mixed Conifer
MCA	Montana Code Annotated
MMBF	Million Board Feet
MEPA	Montana Environmental Policy Act
MT	Montana
N	North
NCDE	Northern Continental Divide Ecosystem
NF	Nonforested
NW	Northwest
PP	Ponderosa Pine
R	Range
RCA	Restoration/Conservation Area

RMZ	Riparian Management Zone
S	South
SE	Southeast
SFLMR	State Forest Land Management Rules
SMZ	Streamside Management Zone
SWHC	Soil Water Holding Capacity
T	Township
TMDL	Total Maximum Daily Load
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
W	West
WA	Washington
WL	Western Larch
WYI	Water Yield Increase

CHAPTER I - PROPOSED ACTION AND OBJECTIVES

1.1 Description of the Proposed Action

The Department of Natural Resources and Conservation (DNRC), Lincoln Field Office of the Clearwater Unit, proposes to harvest timber on state lands to generate revenue for the Montana School Trusts. The project area is located approximately 0 to 4 miles east of Lincoln, Montana in the Keep Cool and Blackfoot River drainages, and involves portions of Section 8, 16, 19, and 22 in Township 14 North, Range 8 West (these sections will be referred to as Section 8, 16, 19, and 22 in the rest of this EA) for a total gross sale area of approximately 1505 acres (see Figure 1-1. Vicinity Map). The proposed action would harvest approximately 2.0 MMBF of timber from 470 acres of forested land. This would be accomplished by means of ground skidding these 470 acres with an improvement harvest silvicultural prescription. Approximately 0.4 miles of road would be constructed, approximately 0.55 miles of road would be obliterated and 0.7 miles would be effectively closed. Harvest operations would be expected to take place between July, 2006 and approximately October, 2008.

1.2 Project Need

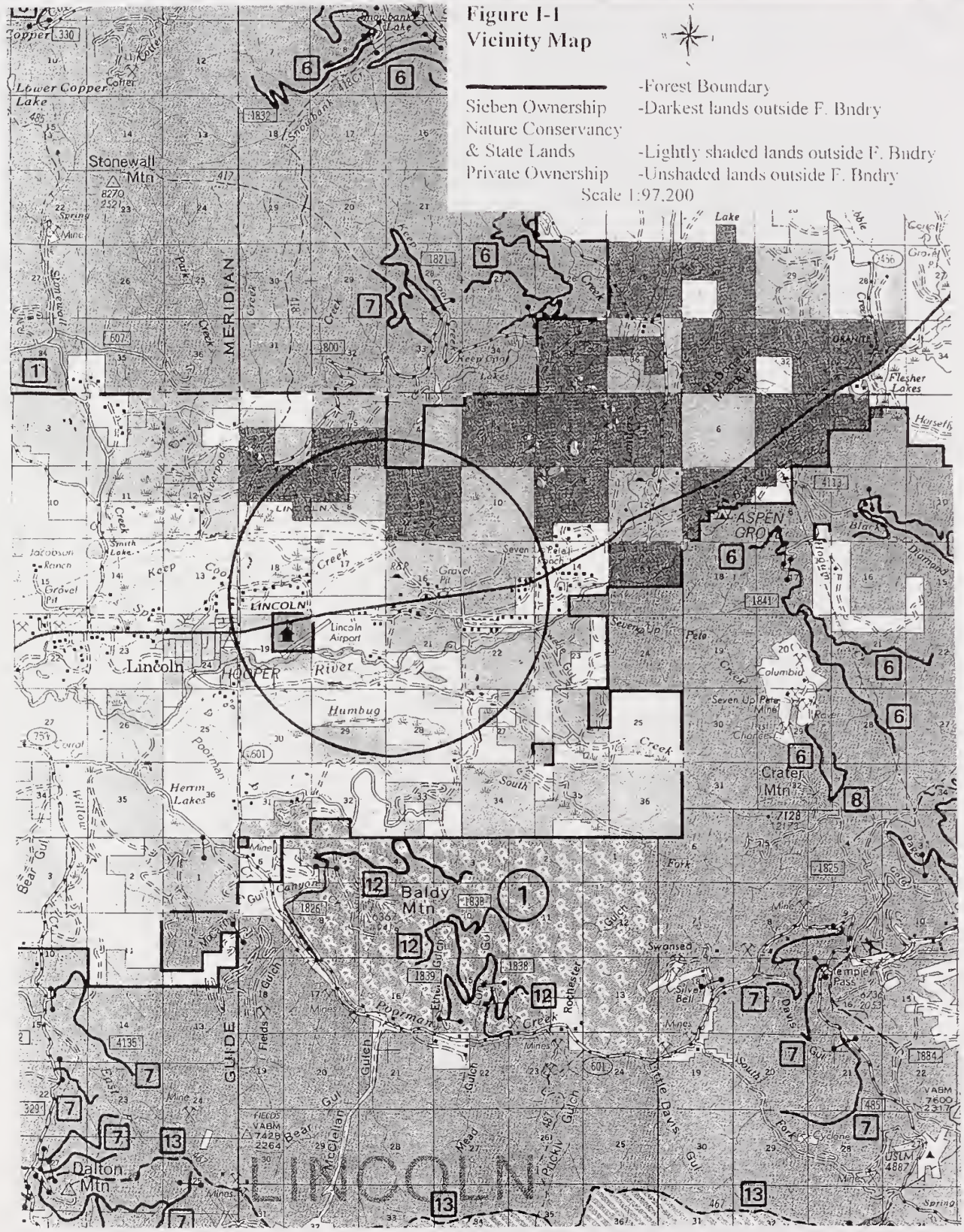
The lands involved in this proposed project are held by the State of Montana in trust for the support of specific beneficiary institutions such as public schools, state colleges and universities, and other specific state institutions such as the school for the deaf and blind (Enabling Act of February 22, 1889; 1972 Montana Constitution, Article X, Section 11). The Board of Land Commissioners and the Department of Natural Resources and Conservation are required by law to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run for these beneficiary institutions (Section 77-1-202, MCA). Additionally, the stands on these parcels of land are generally in poor to fair health and are in need of treatment to bring them back toward their income generating potential. In 2003, the DNRC adopted the State Forest Land Management Rules (SFLMR) (Montana DNRC, 2003). The SFLMR set requirements that the DNRC must follow when managing forested state trust lands. The DNRC would manage the lands involved in this project according to the SFLMR.

1.3 Project Objectives

In order to follow the SFLMR and meet the DNRC's sustained yield requirements, the DNRC has developed the following specific project objectives:

1. Maximize revenue over the long-term for the School Trust accounts from the timber resources and provide a sufficient amount of sawlog volume to contribute to the DNRC's sustained yield as mandated by State Statute 77-5-222, MCA.
2. Manage the identified parcel intensively for healthy and biologically diverse forests to provide long-term income for the Trust.
3. Improve timber stand growth and vigor and reduce the threat of future losses to bark beetles.

4. Reduce fuels in and around the urban interface.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Vicinity Map
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Sieben Ownership -Darkest lands outside F. Bndry
Nature Conservancy
& State Lands -Lightly shaded lands outside F. Bndry
Private Ownership -Unshaded lands outside F. Bndry
Scale 1:97,200
Lower Copper Lake
Stonewall Mtn
MERIDIAN
LINCOLN
Lincoln Airport
Lincoln
HOOPER
River
Humbug
Poorman
Herrm Lakes
Baldy Mtn
GUIDE
Dalton Mtn
ASPEN GRO
Columbia
Crater Mtn
Swansed
Flesher Lakes
Keep Cool Lakes
Seven Up Pete Mine
Gravel Pit
Jacobson Ranch
Smith Lake
Fields
Davis
Rochester
Ethel Gulch
Mead Gulch
Pucklin Gulch
McClellan Gulch
Bear Gul
Bear Gul
Willow
Fork
Cyclone
Spring

1.4 Relevant Laws, Regulations, EISs, EAs, and Other Relevant Documents

1.4.1 Cooperating Agencies With Jurisdiction and Required Permits

- The Clean Water Act and Environmental Protection Agency Water Quality Planning and Management Regulations require the determination of allowable pollutant levels in 303(d) listed streams through the development of Total Maximum Daily Load (TMDL) limits.

- The Montana Streamside Management Zone (SMZ) Law administered by the Department of Natural Resources and Conservation (DNRC) would be adhered to when operations occur near streams.

- Open Burning regulations under the Montana DEQ would be followed for all burning and hazard reduction work.

1.4.2 Other EISs, EAs, and Relevant Documents in the Area

State Forest Land Management Plan EIS, DNRC 1996, set the strategy that guides DNRC management decisions statewide.

Star Val Road Timber Permit, DNRC 2004, salvage of 500 bdft from lease lot in Section 16.

Lincoln Flats Precommercial Thinning EA Checklist, DNRC 2004, precommerically thin 127 acres in Section 8.

McDonald Gold Project EIS, Seven-Up Pete Joint Venture 1994, construction of a gold mine and removal of gold and associated activities on Section 6 T14N, R7W.

Golden Arches EA, DNRC 2004, harvest of 5.6 MMBF in the Landers Fork drainage.

Lincoln Compound II Categorical Exclusion, FS 2003, harvest 155 MBF from 34 acres in Section 19 T14N, R8W.

Snow Talon Burned Area Emergency Rehabilitation Plan, FS 2003, assesses post-fire conditions.

Helena National Forest Weed EIS, FS 2004, proposes weed control on FS ground in the Lincoln area.

Lincoln Post-Fire Rehabilitation Project Categorical Exclusion, FS 2004, proposal to address non-emergency fire rehabilitation needs within the Snow Talon and Moose Wasson burned areas such as tree and shrub plantings, biological weed control, insect monitoring, pesticide, and pheromone treatments, and administrative site maintenance and repair.

Snow Talon Fire Salvage Draft EIS, FS 2005, proposal to salvage approximately 20-25 MMBF on up to approximately 2700 burned acres and associated activities and reclamation of 105 acres of old jammer trails all in the Copper Creek drainage and associated haul road in the Landers Fork and Copper Creek drainage.

1.5 The Decision That Must Be Made

The Decision Maker will determine the following from this EA and will document their decision in the Finding found at the end of the document.

- Should the project be implemented or should an EIS be prepared?
- Do the alternatives presented in the EA meet the purpose of the project?
- Which alternative should be implemented?
- Are the proposed mitigations adequate and feasible?
- Does the selected alternative have a significant effect on the human environment?

1.6 Scope of the Environmental Analysis

1.6.1 Project Scoping

The initial stage of many EAs is the public scoping process, which is used to inform the public that a state agency is proposing an action and gather comments on the possible impacts of the project. The scope of this EA was determined by the professional judgment of resource specialists in DNRC, other state agencies, comments from the public, and other interested parties.

The initial proposal, which was scoped in October of 2004, proposed the harvest of 1.8 MMBF from 475 acres of ground and included the construction of approximately 0.2 miles of road. In addition to public scoping, resource professionals in state and federal agencies were scoped to notify them and receive input. Comments were received from various individuals, organizations, and agencies and grouped into the concerns that follow. These concerns as well as issues that were identified internally within the DNRC were used to help guide the development of the action alternative.

The mailing list of parties receiving initial scoping notices for this project is located in the project file at the Lincoln Field Office. Public scoping comments as well as internal DNRC issues and concerns were summarized and can be found below. The original comments are also located in the project file at the Lincoln Field Office.

1.6.2 State Forest Land Management Rules Role in the Project

The SFLMRs were adopted in 2003 by the DNRC and provide specific rules that the DNRC must follow in the management of all forested state trust lands. A copy of these rules can be obtained at any DNRC office with forest management responsibilities. This EA and its associated proposed activities were developed through an interdisciplinary team approach that facilitated the incorporation of appropriate rules into the proposed action and the proposed management activities and mitigations that may be involved. All appropriate rules were used to help develop the proposed action and were most important in areas such as forest health, income generation, riparian management zones, wildlife, and roads management.

1.6.3 Issues and Concerns

The comments received as well as internal issues were grouped and a summary is presented below. Issues and concerns are listed in no particular order. See Chapters III and IV for more detailed descriptions and on relative importance of these issues and concerns.

Comments were received expressing concerns that:

< If the proposed action does not take place, timber stand health could continue to decline with increased risk of insect and disease outbreaks, and increased competition stress from overstocking.

< If the proposed action does not take place, risk of high intensity stand replacing fires would continue to increase.

< Slash from timber harvest activities could increase fire hazard and could make the site look unpleasant.

< The residual stands could be susceptible to blowdown.

< The proposed project could change the aesthetics in the area as well as around lease and homesites.

< Proposed activities could spread noxious weeds.

< The proposed project could interfere with the groomed snowmobile system during the winter.

< Increased levels of compaction and erosion could occur as a result of the proposed harvest.

< The proposed project could affect the Blackfoot River, which is an important bull trout and westslope cutthroat fishery.

< The proposed project could affect future CWD recruitment to the Blackfoot River and there could be effects if channel migration occurred in the future.

< Management activities associated with this project could have adverse effects on water quality

< Proposed activities could have adverse effects on fisheries habitat.

< The proposed project, if implemented, may negatively impact bald eagles, grizzly bears, gray wolves, and lynx.

< The proposed project, if implemented, may negatively impact sensitive species.

< The proposed project, if implemented, may negatively impact white-tail and mule deer, elk, and moose.

1.6.4 Issues Eliminated From Further Study

1.6.4.1 Snowmobile Trails

There is concern that the proposed activities could interfere with the groomed snowmobile system during the winter. The local snowmobile club that grooms the snowmobile trail system would be kept informed of ongoing activities and alternate routes found or safety hazards and inconveniences minimized.

1.6.4.2 Threatened and Endangered Species

1.6.4.2.1 Bald Eagle (federally threatened)

There is concern that timber harvest activities would alter bald eagle habitat or provide unnecessary disturbance. The project area is 2.1 miles east of the nearest known bald eagle nest. Thus, due to the distance between the nest and project area, there would be low risk of direct, indirect, or cumulative effects to bald eagles as a result of the proposed action.

1.6.4.2.2 Canada Lynx (federally threatened)

Lynx distribution and abundance is strongly correlated with snowshoe hares, their primary prey. Consequently, lynx foraging habitat follows the predominant snowshoe hare habitat, early- to mid-successional lodgepole pine, subalpine fir, and Engelmann spruce forest. At present, the project area is devoid of lynx habitat. Given the lack of habitat and high degree of human development within the project area, there would be minimal risk of direct, indirect, and cumulative effects to lynx as a result of the proposed action.

1.6.4.2.3 Gray Wolf (federally threatened)

There is concern that the proposed timber harvest activities would adversely affect gray wolves. The project area is located approximately 8 miles north of the Halfway wolf pack. However, the

Halfway pack was removed by the U.S. Fish and Wildlife Service in 2003 due to livestock depredations. Although wolves have home ranges on the order of 500 mi^2, due to the distance between the pack and the project area, there would be low risk of direct, indirect, or cumulative effects to wolves as a result of the proposed action.

1.6.4.3 Sensitive Species

1.6.4.3.1 Peregrine Falcon

There is concern that timber harvest activities would disturb nesting peregrine falcons. The nearest known peregrine falcon nest is located approximately 25 miles east of the affected area. Thus, the proposed action would have low risk of direct, indirect, or cumulative effects to this species.

1.6.4.3.2 Black-backed Woodpecker

There is concern that timber harvest activities would disturb black-backed woodpeckers. This species is most often associated with areas that recently experienced stand-replacing fire (Hutto 1995). The 2003 fire season produced approximately 34,242 acres of burned habitat within an approximate 12-mile radius of the proposed project area that may be suitable for black-backed woodpeckers. Thus, with the abundance of habitat, the proposed action would have low risk of direct, indirect, or cumulative effects to this species.

1.6.4.3.3 Common Loon

There is concern that timber harvest activities could affect or disturb common loons. This species is a diving bird, which requires relatively clear water to hunt aquatic prey, and minimal disturbance during nesting. While there are approximately 16 small lakes or ponds surrounding the proposed project area, each body of water is not connected to the Blackfoot River (or are at least connected to upstream tributaries), and is at least 0.25 mile from the proposed action. Thus, common loons would not be affected by the proposed timber harvest operations or associated activities.

1.6.4.3.4 Coeur d'Alene Salamander

There is concern that timber harvest activities could affect this species. This species requires waterfall spray zones or cascading streams. There are no known waterfalls or splash zones within the affected area. Thus, the proposed action would have low risk of direct, indirect, or cumulative effects to this species.

1.6.4.3.5 Townsend's Big-eared Bat

There is concern that timber harvest activities would disturb Townsend's big-eared bats. This species requires caves, caverns, or old mines for hibernacula. The closest mining operation to the project area is a placer mine (placer mines don't typically create mining shafts) located

approximately 0.1 mile north of Section 16, T14N, R08W, on private ground. Current conservation strategies for this species indicate that a 500-ft radius buffer be installed around mine entrances to partially mitigate for the effects of timber harvest (Pierson et al. 1999). Thus, with the proposed action located > 1 mile from a mine shaft (but approximately 0.1 mile from a placer mine), there would be low risk of direct, indirect, or cumulative effects to this species.

1.6.4.3.6 Columbian Sharp-tailed Grouse

There is concern that timber harvest activities could affect this species. The nearest known population of Columbian Sharp-tailed grouse occurs near Ovando, MT (Deeble 1996). Thus, the proposed action would have low risk of direct, indirect, or cumulative effects to this species.

1.6.4.3.7 Northern Bog Lemming

There is concern that timber harvest activities could affect this species. The sphagnum meadows, bogs or fens with thick moss mats required by this species are not present within the harvest area. Thus, the proposed action would have low risk of direct, indirect, or cumulative effects to this species.

1.6.4.3.8 Mountain Plover

There is concern that timber harvest activities could affect this species. The short-grass prairie habitats required by this species are not present within the harvest area. Thus, the proposed action would have low risk of direct, indirect, or cumulative effects to this species.

CHAPTER II - ALTERNATIVES

2.1 Introduction

This chapter is intended to describe the alternatives developed and considered in this EA. It contains summaries and comparisons of the actions and effects involved with each alternative. The environmental consequences of each alternative are listed here for comparative purposes. However, more detailed information can be found in Chapters III and IV, which follow.

2.1.1 Initial Stages of Development

The DNRC has known for some time that forest health is declining on state land in the project area, however only salvage treatments had occurred to this point that were reactive in nature. DNRC felt it was time to pursue preventative treatments in the area to achieve the project goals. It was decided that four sections (8, 16, 19, and 22) would be included in this Cool Flat 4x4 EA (see Table II-1 below). The intent of this project was to treat these four sections to achieve the objectives of maximizing revenue over the long-term from timber resources for the School Trust accounts and provide a sufficient amount of sawlog volume to contribute to the DNRC's sustained yield, manage intensively for healthy and biologically diverse forests, improve timber stand growth and vigor and reduce the threat of future losses to bark beetles, and reduce fuels in the urban interface. The first three of these objectives come directly from the State Forest Land Management Rules that the DNRC is required to follow. The initial proposal, which was scoped in October of 2004, proposed the harvest of 1.8 MMBF from 475 acres of ground and included the construction of 0.2 miles of road. Comments were received from various individuals, organizations, and agencies and grouped into the concerns listed in Chapter I. These concerns as well as issues that were identified internally within the DNRC were used to help guide the development of the action alternative.

TABLE II-1
Description of Sections

Legal Description	State Owned Acres	Forested Acres	School Trusts
Section 8, T14N, R8W	320	262	N1/2SW1/4-School for the Deaf & Blind Remainder-Public Buildings
Section 16, T14N, R8W	640	418	Common Schools
Section 19, T14N, R8W	65	65	Common Schools
Section 22, T14N, R8W	480	242	School for the Deaf & Blind
Total	**1505**	**987**	

2.1.2 Development of Alternatives

To perform analysis of existing conditions and effects of the proposed action in the project area by DNRC specialists, the project leader, and the decision maker, an interdisciplinary team was formed to develop alternatives and address the issues. Public comments were received, grouped into the concerns listed in Chapter I, and existing condition information was compiled. Using this information, the team met to develop alternatives. The largest issues the team built this project around were forest health, grizzly bears, roads, and fisheries issues (see Chapter IV for more detail). Some of these issues led to a 100 to 150 foot no-harvest buffer along the Blackfoot River, the closing of 0.35 miles of road, the more effective closure of 0.35 miles of additional road, and the obliteration of 0.55 miles of road. The team decided with these and other applied mitigations that one action alternative would suffice to address issues and concerns while meeting project objectives. It was decided that any alternatives that proposed to harvest more acres would not meet biological and resource goals, and likewise any alternatives that proposed to harvest less acres would not meet revenue and forest health objectives. So a balance was reached that meets the project objectives.

2.2 Description of Alternatives

2.2.1 Alternative A - No Action

Alternative A defers treatment of all sections at the present time. In this case, the DNRC would move on to a new project area on the Clearwater Unit and begin environmental analysis for a timber harvest and associated road building at that location. Current management activities such as fire suppression, leasing lots, and grazing would continue. No improvements to the current road system would occur, and it would be left in its current state. Forest health would continue to decline on the project area resulting in lost growth and revenue. Following the appropriate level of MEPA review, timber harvesting or road building could be proposed and undertaken in the future. This alternative can be used as a baseline for comparing the environmental consequences of the other action alternative.

<u>Past, Present, and Reasonably Foreseeable Relevant Actions:</u>
Past relevant management activities include historic timber harvesting, precommercial thinning and the salvage of beetle-killed trees. Leasing of current cabin sites, grazing rights, and the lease of ground to the Lincoln School District are expected to continue. Other activities that are likely to continue in the area at similar levels as in the past are those such as firewood gathering, special use permits, fire suppression, recreation, road maintenance, and grazing. Timber harvesting has occurred in the past on private, state and federal land in the vicinity and this activity is likely to continue in the future although the extent is unknown.

2.2.2 Alternative B – Action Alternative

Alternative B proposes to harvest approximately 2.0 MMBF of timber from 470 acres of forested land with an improvement harvest silvicultural prescription (see Figure II-1 for unit locations and 4.3.1.1 for descriptions of prescriptions). Approximately 0.4 miles of road would be constructed while approximately 0.55 miles of road would be obliterated, 0.35 miles closed, and 0.35 miles more effectively closed. All of the roads used as well as some that are not used by this project would receive road maintenance and weed control and would be brought up to BMP's. See Figures II-1 and II-2 and the following Table II-2 for treatments specific to each section.

TABLE II-2
Summary of Proposed Treatments by Sections
(Action Alternative)

	Section 8	Section 16	Section 19	Section 22	Total
Acres	320	640	65	480	1505
Forested Acres	262	418	65	242	987
Improvement Harvest Acres	130	235	65	40	470
MMBF Harvested	0.65	1.09	0.2	0.06	2.0
Current Open Road Miles	2.45	9.0	0.5	0.8	12.75
Current Closed Road Miles	0.35	0	0	1.4	1.75
Proposed Open Road Miles	2.1	8.45	0.5	1.2	12.25
Proposed Closed Road Miles	0.7	0	0	1.4	2.1
Proposed Road Obliteration	0	0.55	0	0	0.55
Proposed Road Construction	0	0	0	0.4	0.4

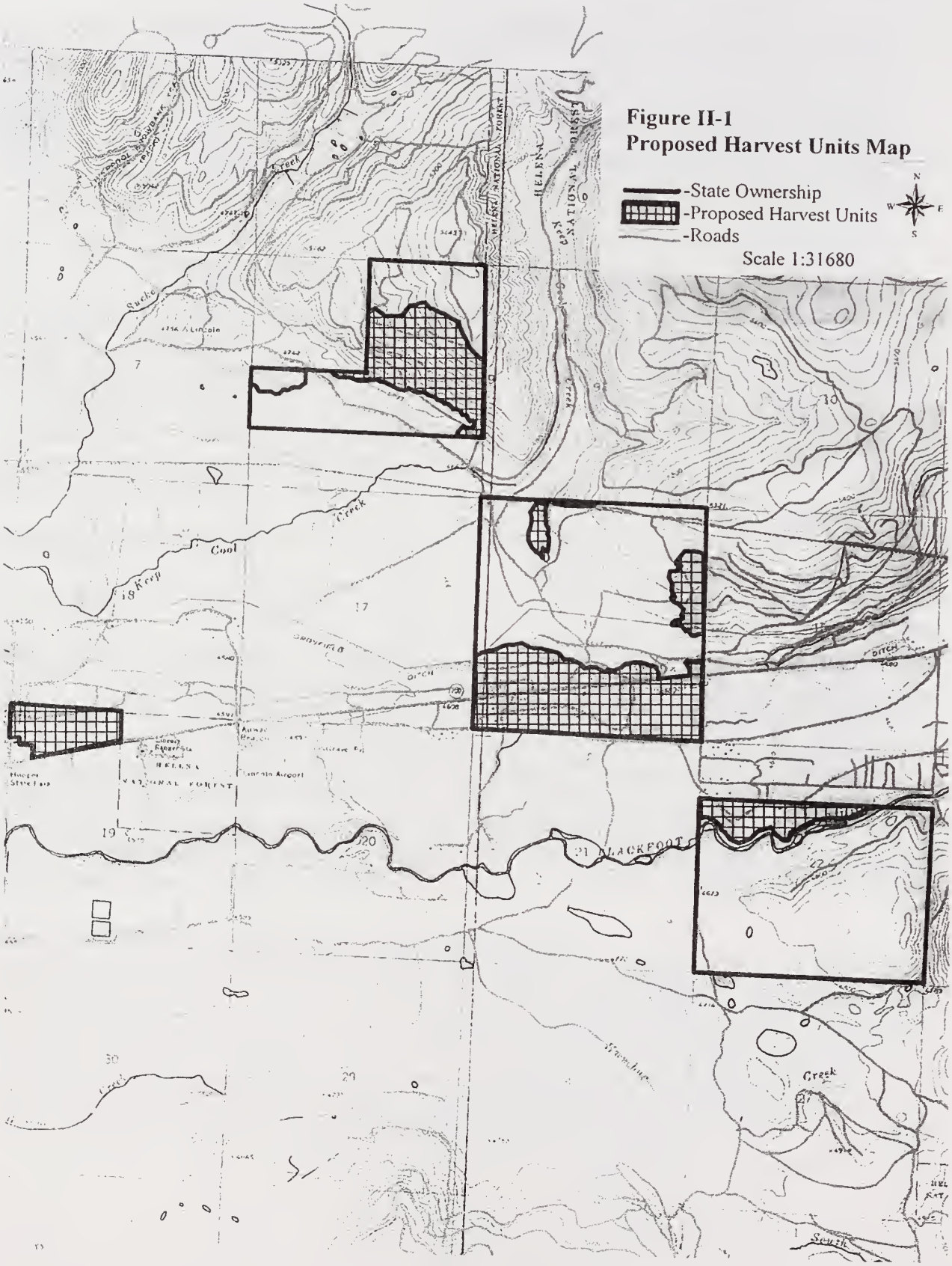

Figure II-1
Proposed Harvest Units Map

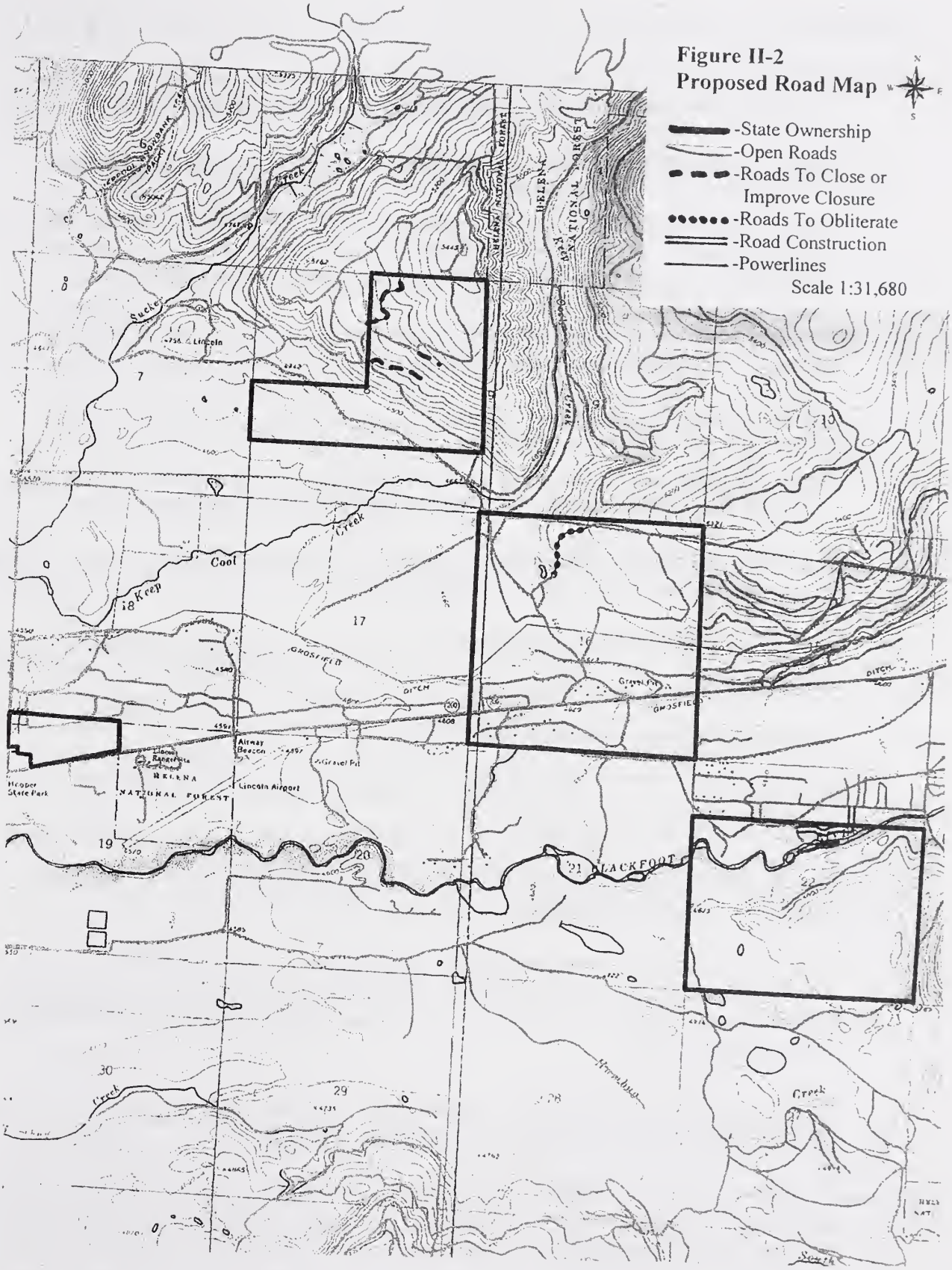
Figure II-2
Proposed Road Map
-State Ownership
-Open Roads
-Roads To Close or Improve Closure
-Roads To Obliterate
-Road Construction
-Powerlines
Scale 1:31,680
Lincoln
Cool
Keep
Creek
Sucker
Airway Beacon
Lincoln Airport
Gravel Pit
Hooper State Park
HELENA NATIONAL FOREST
BLACKFOOT
DITCH
GROSSFIELD
Strawberry
South

Mitigations For Action Alternative

< A majority of slash in areas immediately adjacent to and easily seen from the heavy use areas would be removed and/or piled and all slash on lease lots would be piled.

< Winter harvesting would be required on lease lots to minimize ground disturbance.

< All road construction and off-road harvesting equipment would be cleaned of plant parts, seeds, and mud to prevent the introduction of noxious weeds. Equipment would be subject to inspection by the forest officer prior to moving equipment on site.

< Noxious weeds on existing roads would be sprayed prior to timber harvesting and post-harvest. Weed infestations would be mapped.

< Biological control agents known to feed on spotted knapweed would be released.

< Newly disturbed soils on road cuts and fills would be promptly reseeded to site adapted grasses to reduce weed encroachment and stabilize roads from erosion.

< Adequate road surface drainage would be provided on all temporary or abandoned roads that would not require periodic maintenance.

< Proper and adequate road drainage such as drain dips to control erosion from roads would be installed.

< New road construction would be minimized.

< The SMZ, HRA, and water quality laws would be complied with as well as any other applicable federal, state, or local laws.

< Forestry BMP's would be implemented as the minimum standard for all operations associated with the proposed timber sale.

< Existing road systems would be planned, designed and improved to meet long-term access needs and to comply with BMP's. Existing sources of sediment associated with the road system would be identified and problems would be mitigated where feasible to improve water quality.

< Harvest would be deferred within 100 feet (400 foot stretch) and 150 feet (remainder) of the Blackfoot River and associated important overflow channels.

< Equipment and hauling operations would be limited to periods when soils were relatively dry, frozen or snow covered to minimize soil compaction, displacement, rutting, erosion and maintain drainage features. Some moister conditions would be accepted on harvest units where tractors remain on designated trails and timber would be winched to trails.

< Skidders would be limited to slopes less than 45%.

< 5-10 tons/acre large woody debris would be retained as feasible for nutrient cycling and long-term productivity except along open roads and near residences.

< Designated skid trails and equipment restriction zones would be used to avoid damage to sensitive areas (ie. wet areas, seeps, bogs, sensitive soils etc.) and steeper slopes where adverse skidding would occur.

< Approximately 0.55 miles of road would be obliterated resulting in a net decrease in road densities.

< Approximately 0.35 miles of road would be closed and another 0.35 miles would be more effectively closed for wildlife security.

< Snags and snag recruits would be retained according to the SFLMR (36.11.411).

2.2.3 Alternatives Considered but Eliminated from Detailed Study

There appear to be no other alternatives that can realistically offer an equivalent opportunity to meet the project objectives for the following reasons:

1. Harvesting as proposed in all or parts of the described sections would seek to maximize revenue for the school trust.
2. The proposed action would ensure that the long-term potential for harvesting timber from these sites would be enhanced by improving current growth rates.
3. Through an interdisciplinary team, revisions were made to the initial proposal to mitigate unresolved conflicts that may have required additional alternatives or created greater impacts.
4. Any alternatives that proposed to harvest more acres would not meet biological and resource goals, and likewise any alternatives that proposed to harvest less acres would not meet revenue and forest health objectives. So a balance was reached that meets the project objectives as well as possible and resulted in the harvest plan of the proposed action alternative.

2.3 Comparison of Alternatives

2.3.1 Alternative A – No Action

As previously stated, this alternative can be used as a baseline for comparing the environmental consequences of the action alternative, because it defers treatment of all sections at this time. Existing conditions would remain primarily the same. All the road systems would remain in their current poor to fair condition and would not meet BMP's or receive road maintenance in the near future by the DNRC. Therefore erosion would continue in localized areas. Additionally,

stands targeted for treatment in the action alternative would go untreated and continue to age and decline in vigor as competition for growing space and diseases increased. There would also be increased risk of mountain pine beetle attack in the ponderosa pine stands as stand vigor declines. There would also be an increased chance of a stand replacing fire as fuel loadings build up. No road closures would occur to reduce open road densities. Conversely, wildlife security cover would not be changed from its current state, no new roads would be built, and hydrologic conditions in the watersheds and fisheries would not be affected by any of the activities proposed by the action alternative.

2.3.2 Alternative B – Action Alternative

Under this alternative, timber harvesting, road building, and other associated management activities would occur. Table II-3 summarizes the environmental effects of each of the alternatives. A more detailed explanation of environmental effects can be found in Chapter IV.

TABLE II-3
Comparison of Environmental Effects by Proposed Alternative

	Alternative A (No Action)	Alternative B (Action)
Volume Harvested (MMBF)	0	2.0
Acres Harvested	0	470
% Timbered Ownership Receiving Treatment	0	48%
New Road Construction (miles)	0	0.4
Road Obliteration (miles)	0	0.55
Open Roads (miles)	12.75	12.25
Closed Roads (miles)	1.75	2.1
Approximate Average Basal Areas in Improvement Harvest Units	60-110	40-60
Risk of Insect Attack	high	low
Risk of Stand Replacing Fire	moderate	low
Forest Health and Growth Rates	Poor to good	good
Risk of blowdown	low	moderate
Risk of Noxious Weed Spread	slow	Increased/moderate
Occurrence of Noxious Weeds	Moderate to high	Moderate to high
Weed Spraying	very little	roads and key infestations
Changes in Aesthetics	none	low

Harvesting in Old Growth (acres)	0	0
Effects to Soils	none	low risk
Effects to Water Quality	none	low risk
Effects to Water and Sediment Yield	none	low risk
Effects to Fisheries	none	low risk
Effects to Threatened and Endangered Species	none	low risk
Effects to Sensitive Species	none	low risk
Effects to Big Game Species	none	low to moderate risk
Effects to Archeological Resources	none	none
Estimated Gross Revenue to the State	$27,228/year	$528,000 plus $27,228/year
Estimated Net Revenue to the School Trust	$27,228/year	$402,000 plus $27,228/year

CHAPTER III – AFFECTED ENVIRONMENT

3.1 Introduction

This chapter identifies and describes those resources that are affected by the proposed action, and is organized by general resource categories and their associated issues. It does not describe any effects of the alternatives, as these will be covered in Chapter IV. The descriptions of the existing environment found in this chapter can be used as a baseline for comparison in Chapter IV.

3.1.1 General Description of the Area

The proposed Cool Flat 4x4 Timber Sale is located in the western foothills of the Continental Divide, northeast of Lincoln, MT. Elevations in the harvest area vary between 4500 and 5400 feet. These parcels drain to tributaries of the Blackfoot River. The trust lands involved in the proposed project are forested and non-forested with grazing leases, cabin site leases, an administrative site, gravel special use permits, and a school lease site on portions of all four sections.

Section 8 is the furthest section from Highway 200 and as a result, receives less recreational use, however the clubhouse for the local snowmobile club lies less than a mile west of this section and the area is heavily used by snowmobiles.

There are currently 34 cabin site leases (approximately 1-2 acres in size) on Section 16 as well as one commercial lease lot (sawmill site). All of the lots are located within 700 feet of Highway 200 and all but 4 are within 400 feet. Most of the lease lots have cabins on them, and 10 are year-round residences. The mill site, which is in the southwest quarter of Section 16 approximately 700 feet from Highway 200, has been inactive for over 5 years but has recently been receiving some use and may become a small working sawmill in the future. This section receives heavy recreational use year-round. The proposed action would thin timber stands on most of the lease lots.

The administrative site for the Lincoln Field Office of the DNRC is located on Section 19. This section lies on the eastern outskirts of Lincoln and is adjacent to Highway 200. The Lincoln Public School's have a permanent license on 28 acres in the northeast portion of this ownership to develop a school site and they also have rights to 1500 bdft/acre of timber on their site. There are currently no known plans to develop this site and the proposed action would not affect this license.

The portion of Section 22 that lies north of the Blackfoot River is immediately adjacent to Lemire Acres Subdivision (primarily 1-5 acre lots) on the 4x4 Road. This area receives heavy recreational use year-round. Access to this portion of the parcel is likely to be through a permanent easement on Lewis and Clark County Parks land.

During the fire season of 2003 approximately 37,700 acres burned as part of the Snow Talon Fire in the upper reaches of Copper Creek and the Landers Fork and surrounding drainages with primarily high intensity stand replacing fires. This fire lies north of the project area and burned to within approximately three miles of state ownership in Section 8.

The forested areas on state ownership within the project area are comprised primarily of ponderosa pine with interspersed Douglas-fir. The forested habitat types present are primarily drier types with the majority being PSME/FESC, CAGE, SYAL and CARU (Pfister et.al., 1977). These stands are generally single-storied and single-aged (primarily 70-120 years old except a few 20-30 young stands) although some multi-storied and multi-aged stands also exist. Regeneration and sapling size trees are common within these stands, however most are in poor health due to competition.

Historical fire frequencies for the warm dry Douglas-fir fire group have a mean fire interval of approximately 5-25 years and the moist Douglas-fir fire group has a mean fire interval of approximately 42 years (Fischer and Bradley, 1987). Most of the stands in the proposed project area have higher stocking rates and greater canopy closure than generally occurred historically. Many of the younger age class Douglas-fir and ponderosa pine would likely have been thinned out or a small patch completely killed by a normally occurring fire event. Naturally occurring fire events would have created opportunities for continued regeneration of the seral species such as ponderosa pine and would have generally kept the stand structure more open than it is currently (Remington, 1993).

In many locations typical understory vegetation historically consisted of grasses and shrubs such as snowberry, rose bush, pinegrass, rough fescue, and arrowleaf balsamroot (Pfister et.al., 1977). Fire suppression has allowed the stands to develop a more closed canopy condition which has caused a decline in these understory species. Annual grass and bunchgrass types in the project area are experiencing encroachment by ponderosa pine and Douglas-fir. This is likely due to the lack of frequent fires, which historically kept the south and west aspects clear of all but some scattered individual trees (Gruell, 1983). Grasslands are found interspersed within forested areas (regardless of aspect) where deep, rich soil conditions and frequent fires combined to retard tree establishment (Remington, 1993).

The trust lands involved in the proposed sale area total approximately 1505 acres with approximately 987 acres of forested ground. General stand vigor ranges from poor to good with the majority of the area being in the fair category. Insect activity is currently present in most of the stands in low to moderate amounts, and there is increasing susceptibility to bark beetles as the stands continue to become more closed-canopied.

3.1.2 Cumulative Impacts of Past Forest Management Activities

Past harvesting has occurred in all four sections as well as the remaining state land within the analysis area and most of the adjacent private and Forest Service land as well.

Past harvesting in Sections 16, 19, and that portion of 22 north of the Blackfoot River and the southern portions of Section 8 were primarily selective. Most of this harvesting occurred over 30 years ago at various points in time. The selective harvesting appears to have removed primarily larger trees however some large trees remain. Harvesting has created room for younger age classes, and the older trees remaining have poor overall vigor. Few skid trails are evident and stands are still heavily stocked with fairly closed canopy. Past harvesting in the northern portions of Section 8 and in state ownership in Sections 4, 6, 10, and 22 south of the Blackfoot River utilized primarily regeneration harvest systems in which more of the canopy was removed and regeneration is now established. Much of the regeneration harvesting in these sections took place approximately 10 to 20 years ago and treated approximately 30 percent or less of the section's forested acres. These sections also have some evidence of other older past selective harvesting.

All of the sections have old road systems utilized in past harvesting and all have received moderate to high levels of firewooding as is evidenced by the scattered stumps of dead trees that were removed. Some less accessible areas still have high amounts of dead standing and down trees while the more accessible areas have primarily been picked clean.

Timber harvesting has taken place on a majority of the surrounding private lands (see Figure III-1). Most of this harvesting has been by means of high-grading, group selections and some selective harvesting. Most of the harvesting is over 15 years old and is fully regenerated with good stocking levels, although Section 15 just east of state Section 16 was high-graded approximately 10 years ago and is still quite open. Harvesting on these surrounding private lands is expected to continue over time, however to a lesser extent than in the past since a majority of the ground has already been heavily harvested.

There is good public access to all four sections. Sections 16 and 19 are accessed from paved roads, while Section 8 is accessed by a lower standard dirt road, and access to Section 22 north of the Blackfoot is by foot through county parks property to the east. Major past and present uses of the proposed project area are grazing, timber production, and mineral exploration.

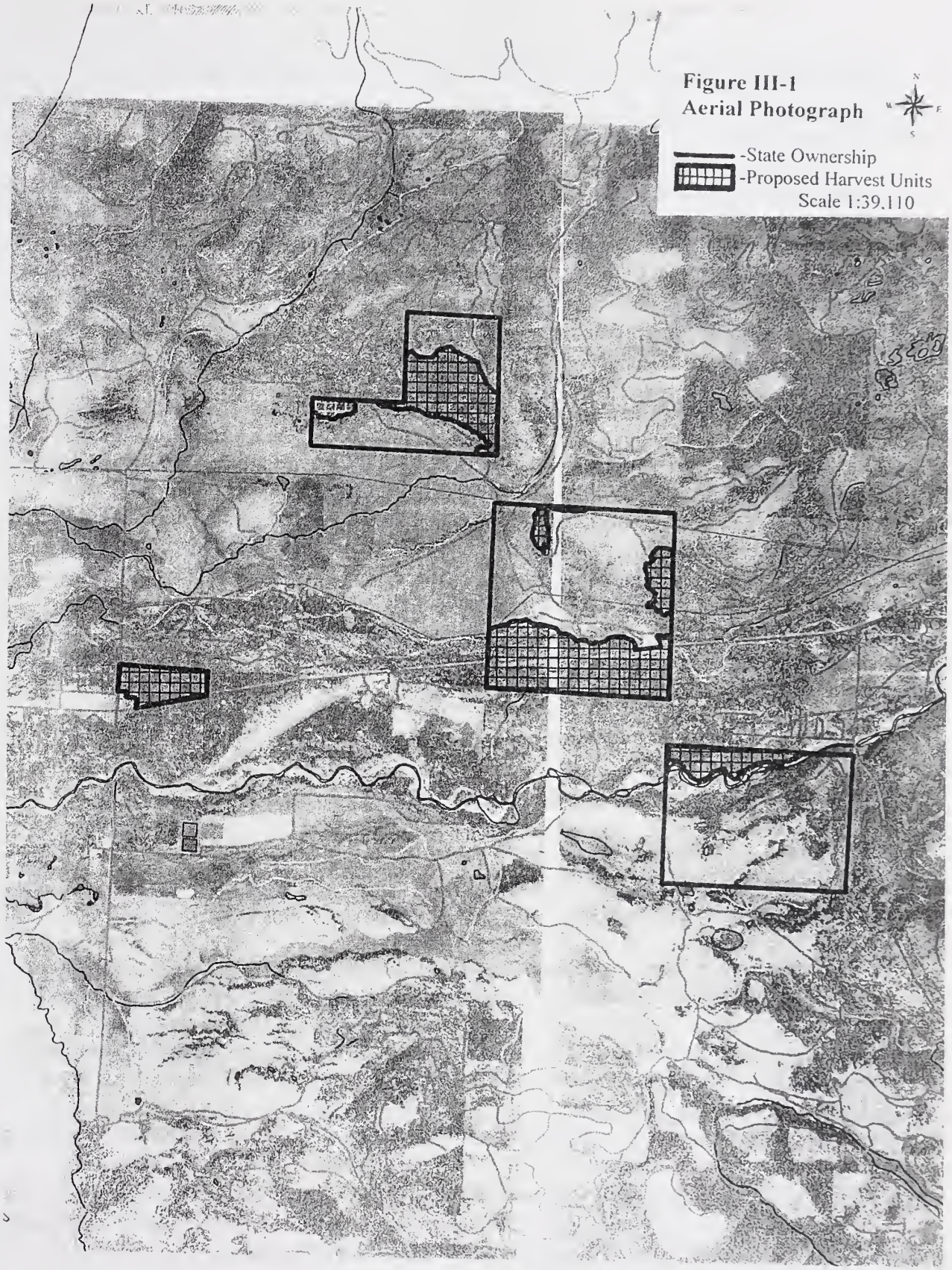
Figure III-1
Aerial Photograph
-State Ownership
-Proposed Harvest Units
Scale 1:39,110

3.2 Affected Resources

3.2.1 Vegetation

For the vegetative related resources, the cumulative effects analysis area includes all four state parcels and all those lands within one mile of these four sections. This involves and includes both private and federal ownership in addition to state ownership (see Figure 1-1. Vicinity map). In general, the area surrounding the state ownership has been more heavily harvested in the past 40 years than state ownership.

3.2.1.1 Forest Structure and Cover Types

3.2.1.1.1 Regional and Unit-wide Assessments

At the broad scale, assessments prepared for the 1997 Interior Columbia River Basin (ICRB) Draft EIS are useful in examining how DNRC's ownership fits into the larger ecosystem. The information in the ICRB Draft EIS shows the general trend across the analysis area is a decrease of ponderosa pine, western larch, and western white pine across their ranges. The primary trend is from shade intolerant to more shade tolerant species (true firs, spruces, and western red cedar) with the shade intolerant species (ponderosa pine, lodgepole pine, and western larch) out competed and replaced by shade tolerant species. Fire regimes have changed from predominantly mixed and non-lethal severity to a large predominance of lethal severity fires. Acres of old forests of both multistory and single story structure have decreased.

The ICRB EIS grouped forests into three broad categories:

Dry - includes ponderosa pine, dry Douglas-fir, and dry grand fir forests.

Moist – includes cedar/hemlock, moist Douglas-fir, grand fir, and wet spruce/fir forests.

Cold – includes the higher elevation forests not falling into 1 of the other 2 categories.

All three forest groups have experienced large increases in dominance by shade-tolerant species due to timber harvesting, fire suppression, insects, and diseases. All 3 groups are more likely to experience stand replacing fires than they did historically due to a large buildup of fuels and changes in stand structure and composition. *The majority of the stands in the proposed project area would fall in the Dry and Moist forest category.*

An overall decrease in old growth stands has occurred in the dry forest group with a large increase in multistoried stand conditions and a large decrease in single storied forests. Within the multistoried forests, shade tolerant tree species are 3 times as abundant. Ponderosa pine has been replaced by grand fir or Douglas-fir on nearly 40 % of its range. Shade tolerant species dominate 30% more stands than historically. *Many of the trends summarized above are taking place in the proposed project area.*

Estimating historical conditions is important in defining what the forest looked like before the widespread settlement and influence of the western Europeans (pre-industrial age). The working assumption is that average historical conditions represent a healthy, sustainable, diverse forest with all the pieces intact as committed to in the SFLMR. Historical conditions provide an indication of a desirable future condition for the forest tempered by current circumstances. Appropriate conditions are based on ecological characteristics (land type, habitat type, disturbance regime, unique characteristics) and can be characterized by the proportion and distribution of forest types and structures historically present on the landscape.

Past management activities and fire suppression appear to have had some effect on shifting cover types on Clearwater Unit. A majority of the current cover types are the same as what would be considered historical (appropriate) cover types under natural processes (Table III-1). 5816 acres of current cover type is different from the appropriate type, which is 12.6% of the total acres Unit-wide. The majority of the stands that are not in the appropriate cover type fall within the WL/DF type primarily because these stands are more dependent on fire or proper management and are more susceptible to encroachment by other species.

Table III-1
Area by Current Cover Type and Appropriate Cover Type for Clearwater Unit

Current Cover Type [1]	Appropriate Type							
	ALP/NC Acres	DF Acres	HW Acres	LP Acres	MC Acres	PP Acres	WL/DF Acres	**Total Acres**
ALP	353	167		285			1909	**2714**
DF		5844					291	**6135**
HW			176					**176**
LP				4122		16	895	**5033**
MC		284		165	458		1337	**2244**
PP						16,455	36	**16,491**
WL/DF		293				138	12,900	**13,331**
Total	**353**	**6588**	**176**	**4572**	**458**	**16,609**	**17,368**	**46,124**

[1]ALP = Alpine Fir, HW = Hardwood (Cottonwood, Aspen) PP = Ponderosa Pine, DF = Douglas-fir, WL-DF = Western Larch-Douglas-fir, LP = Lodgepole Pine, MC = Mixed Conifer.

Note: These figures were computed using current data as of January 1, 2004.

Clearwater Unit is currently dominated by PP and WL-DF cover types (36% and 29% respectively), which are also the dominant appropriate types. This indicates that Clearwater Unit has a variety of lower elevation dry types as well as more moist higher elevation types with a distribution of cover types in between.

Table III-2 lists Unit-wide age class distribution by cover type. Stand age has been influenced by fire suppression as well. This lack of moderate severity and stand replacement fires has been a primary cause in the shift in age classes from the younger seedling/sapling stages to the more

mature age classes. Historically in this region, an average of cover types within the respective age classes would be 23% in seed-sapling, 29% in poles, 21% in mature, and 21% in older age classes (Losensky, 1997).

Table III-2
Current Age Structure by Current Forest Cover Types for Clearwater Unit

Cover Type	Seed-Sapling 1-39 yrs	Poles 40-99 yrs	Mature 100-149 yrs	Older 150+ yrs	**Total Acres**
PP	954	4725	7072	3740	**16,491**
DF	307	1187	2776	1865	**6135**
WL-DF	219	2774	5328	5010	**13,331**
LP	591	2773	1331	338	**5033**
MC	81	789	1075	299	**2244**
ALP	106	606	918	1084	**2714**
HW	0	163	13	0	**176**
Total ac	**2258 (5%)**	**13,017 (28%)**	**18,513(40%)**	**12,336 (27%)**	**46,124**

Note: These figures were computed using current data as of January 1, 2004.

3.2.1.1.2 Project Level Analysis

Within the proposed sale area all of the stands have the same current cover type as the appropriate cover type. This is well below the unit average of 12.6% that do not have the same cover types.

On state ownership in the analysis area the predominant stand type is ponderosa pine followed closely by Douglas-fir (Table III-3), which is somewhat different from the unit averages found above. The age trends are somewhat similar to the unit-wide (Table III-2) averages especially in the pole and mature age classes. There is however a 17% difference in the seed-sap age class and a 20% difference in the older age class. Most of the trends affecting the ICRB are also similar to those of the analysis area.

Table III-3
Current Age Distribution by Cover Type in the Analysis Area On State Land

Cover Type	Seed-Sap 1-39 Acres	Poles 40-99 Acres	Mature 100-149 Acres	Older 150+ Acres	Non-Forested Acres	**Total Acres**
PP	231.9	343.8	362.7	45.8		**984.2**
DF	0	3.5	454.6	90.7		**548.8**
WL-DF	43	0	19.6	0		**62.6**
LP	119.7	35.1	0	0		**154.8**
MC	0	157.5	4.3	0		**161.8**
ALP	35.1	11.9	22.4	0		**69.4**

NF*					591.1	591.1
Total	**429.7(22%)**	**551.8(28%)**	**863.6(43%)**	**136.5(7%)**	**591.1**	**2572.7**

*NF = nonforested

All of the stands found on the four sections in the proposed action north of the Blackfoot River are either ponderosa pine or are nonforested and the remainder of the stand cover types are found within the analysis area on other state parcels. On the four sections north of the Blackfoot River there are 231.9 acres in the seed-sap age class, 318.5 acres in the pole age class, 166.5 acres in the mature age class, and 15.9 acres in the old age class. Some of the seed-sap acres are young ponderosa pine stands that are encroaching on the nonforested sage and grasslands scattered in and around the timbered stands.

Most of the forested stands located in Section 8 are found in the northeast portion of the section and a progression of more Douglas-fir can be found within the stands with the increase in elevation. Several of the stands near the nonforested ground in the southern half of the section are primarily encroachment seed-sap stands. The one older stand found within the project area is located in the northeast corner of this section. The sawlog sized stands are well stocked with diameters that average 14-16 inches in diameter and basal areas averaging 70-90. The encroachment stands average less than 3 inches in diameter and are moderate to well stocked. Vigor in almost all these stands is poor to fair due to bark beetles and high stockings.

The larger sized timbered stands found in Section 16 are located primarily in the southern third of the section as well as a stand in the northeastern quarter. They consist of primarily ponderosa pine with some areas that are more heavily stocked with Douglas-fir. There is a fairly even representation of seed-sap, pole, and mature age classes across the forested stands. The mature aged stands average 16-20 inches in diameter with 60-110 average basal areas. A majority of the seed-sap stands found in the middle portions of the section have recently been precommercially thinned and average 3 inches in diameter. Most of the stands are well stocked with vigor ranging from poor to fair. Competition due to stocking rates is high while soils are relatively shallow and sandy and bark beetles and root rot are prevalent.

All of the state ownership in Section 19 is forested with poor to good vigor. These are all mature age class stands with diameters averaging 12-14 inches and basal areas around 70-80. Ponderosa pine dominate the stands with a scattering of lodgepole pine and spruce. These stands tend to be less heavily stocked and are more evenly spaced than the other sections and there is very little regeneration present in the understory.

That portion of Section 22 north of the Blackfoot River is dominated by ponderosa pine with some juniper and cottonwoods scattered in along the edges of the river. The stands are clumpy in nature with some areas very heavily stocked and others with only scattered trees. Diameters average 16-18 inches and basal areas across the clumpy stockings average 40. The stands are moderately stocked on average with poor to fair vigor and bark beetles have been prevalent in the past.

Approximately 518 acres of grasslands are found scattered throughout all four sections. These are composed of native grasses, sagebrush, and encroaching trees.

Cumulative Effects

Cumulatively, the stands found on state ownership are in younger age classes than might have been expected historically. Additionally, within the analysis area much of the private land has been harvested within the last 30-40 years and also have a higher representation of these younger age classes resulting in an age class structure within the analysis area that is lower than what would have been expected historically. Almost all the stands surrounding state ownership are moderate to well stocked and cover types appear to be appropriate.

3.2.1.2 Forest Health

Generally, the overall stand health across State ownership is good to poor and is primarily dependent on stocking levels and age. Most of the stands are overstocked, and/or have problems with insects and disease. Generally, the stands that are heavily stocked have poorer rates of growth since growing space, nutrients, water, and sunlight are more limited. Health varies from stand to stand, but the stands with the poorest health are the heavily stocked stands in which the individual tree vigor is declining and where growing space is limited. The best growth rates on these parcels can be found in the younger, thriftier stands of ponderosa pine and in some of the multi-storied stands. There are currently high levels of insect activity on these parcels, and conditions do exist for outbreaks to continue to occur.

Generally the ponderosa pine stands are in fair to poor health and are in better health where the younger age classes exist. Overstocking and shallow soils are the primary growth inhibitors in these stands. Many of the older trees have thinning crowns, dead tops, and poor growth rates while the younger trees are relatively healthy and suffer primarily from overstocking, competition, and insect activity. There are moderate to high amounts of armellaria root rot within the stands in and around the lease lots in Section 16 that are primarily affecting the Douglas-fir and to a lesser extent the ponderosa pine. These stands are suffering mortality primarily in the Douglas-fir trees and other infected trees have poorer growth and thinning crowns and are being weakened by the disease.

Mountain pine beetle activity is prevalent on all of the sections although it is less widespread in Section 19. Stands in the project area have been subject to high losses over at least the last 10-15 years although over the last 2 years mortality due to beetle attacks seems to be on the decline. However most of these stands are either at or are currently reaching a highly susceptible stage for mountain pine beetle attacks. The most susceptible stands are at relatively low elevations, greater than 8 inches in diameter, and older than 80 years of age (USDA Forest Service et. al., 1991). The risk is compounded by the stands being in poor health with low vigor.

Within the analysis area on surrounding ownership stand health tends to be better since most of the stands have been managed in the last 40 years and are now in the younger age classes. Some of the stands are to the point where they are becoming densely stocked and competition is beginning to slow growth rates however.

Cumulative Effects

The near exclusion of fire in the 20th century has likely affected many of the currently overstocked stands in the analysis area. The ponderosa pine stands would have been expected to receive frequent low intensity fires that would burn many of the understory Douglas-fir and pine and maintain these stands at lower stocking levels than exist today which would have resulted in more healthy and vigorous stands. The Douglas-fir stands would have been expected to receive less frequent but moderate intensity fires that also would have had beneficial thinning effects that would improve forest health.

3.2.1.3 Fire Hazard

The most predominant historic fire frequencies in the project area are the warm, dry Douglas-fir and moist Douglas-fir habitat types, which had a mean fire interval of around 5-25 years and 42 years respectively in presettlement stands. Fire was an important agent in controlling density and species composition. Low to moderate severity fires converted dense stands of pole-sized or larger trees to a more open condition, and subsequent light burning maintained stands in a park-like state. Frequent low or moderate fires favored larch and ponderosa pine over Douglas-fir in stands where these species occurred. Severe fires probably occurred on dense, fuel-heavy sites and resulted in stand replacement. Stand replacement fires favored lodgepole pine on sites where this species was present (Fischer and Bradley, 1987). In the ponderosa pine dominated stands the fire frequency is expected to be shorter between fires and was typically a lower intensity event except in areas where fuels had built up.

Currently, the risk of a stand replacing fire or a fire that would burn more intensely than expected under natural conditions historically on these three sections is moderate. With the near exclusion of fire in the 20th century, stand dynamics, succession, and fuel loadings have all changed. With increased fuel accumulations on the forest floor, stand densities, and amounts of ladder fuels (especially Douglas-fir in the understory) in these stands, fires burning today are much more likely to be more intense. These more intense fires tend to replace entire stands that would not have typically been replaced historically often times with negative effects of soil damage, species composition changes, difficulty regenerating the site, and sometimes very unnatural conditions for entire drainages from those of historic conditions.

Cumulative Effects

The near exclusion of fire in the 20th century has likely affected many of the currently overstocked stands in the analysis area. Stand dynamics, succession, and fuel loadings have all changed over the past 100 years to create a situation that puts these forest stands at a much higher risk of high intensity and sometimes stand replacing fires. Past harvesting of trees has helped decrease fuel loadings and stand densities, but in many cases has removed the larger trees that are in most cases more fire resistant. Within the analysis area, fire hazard has generally increased over time in the ways described above with the exception of the more recently harvested areas which are primarily on the adjacent private lands. In these locations, the risk of high intensity fires is still low to moderate due to decreased stocking levels, amounts of mistletoe, and ladder fuels.

3.2.1.4 Aesthetics

The primary high use/high travel areas that the proposed project area can be seen from are Highway 200 which runs through the south half of Section 16 and south edge of Section 19 as well as the lease lots found in the south half of Section 16 and near the subdivision on the 4x4 Road adjacent to Section 22. The majority of the area in and immediately adjacent to these more heavily used areas are well stocked forested stands with small openings containing patches of advanced regeneration and are all in the flat valley bottom. Most of the lease lots located in Section 16 have moderate to heavy stocking of mature trees in and around the lease lots and associated cabin and/or homesites. Section 8 is somewhat more remote than the other sections and is on moderate hill slopes, but is more distantly seen from heavily used areas such as the town of Lincoln and Highway 200.

From the stand level (within the stand), most of the sections are timbered with very few high standard roads, which can be aesthetically pleasing to many. Sight distances in most locations are less than 200-300 feet, which does not allow for visual pleasure of the landscape but does provide a feeling of seclusion. There are many low standard roads within the sections, which provide easy foot and in some locations vehicle access to the stands. Some of the stands are very thick, have heavy downfall, and/or have heavy beetle infestations resulting in pockets of dead trees. Other areas have park-like conditions with relatively little downfall or disease and resulting in a pleasing appearance to most.

Cumulative Effects

Currently trees cover a majority of the project area. These trees soften the view both at medium and long distances. The proposed project areas along Highway 200 are on flat ground. The stands in this area have and will continue to have a higher ability to absorb changes within the viewshed. For example 20 to 30 trees on a flat surface can be described as having an open and parklike appearance. However, on a steeper hillside, the trees can begin to seem more open and the area begins to seem "barren". This is a common concern when moving silvicultural prescriptions from flatter ground to steeper areas. Both areas are the same, but the steeper one is often more noticeably open to the viewer. Over the course of time, all areas will regenerate and the view will begin to "fill in".

With the exception of some of the more heavily harvested adjacent private lands, the analysis area likely appears more heavily stocked than what would have been expected historically due to the exclusion of fire and resulting increase in stand densities and lack of moderate intensity fires. There has been little to no effect aesthetically from road construction in the analysis area as they are very hard to discern from the high use areas in the valley bottom. At the stand level, sight distances are expected to be shorter due to increased stocking levels.

3.2.1.5 Old Growth

There are 136.5 acres of stands classified as old growth in the analysis area that meet the Green et al. definition of old growth that has been adopted by the DNRC. Most of these acres (90.7)

are Douglas-fir cover type and the remainder of acres are in the ponderosa pine cover type resulting in 7 percent of the state ownership on the project area being classified as old growth.

While other stands in the analysis area do contain scattered old trees, none are sufficient enough in numbers to qualify the stands as old growth.

Cumulative Effects
Within the analysis area the near exclusion of fire would have likely increased the amount and distribution of old growth, however heavy past harvest activity on adjacent private lands has likely resulted in a net decrease in the amount of old growth that might have been expected on the landscape historically. Some old growth stands may exist within the analysis area on Forest Service ground as well as on private ownership.

3.2.1.6 Sensitive Plants

A search of the Montana Natural Heritage Program was conducted and no sensitive plants were identified in the analysis area. No sensitive plants have been identified in field reconnaissance by DNRC personnel.

3.2.1.7 Noxious Weeds

Noxious weeds occurring in this analysis area are mostly spotted knapweed (Centaurea maculosa) and spot infestations of Canadian thistle (Cirsium arvense), and yellow toadflax (Linaria vulgaris). One of the largest and heaviest infestations of spotted knapweed in the Lincoln area occurs in the project area on state and private ownership. Knapweed occurs across most of Sections 16 and that portion of 22 north of the Blackfoot River. On the remaining sections it occurs primarily along roadsides and in some portions of forested and nonforested areas. Biological control has recently been used to reduce infestations of knapweed as well as decades of herbicide treatments for knapweed.

Cumulative Effects
These species of weeds are all non-native to the area and were introduced by humans and human activities primarily associated with ground disturbance. Past activities such as road construction, logging, powerline construction, and grazing are likely to have increased the occurrence and spread of these species of weeds in the area.

3.2.2 Soils

Soils within the project area are a combination of soil types listed in the chart below. Some soils in the project area have a higher soil water holding capacity and remain wet later in the spring. These soil types include 499D Farnuf Hilger Stony Loams Cool 4-25% slopes and 609A Slategoat Silt Loams 0-2% slopes have a higher susceptibility to compaction and displacement.

Table III-4
Soils Found On The Project Area

Map Unit	Topsoil	Subsoil	Drainage	SWHC	Displacement	Compaction	Erosion	Notes

			Class		Hazard	Hazard	Hazard	
4B Silvercity Gravelly Loam 1-4% slopes	0-6 in	>40 in	Well Drained	2.9-4.2 in	Low	Low	Low	
6A Totleake Gravelly Loam 0-3% slopes	0-4 in	>40in	Well Drained	2.0-2.7 in	Mod	Low	Low	
119F Worock Stony Loam. Warm 8-35% slopes	0-5 in	>40 in	Well Drained	4.6-5.3 in	Low	Mod	Mod	
301B Typis Ustifluvents 0-4% slopes			Well Drained					
499D Farnuf -Hilger Stony Loams. Cool 4-25% slopes	Farnuf 0-5 in Hilger 0-6 in	>40 in	Well Drained	Farnuf 8-10 in Hilger 3.5-4.2 in	Low Low	Mod Low	Mod Mod	
609A Slategoat Silt Loam 0-2% slopes	0-7 in	>40 in	Moderately Drained	9.1-11.5 in	Low	Mod	Low	
784D Yourname Stony Loams 8-35% slopes	0-6 in	>40 in	Well Drained	4.9-5.7 in	Low	Mod	Mod	

Cumulative Effects

Existing cumulative effects to soils within the project area are low. Some old trails are present, but were observed to be stable, well vegetated and less than 15% of the total area. No major impacts such as compaction, displaeement or erosion were observed within the proposed project area.

3.2.3 Hydrology and Fisheries

3.2.3.1 Hydrology

3.2.3.1.1 Water Quality and Beneficial Uses

The analysis area is located within 4 sections, (8, 16, 19 and 22) of T14N, R8W. The proposed aetivity area is located on gentle to moderate slopes, between 0 and 50%. Most of the project area is surrounded by private ownership. The east half of Seetion 16 borders Nature Conservancy and the NE ¼ of Section 19 is Forest Service Ownership. The only water located within the proposed project area is the Blackfoot River located in Section 22. There is an irrigation ditch that runs through Section 22 and is within approximately 50 feet of the channel for a short distanee. The ditch runs through state land and then through private land. After conversation with landowners and residents, this irrigation ditch is not known to have surface flow to any body of water and would not be considered a class 3 channel.

Section 16 does contain some historic overflow channels, which have not seen flow in many years. There is also the Grossfield ditch, whieh runs through the south half of Section 16. The diteh has been non-funetional for many years and does not have return surface flow to any other

body of water. The remaining portion of the project area is drained by dry draws with no discernable stream channel. Keep Cool Creek runs through the NW ¼ of the NW ¼ of Section 16. However, it is well outside of the boundaries of the project area. As a result, there would not be any anticipated effects to Keep Cool Creek and it was not analyzed as part of this project.

Existing road conditions on some sections of the proposed haul route in Sections 8 and 16 are poor. Poor drainage has resulted in rutting and potholes. Other portions of the road system have isolated steep pitches with insufficient road drainage. Because there is no water in these sections, sediment delivery has not been observed to deliver to any body of water. There is a stream crossing on private land that currently does not meet BMP standards. Sediment delivery to the stream from road surface runoff is occurring at this location.

Section 22 contains the Blackfoot river. There is an old road located near cabin sites on this section. This road is narrow and has been used for primarily 4-wheeler and occational pickup traffic. Not all sections of this road meet BMP standards. It is poorly drained in some locations and rutting was observed in isolated areas. There was no sediment delivery to the Blackfoot river observed as a result of the road location, which is outside the channel migration zone.

The Blackfoot River in Section 22 is listed on the 1996, 2000 and 2002 303(d) list of impaired water bodies. In 2000 it was listed for siltation and other habitat alterations and probable causes were erosion and sedimentation. It was listed in 2002 for siltation and habitat alterations as well. Probable causes are agriculture and silviculture.

Cumulative Effects

Although existing road conditions are poor in some sections of road, there is no water located throughout sections 8 or 19 and the ditch in Section 16 is non-functional. The Blackfoot river is located within Section 22, but no direct delivery was observed. Although sediment delivery was observed at a crossing site on private land that accesses Section 8, this was the only site observed within the entire project area. Existing cumulative impacts to water quality in the project area are minimal.

The Blackfoot River is a B-1 Classified Stream in the Montana Surface Water Quality Standards. The B-1 classification is for waters that are considered suitable for domestic use after conventional treatment, as well as recreation, swimming and bathing. They are also suitable for growth and propagation of salmonid fish and other associated aquatic life, waterfowl, furbearers, agricultural and industrial water supplies. Another criteria for a B-1 classification is; no increases are allowed above naturally occurring concentrations of sediment, settleable solids, oils or floating solids, which will or are likely to create a nuisance or render the waters harmful, detrimental or injurious to public health, recreation, safety, welfare, livestock, wild animals, birds, fish, or other wildlife.

Downstream Beneficial uses are recreation, irrigation, stock, domestic, mining, fish and wildlife and observation and testing.

3.2.3.1.2 Roads

There are approximately 14.5 miles of roads on state ownership within the project area (see Figure II-2. Proposed Roads Map and Table II-2). This includes portions of Highway 200 in Section 16. Most of these roads are currently open to the public and lie on flat ground which causes difficulty in achieving drainage from the road surface and has resulted in some segments becoming rutted and potholed when wet. A few roads in Section 8 and the north half of 16 are steep and narrow with gradients exceeding 12%, while others are flatter with gradients less than 8%. Some of these steeper roads have received varying amounts of rutting and rilling in the past.

Several stretches of road do not meet BMPs due to steepness and lack of drainage structures. Most of these roads receive moderate to high levels of use during all times of the year since they are open to the public. All of the roads on state land are not restricted by physical closure devices except for those that are overgrown with vegetation and several roads which have gates and earth berms.

3.2.3.2 Fisheries

The only fish populations located in the project area are in the Blackfoot river in Section 22. The Blackfoot River is highly valued as a productive cold water fishery supporting populations of bull trout (Salvelinus confluentus), rainbow trout (Oncorhynchus mykiss), cutthroat trout (Oncorhynchus clarki lewisi), mountain whitefish (Prosopium williamsoni) and brown trout (Salmo trutta) as well as other native and non native species. Bull trout are listed under the Endangered Species Act as threatened, and westslope cutthroat trout are considered a "species of special concern". As mentioned above, the Blackfoot River in Section 22 is listed on the 1996, 2000 and 2002 list of impaired water bodies.

Riparian areas along the Blackfoot River are integral components of fisheries habitat since these areas provide a source of large woody debris and canopy interception of direct solar radiation. Riparian conditions in this section of the Blackfoot River were observed to be in good condition. Bank stability and integrity was observed to be in good condition, with some areas of natural bank erosion present. Canopy cover along banks is absent in some isolated sections of the Blackfoot in the project area. This is most likely due historic riparian harvest and lack of woody vegetation. However, the amount of project area within this section is limited and most of the Blackfoot River within the project is in good condition.

Under the Federal Endangered Species Act, bull trout are currently listed as a "threatened" species. The U.S. Fish and Wildlife Service has developed a bull trout recovery plan, but no streams in Montana are included in the critical habitat designation under the draft recovery plan . The Montana Bull Trout Restoration Team has developed guidance that is contained in the Montana Bull Trout Restoration Plan. The goal of the Montana Bull Trout Restoration Plan is to ensure the long-term persistence of complex (all life histories presented), interacting groups of bull trout distributed across the species range and manage for sufficient abundance within restored RCA's (Restoration/Conservation Areas) to allow for recreational utilization. .

West slope cutthroat (WCT) have been listed as a Class A State Species of Special Concern. This Class A designation indicates limited numbers and/or limited habitats both in Montana and elsewhere in North America. The DNRC entered into a Conservation Agreement as a collaborative and cooperative effort among resource agencies, conservation and industry organizations, resource users and private landowners to protect WCT populations. The basic goal of this effort is to protect existing populations and ensure the long-term persistence of WCT populations within their historic range in Montana.

Cumulative Effects

Existing cumulative effects to fisheries within the proposed project area are low. Habitat alterations within the project area on State land have been minimal.

3.2.4 Wildlife

3.2.4.1 Threatened and Endangered Species

3.2.4.1.1 Grizzly Bear (Federally Threatened)

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.

Portions of the project area are located within the Northern Continental Divide Ecosystem (NCDE; Section 8) grizzly bear recovery area, while the remaining parcels are located < 2 miles south of the recovery area. Due to the location of the project area within and adjacent to the NCDE, the cumulative effects analysis area will be the combined areas covered by the Alice Creek and Red Mountain sub-units of the Monture-Landers Fork Bear Management Unit (BMU; a subdivision of the NCDE), and expand south of Hwy. 200 to encompass the valley floor to the Lincoln Canyon entrance and the confluence of Seven-Up Pete Creek with the Blackfoot River. Thus, the analysis area totals 253 mi^2 (162,029 ac). The ownership of the analysis area is a mixture of landowners, and contains a portion of the Scapegoat Wilderness (Table III-5).

Table III-5
Ownership Patterns within the Grizzly Bear Analysis Area

Landowner	Acres (%)
DNRC	6,584 (4.1)
Plum Creek and/or The Nature Conservancy	9,313 (5.8)
Bureau of Land Management	69 (.043)
U. S. Forest Service	110,166 (68.0)
Scapegoat Wilderness (subset of USFS)	50,669 (31.3)

Private Lands	35,095 (21.7)
Water	758 (.468)
Total	**161,985**

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 1.68 miles of open road per square mile (simple linear calculation; 426 miles of open road [does not include seasonally restricted roads]), and 2.24 total miles of road per square mile (568 miles of road), within the 253 square mile grizzly bear analysis area. Within the 2.29 mi^2 project area, there are approximately 5.57 miles of open road per square mile (12.75 miles of road), and approximately 6.33 miles of total road per square mile (14.5 miles of road; simple linear calculation).

Other activity associated with the project area includes grazing 404 AUM on Sections 8 and 16 (and other non-project area parcels), 151 AUM on Section 22 (and other non-project area parcels), 34 cabin sites and a 22.8 acre sawmill in Section 16, and an undeveloped site for a school in Section 19. Historically, both recent and past, grizzly bears have been re-located or removed from the population within the analysis area because they were found preying upon sheep in late spring (J. Jonkel, MT FWP, personal communication). Thus, the analysis area has historically been problematic for grizzly bears.

3.2.4.2 Sensitive Species

3.2.4.2.1 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. 1992, McClelland et al. 1979, McClelland 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 stands within project area are dominated by ponderosa pine and Douglas-fir. Average stand dbh is 11 inches, with a range of 3 to 20 inches (Stand Level Inventory database). There are currently 15 stands of potential pileated woodpecker habitat, totaling 393 ac, distributed throughout the project area that contain multi-storied structure with average stand diameters ≥ 15 inches (range 16 - 20 inches dbh). The analysis area is a 1-mile radius surrounding the project

area, and is comprised of approximately 5,097 forested acres. Of these acres, approximately 810 acres have been developed with cabin sites or the town of Lincoln, MT, and thus, may be unsuitable for pileated woodpeckers. Within the project area, the amount of developed forestland amounts to approximately 150 acres.

3.2.4.2.2 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). Because fishers prefer stands with dense canopy cover, areas that have experienced high intensity fires would not be suitable fisher habitat for several decades. However, newly created snags would provide needed coarse woody debris over time.

Within the project area, there are approximately 223 acres of habitat types (i.e., Pfister et al. 1977) that fisher prefer to use. Because these habitat types are present does not necessarily indicate that these acres are currently suitable for use by fisher (i.e., stand structure, canopy closure, etc.). Adjoining lands within a 1-mile radius of the project area are generally devoid of suitable habitat for fishers due to past, or currently planned private, forest management. As a result, potential fisher habitat in Section 10, T14N R8W, would generally be an isolated island. Thus, while preferred fisher habitat types may currently exist within the project and analysis areas, suitable habitat may not due to isolation and distance from other habitat.

3.2.4.2.3 Flammulated 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. Home ranges are typically > 20 acres in area (McCallum 1994). 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 under burns 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 926 acres of flammulated owl preferred habitat types (SLI data), with those acres being relatively evenly distributed throughout the project area. Due to the size of both the project area and flammulated owl home range, the project area will also be the cumulative effects analysis area.

3.2.4.2.4 Harlequin Duck

Harlequin ducks require white-water streams with boulder and cobble substrates for nesting and breeding. Harlequins usually nest under bushes along rocky shores that are adjacent to the rapids of mountain streams. They typically dive 3 to 5 feet in the swift currents in search of food along

the streambed. Typical food items are primarily animal food, consisting of: crustaceans, mollusks, insects, echinoderms and fish (Bellrose 1980). Thus, water quality is an issue for harlequin ducks so that they can continue to find food during the breeding season.

The Blackfoot River and its tributary, Keep Cool Creek, each flow through portions of the project area and could thus be affected by the proposed action. While there are no existing records of harlequin ducks nesting within the project area, or along Keep Cool Creek and the Blackfoot River (for 5 miles downstream; Montana Natural Heritage Database), there are concerns that water quality downstream could be affected by the proposed project as well as runoff from the Snow-Talon fire.

3.2.4.3 Big Game

3.2.4.3.1 White-tail and Mule Deer

Densely stocked thickets of conifer regeneration and overstocked mature stands provide thermal protection and hiding cover for deer in winter, which can reduce energy expenditures and stress associated with cold temperatures, wind, and human-caused disturbance. Areas with densely stocked mature trees are also important for snow interception, which makes travel and foraging less stressful for deer 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 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 herds.

Within the project area, there are approximately 406 acres of densely canopied forest which provide snow-intercept, and possibly thermal cover for white-tailed deer. Within the larger cumulative effects analysis area, the area inclusive of the project area and a one mile radius surrounding it, there are approximately 2,591 acres of snow intercept/thermal cover (determined using orthophotographs dated 20 August 1995). Due to the project area's intermingling with the town of Lincoln, MT, and its somewhat developed nature (cabin sites), this area likely receives low levels of hunting pressure through archery hunting. Additionally, there are two grazing licenses on the project area, including one for 404 AUMs, and the other for 151 AUMs.

3.2.4.3.2 Elk

Elk generally avoid open roads, however, they become more tolerant of closed roads in the area over time (Lyon 1998). 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., $\geq$250 acres) areas of forest cover $\geq$0.5 miles from open roads serve as security for elk. Thus, removing cover that is important for wintering 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 elk herds.

Following the concept of elk security cover (Hillis et al. 1991), there is no elk security habitat within the project area due to the abundance of open roads. The grizzly bear cumulative effects analysis area will also be used for the analysis of elk habitat because many of the elk that utilize the project area migrate from the Scapegoat Wilderness Area. Thus, there are approximately 58,921 acres of elk security habitat within the analysis area. Because of the 2003 Snow Talon fire, the amount of security habitat was recently reduced to its current levels.

3.2.4.3.3 Moose

Moose are the largest ungulate in North America, distributed throughout Alaska, Canada, and many of the border states. In general, moose habitat includes: areas of abundant high-quality winter browse; shelter areas that allow access to food; isolated sites for calving; aquatic feeding areas, young forest stands with deciduous shrubs and forbs for summer feeding; mature forest that provides shelter from snow or heat; and mineral licks (Thompson and Stewart 1998). The 162,029 acre cumulative effects analysis area (same area used to analyze for grizzly bears and elk) is a mixed area with dense coniferous forest towards the NW, with a 37,706 acre area burned in 2003 (Snow Talon Fire), and recently harvested private timber lands in the SE portion, near the valley floor. Additionally, moose would forage along the riparian areas associated with Copper Creek, the Landers Fork, Alice and Bartlett Creeks, and the Blackfoot River. Due to the project area's proximity to Hwy. 200, and human residences in and around Sections 16, 19, and 22, moose may only utilize the project area as they transition from the Blackfoot River to more northerly destinations. There are approximately 48,942 acres of moose winter range within the analysis area, and all of the project area is considered to be winter range habitat.

3.2.5 Archeology

No historic and prehistoric cultural resources have been identified in the project area.

CHAPTER IV – ENVIRONMENTAL EFFECTS

4.1 Introduction

This chapter describes the environmental effects of each alternative on the resources described in Chapter III and contains the scientific and analytic basis for the alternatives comparison summarized in Chapter II. It is organized in the same manner as Chapter III by general resource categories and their associated issues.

4.2 Predicted Attainment of the Project Objectives

See Chapter I for a complete list of the project objectives. The no action alternative does not meet any of the project objectives. Revenue would be lost and forest health would continue to decline under this alternative. The DNRC would be required to find volume elsewhere to meet its sustained yield.

The action alternative does meet all of the objectives. This alternative would improve forest health and growth substantially on the 48% of the forested acres that are treated. The majority of the remaining untreated ground is already in fair to good health and does not require treatment at this time. Preventative silvicultural treatments would take place on 470 that would reduce the risk of further losses to bark beetles and reduce fuel buildups in and around the urban interface.

4.3 Affected Resources

4.3.1 Vegetation

For the vegetative related resources the cumulative effects analysis area includes all four state parcels and all those lands within one mile of these four sections. This involves and includes both private and federal ownership in addition to state ownership (see Figure 1-1. Vicinity Map). Most of the conclusions that are arrived at in the following section are as a result of professional judgment and experience.

4.3.1.1 Forest Structure and Cover Types

Alternative A

The stands would not be harvested and should remain essentially the same, although successional processes would slowly change the attributes over time. This gradual succession would be the case with all the stands under the no-action alternative. The stands would continue to age and trees would grow larger. An increase in stem rot, mistletoe, and other infectious agents would be expected as would increased amounts of down woody debris. The already overstocked stand conditions would continue and worsen. Although, a slow progression with small openings being created as individual trees or groups of trees die, and the initiation of new growth might be expected. There would be an increased risk of large-scale loss of stands due to insect and disease outbreaks or fire over time.

Alternative B

Under the action alternative, average tree size, and tree spacing would be affected. In general, age class distribution within the proposed harvest units would remain the same in the near-term since trees in all age classes would be left (see Table IV-1) although average age of trees within stands is expected to be reduced over time as the growing space that is created through the harvesting is regenerated with new young trees. In all cases, the stands would be more openly spaced as trees are harvested. Within the improvement harvests, where there are currently multi-storied stands, this would remain post-harvest, and where there are single-storied stands the removal of some trees and resulting initiation of regeneration would over time create a two-storied or multi-storied stand.

Table IV-1 is identical to Table III-3, which reflects that no changes are expected to occur in the age distribution within the project areas as a result of the proposed action. The numbers found below are estimates based on professional judgment of age class distribution post-harvest and can be used as relative guides to depict expected changes.

Table IV-1
Proposed Age Distribution by Cover Type in the Analysis Area

Cover Type	Seed-Sap 1-39 Acres	Poles 40-99 Acres	Mature 100-149 Acres	Older 150+ Acres	Non-Forested Acres	**Total Acres**
PP	231.9	343.8	362.7	45.8		**984.2**
DF	0	3.5	454.6	90.7		**548.8**
WL-DF	43	0	19.6	0		**62.6**
LP	119.7	35.1	0	0		**154.8**
MC	0	157.5	4.3	0		**161.8**
ALP	35.1	11.9	22.4	0		**69.4**
NF*					591.1	**591.1**
Total	**429.7(22%)**	**551.8(28%)**	**863.6(43%)**	**136.5(7%)**	**591.1**	**2572.7**

*NF = nonforested

Most cover types are not expected to change as a result of the silvicultural prescriptions proposed for these timber stands, however some portions of stands may be reclassified with new cover types due to harvest in a portion of a stand and no harvest in the other and from misclassification, etc. An example would be where a 100 acre stand of ponderosa pine with pockets of Douglas-fir was lumped into a ponderosa pine stand preharvest, it might receive 60 acres of harvest where ponderosa pine was predominant and those 60 acres would be remain classified as ponderosa pine post-harvest with the remaining 40 acres that were heavily weighted to Douglas-fir might be reclassified as a Douglas-fir cover type.

None of the sections have experienced measurable amounts of blowdown during large wind events and it therefore does not appear to be a chronic problem on the project area at the current time. On other state parcels in the Lincoln area blowdown of residual trees post-harvest has been a problem.

Trees most susceptible to blowdown are typically those that are larger with bigger crowns and those that are shallow rooted such as spruce and lodgepole pine, however blowdown of Douglas-fir and to a lesser extent ponderosa pine in the area is also quite common. A low amount of blowdown could be expected in the residual stand post-harvest on the project area although very little blowdown is more likely. Blowdown is most likely to occur in the more open areas with shallow soils and along property lines where adjacent stands have been heavily harvested in the past where the wind could pick up speed in the more open areas and then hit the more dense edges of improvement harvests with greater force. The majority of the blowdown that could occur as a result of the proposed project would be expected within the first several years following harvesting. After the first several years, the residual trees tend to expand their root systems with the new-found growing space as a result of the thinning effects of harvesting and become more wind-firm over time. Should blowdown occur, the residual stands could be somewhat more open than proposed in the action alternative, and this blowdown may be harvested as part of the proposed action.

The following is a summary of the silvicultural prescriptions and treatments that would influence the structures of the stands in the harvested portions of the project area. See the maps in Chapter II to aid in understanding harvest unit size, shape, and location.

Improvement Harvest:

This treatment would improve the health and growth of the residual stand by removing poorer trees of all sizes and create growing space and associated increases in sunlight, water, and nutrients for the residual trees. Harvesting would promote and maintain the uneven aged nature of the stands. Almost all lodgepole pine would be removed and ponderosa pine would be favored over Douglas-fir where present. In areas where Douglas-fir is more prevalent and/or where root rot is infecting trees, the basal area removal would on average be higher in order to favor growing space for ponderosa pine and remove the more root rot susceptible Douglas-fir. This could result in openings of approximately ½ acre in size with little to no leave trees. This removal of competitive trees around ponderosa pine would create small openings around the ponderosa pine, which would encourage some regeneration of the species. While initiation of regeneration is not a primary goal of this treatment, where openings in the canopy are created, regeneration may become established and would be encouraged. Approximately 60% of the basal area would be removed by cutting trees that are in poorer health, with poor crowns or form, and those that are overcrowded. Some areas may have less than 60% of the basal area removed due to relatively good existing health of the stand and in other areas more than 60% of the basal area may be removed due to relative poor health of the existing stand and in areas with greater amounts of Douglas-fir and lodgepole pine, but overall the prescription stand basal area reductions should average around 60%. Some blowdown and secondary mortality due to root rot within and adjacent to the units could be expected and may be salvaged as part of this project. Advanced regeneration and healthy submerchantable trees would be protected to the extent practicable. Poor suppressed trees with little to no potential for future growth would not be protected and may be slashed if needed post-harvest. Additional thinning of heavily stocked pockets of advanced regeneration would also take place to improve growth if time and funding were available. Harvesting should promote the rejuvenation of some quaking aspen within the

stands where it is currently present and is being suppressed from coniferous competition. Most large standing dead trees would be left as snags where safe to do so and most of the trees with greater than 60% rot would be left as snag recruits. Approximately 5-10 tons of coarse woody debris would be left within the units except along some open roads, near current and possible future cabin sites, and near heavily used recreational areas.

Cumulative Effects

The risk of negative cumulative effects occurring is very low since many of the proposed treatments are designed to emulate historic processes and bring the stands back toward more historic stand conditions. Future possible harvesting on private lands within the analysis area would tend to make age classes younger, but would not be expected to cause large negative effects to forest structure and cover types since they would be expected to be relatively small in extent. Some blowdown could occur on private ownership bordering cutting units due to proposed harvesting. The likelihood of this happening would be low, and would be expected to be small in extent due to the fact that most of these bordering lands have already been harvested in the past several decades.

4.3.1.2 Forest Health

Alternative A

Under this alternative, stand health would remain the same in the short-term, but continue to decline as stands age and competition becomes more intense. Diseases including root rot and mortality due to bark beetles would increase as time goes on and stand vigor continues to decrease.

Alternative B

The silvicultural prescriptions found in section 4.3.1.1 describe the proposed treatments in detail.

Generally, the improvement harvests on 470 acres would thin and sanitize the stands and greatly increase growth rates and tree vigor. Stocking levels and competition would be reduced by removing the poorer growing trees including trees with poor form, with thin or small crowns, trees infected by disease, or trees that are otherwise contributing to overstocking. This would tend to improve stand vigor and initiate new growth and regeneration. Overall stand health would be improved which would make the stands much less susceptible to insect and disease outbreaks. Harvesting in areas where root rot is present would be likely to increase the spread and intensity of this disease in the remaining trees, however prescriptions are designed to leave healthier trees that are more resilient to attack and promote less susceptible species such as ponderosa pine. Mortality that occurs due to the possible increase in root rot may be salvaged as part of this project.

With proposed treatments blowdown of some residual trees could be expected. This could have a negative effect to forest health by providing a food source for bark beetles. However, these trees may be salvaged as a part of this proposal, which would virtually eliminate this risk.

Cumulative Effects

No negative cumulative effects are expected to occur to forest health as a result of this project. The proposed treatments would reduce insects and disease populations in the area directly and would greatly improve forest health and vigor. Cumulatively this would serve to reduce the risk of insect and disease outbreaks in the area and minimize the risk of populations building on state ownership that could affect adjacent landowners in the near future.

4.3.1.3 Fire Hazard

Alternative A

Fire hazard and the risk of stand replacing fires on the project area would not be affected as a result of this alternative. The stands would remain at high fuel loadings and ladder fuels would continue to increase at levels well above those expected without the exclusion of fire. Existing conditions described in Chapter III would persist and worsen. Stand densities and down fuel loadings would be expected to increase over time as would the amount and severity of insects and disease mortality. This condition would be expected to increase over time until the fuels are modified by an ecological disturbance or by management activities.

Alternative B

The reduction in stand densities and removal of forest products and forest fuels proposed in this alternative on 470 acres would greatly reduce the risk of moderate intensity to stand replacing fires. If fires were to burn through the area, they would be more likely to be light to moderate severity as a result of this reduction in fuels except in extreme fire conditions. With the reduction in fuels and thinning of the tree canopies, fire would be more likely to be ground fires that would burn in the understories and be more controllable than stand replacing crown fires. Treatments would reduce ladder fuels by removing and thinning smaller trees, which would reduce the chance of fire reaching and carrying in to the overstory. Eventually over time as the stands regenerate and become older with larger trees, more fuels, and tighter canopies, the risk of higher intensity fires would again begin to increase.

Some of the tops, limbs, and unusable pieces of trees would be left in the forest to recycle nutrients and to provide coarse woody debris for microorganisms, small mammals, and forest health. This slash would increase fire hazard in the ground fuels on the site for up to approximately 3-5 years as it cures and decomposes. Slash left in the woods would meet the State Hazard Reduction Laws. There would be slash piles at the landings, which would be burned or otherwise disposed of within approximately 2 years of their creation. The effects of this short-term increase in ground fuels would be somewhat offset by the reduction in the overall volume of fuels.

The proposed harvesting would also decrease the risk of uncontrollable fires to the lease sites and associated structures found on state land within the project area as well as adjacent land and homesites and the town of Lincoln. The thinning and removal of forest fuels especially in the canopies would be expected to decrease fire intensities which would allow fire personnel to control these fires more easily.

Cumulative Effects

For the first three to five years fire hazard would not likely be reduced due to the offsetting effects of decreased stand densities but increased slash loadings. In the long-term however, the decreased risk of high intensity and stand replacing fires on 470 acres would provide a net benefit within the analysis area. Should a fire start in the overstocked or heavily diseased stands and build to high intensities, it puts most of the nearby stands at increased risk regardless of their fuel loads or stocking levels due to the fire intensity that was allowed to build. By removing 470 acres from this heavily stocked and diseased state, the surrounding landscape would benefit through reduced risk of higher intensity fires and through creation of areas where fire might be more controllable.

4.3.1.4 Aesthetics

As described in Chapter III, the project area can be seen from Highway 200, and the lease lots, and the subdivision on the 4X4 Road.

Alternative A
Aesthetics would remain much the same as they are now under this alternative. Over time these stands would likely appear more dense with increases in down and standing dead debris. There would also be an increased risk of insect or disease attack or high intensity fire in these stands as stand densities and fuels build up. Such disturbances would open the stands considerably and change the aesthetics from their current state.

Alternative B
As a result of the proposed action, stands would appear more open as approximately 60% of the basal area would be removed and sight distances would be increased. Stands would appear more park-like or thinned and more sunlight would reach the ground. The residual stand would look more healthy and thrifty with the removal of the less healthy and diseased trees. Over time the existing trees and regeneration would grow resulting in shorter sight distances and a more densely forested look. Grass and brush coverage would increase and tree stumps would be visible in the non-winter months. Some slash would be left on the ground although most slash in areas immediately adjacent to the heavy use areas would be removed and piled. This should result in a somewhat more pleasing look adjacent to heavily used areas than harvest units where slash and coarse woody debris are left in larger amounts. Slash piles would be visible in some locations until they were burned. Blackened soil and some charred pieces would be evident for some time after these piles were burned. Removal of trees would allow increased viewing of the landscape and associated wildlife, but would reduce the heavily forested look of the area. Eventually stands would begin to regenerate in more open areas. Within approximately 20 years younger trees should provide increased cover and screening of the area. As stands mature, they would more closely resemble the conditions that currently exist.

Section 8 and the northern portions of Section 16 can be seen at a distance from Highway 200. After treatment, these areas would appear very similar to their current appearance. The canopy coverage would look somewhat less dense (with an expected reduction of approximately 50-60%) and more small openings would be visible where the ground could be seen. Over time, trees and tree canopies would expand and the stands would appear more dense with fewer

openings in the canopies. Existing roads would not likely be seen except for isolated short segments. At certain angles skid trails might be evident for the first several years following harvesting. This could be especially evident if summer harvest operations disturb soils. Over time skid trails would revegetate and tree crowns would fill in openings.

At the stand level, relatively little road construction and other road disturbing activities are planned. No measurable effect aesthetically is anticipated from this activity. Within all of the harvested areas, sight distances and views of the topography and surrounding landscape would be increased. Within improvement harvest areas stands would appear more open as approximately 60% of the basal area would be removed and sight distances would be increased. Stands would appear more park-like or thinned and more sunlight would reach the ground. The residual stand would look more healthy and thrifty with the removal of the less healthy and diseased trees. Existing trees and regeneration would grow in over time resulting in shorter sight distances and a more densely forested look.

On and adjacent to the lease lots as well as adjacent to homes along the 4X4 Road, the changes described above will be most evident to residents. Changes will be most evident during and immediately following proposed harvesting. As time goes on, changes would be less evident and notable, especially as stands grow and regenerate. Some negative affects are expected due to the removal of trees between the lease lots and Highway 200 causing an increase in noise and greater visibility to and from the highway. This increase in noise is expected to decrease over time as stands grow and regenerate. The regeneration is expected to provide the greatest mitigation of increased noise and sight over time. As the proposed harvesting occurs, residents will also see and hear logging equipment near their homes. This negative effect is expected to be of short duration.

Skid trails would be readily evident in most harvested areas but would become less evident over time. Skid trails would be more evident in summer harvested areas and much less evident in winter harvested areas since ground disturbance would be less at this time of year. Slash would be evident (especially for the first 2-3 years) across most of the harvest units and would cause a short-term unsightly appearance. This effect would ameliorate over time as the slash decomposes and needles fall off.

Cumulative Effects

Most of the lands within the analysis area are forested with varying size and age classes of trees, however a portion of the area has openings with evidence of past timber harvesting. The proposed activities are expected to blend with the current mosaic on the landscape. The proposed project would have a low risk of negatively affecting the aesthetic quality or forested characteristics of the area. Effects are expected to be more pronounced in the short-term with the immediately noticeable change from heavily forested stands along the roads to somewhat more open conditions. This effect would decrease over time as the stands grow and regenerate.

4.3.1.5 Old Growth

Alternative A
The amount of old growth on the project area would remain the same as would the amount of old trees within the other stands in the project area. Stands would continue to age and over time some additional areas might meet the definition of old growth provided some disturbance not change their age, size, or stocking characteristics.

Alternative B
The amount of old growth on the project area would remain the same since no stands that meet the definition of old growth are proposed for harvest.

Old trees as well as mature trees within the proposed harvest areas would be cut. This could result in fewer stands being eligible to be recruited into the old growth classification in the near-term, which would be a negative effect to old growth of the proposed project. Improvement harvesting would not preclude stands from becoming old growth since all size and age classes would be represented post-harvest, however stand characteristics would be changed and might delay their recruitment into old growth classification. Harvesting would allow residual trees to grow larger and faster which could enhance attaining old growth status in the future.

Cumulative Effects
The proposed project would not decrease the amount of old growth currently in the analysis area, however it could delay the amount of old growth stands available for recruitment into old growth status in the near-term, which would result in a negative short-term effect to old growth amounts and abundance in the area.

4.3.1.6 Sensitive Plants

No sensitive plants have been identified. No effects are expected to occur under either alternative.

4.3.1.7 Noxious Weeds

Alternative A
It is expected that noxious weed infestations would increase over time. Heavy tree canopies would continue to compete with weeds, but they would continue to spread across the analysis area. Biological control agents might help decrease the densities of infestations of knapweed in localized areas as they become more established.

Alternative B
The proposed activities would result in an increase in ground disturbance. Mechanized equipment and ground disturbance could increase or introduce noxious weeds throughout roads and forested areas. Seeds of weeds such as thistle and knapweed are likely to be scattered throughout the forested areas and the reduction of canopy and resulting disturbance from the timber harvest activities is expected to provide the catalyst for spread.

For this project an Integrated Weed Management (IWM) approach would be implemented that would include: prevention, revegetation and weed control measures for spot outbreaks, which are

considered the most effective weed management treatments. Short-term goals would be to reduce existing noxious weed populations and increase native plants and seeded grasses. Where weeds are replaced with grasses, erosion would be reduced due to the improved plant cover. Localized herbicide applications would be used, primarily along disturbed roadside edges and spot treatments of small infestations. An herbicide treatment of most of the noxious weeds along the roadsides would occur prior to proposed activities and following completion of activities.

To protect water quality, herbicide would not be applied where runoff could enter surface waters or riparian features. Existing biological control efforts for knapweed would be monitored and supplemented if necessary.

Cumulative Effects
With the planned IWM approach cumulative effects of the spread and establishment of noxious weeds in the area as a result of the proposed activities are expected to be minimal although populations are expected to continue to increase over time.

4.3.2 Soils

Alternative A
Under Alternative A, there are no anticipated impacts to displacement, compaction or erosion.

Alternative B
The primary risks to long-term soil productivity are compaction and erosion of surface soils. During timber harvest, equipment operation on wet sites and sensitive soils can result in soil compaction, rutting, displacement and erosion. Potential effects are a reduction in long-term soil productivity and regeneration potential, as well as impacts to coarse woody debris distribution and nutrient cycling.

Under the action alternative, the risk of direct and indirect impacts is expected to be minimal as a result of implementation of recommended mitigation measures. All harvesting would be done using ground-based operations (ie. not cable yarded or helicopter logged). In order to limit cumulative impacts, existing skid trails would be used where available if they are properly located and adequately spaced. Utilizing existing skid trails and mitigating direct and indirect effects with soil moisture restrictions, season of use and method of harvest, the risk of unacceptable long-term impacts to soil productivity would be low.

Season of operation would be winter, summer and/or fall. The total ground surface area where soils are disturbed by trails and landings would be restricted to 15% of the total area of the unit. Harvest operations during summer and fall conditions would be restricted to periods of 20% or less soil moisture at 6 inches below the soil surface.

Skidding would be restricted to slopes of 45% or less to reduce potential erosion and displacement. Soil moisture content on sensitive soils would be checked and approved by the Forest Officer before the start of harvest operations.

Cumulative Effects
Cumulative effects could occur from repeated entries into a harvest area. Cumulative impacts are expected to be minimal by limiting the area of total adverse soil impacts to 15% or less of the total area of each harvest unit. Large woody debris would be maintained on the site at approximately 5-10 tons/acre. An acceptable risk of cumulative effects is expected if implementation of BMP's, proper skid trail planning and design and limiting operations to dry and frozen conditions occurs.

4.3.3 Hydrology and Fisheries

4.3.3.1 Hydrology

4.3.3.1.1 Water Quality and Beneficial Uses

Alternative A
Under the No Action Alternative, direct, indirect and cumulative effects evaluated were those associated with past management activities within the proposed project area. Direct, indirect and cumulative effects within the project were observed to be minimal.

Alternative B
A watershed effects analysis was completed for the proposed sale area to determine the potential direct, indirect and cumulative impacts to water quality. The only water located within the project area is in Section 22. The Blackfoot river was listed on the 1996, 2000 and 2002 303(d) list. Pursuant to Montana Annotated Code section 75-5-703 10C, pending completion of a TMDL on a water body listed pursuant to 75-5-702: new or expanded non-point source activities affecting a listed water body may commence and continue provided those activities are conducted in accordance with the reasonable land, soil and water conservation practices. A draft TMDL for sediment has been completed and is currently under review by the Department of Environmental Quality (DEQ).

Under the action alternative minimal direct, indirect and cumulative effects are expected as a result of the proposed action. Mitigation measures implemented during the proposed activities are expected to minimize the potential impacts to water quality. Riparian Management Zones (RMZ's) would be implemented on the Blackfoot River in Section 22. A 150 foot no-cut buffer would be implemented on most of the units in Section 22. There would be a section of approximately 400 feet where the no-cut buffer would be 100 feet and extended to incorporate the channel migration zone in those areas where the channel migration zone is greater than 100 feet. There is an irrigation ditch located approximately 50 feet from the river in this section. All the units located adjacent to the Blackfoot River are tractor units.

A skidding plan would be designed and approved by the Forest Officer to minimize displacement and compaction. Because slopes in the area are less than 5%, erosion will likely not be a factor. The ditch in this section does not have return flow to any body of water and will not be treated as a class 3 stream channel. However, restricting crossing sites to those located by the Forest

Officer would minimize impacts to the ditch. All Streamside Management Law and Rules would be implemented.

All roads within the project area would be improved to meet BMP standards. Gravel and turnpiking would be required in some locations to provide adequate road drainage. Drain dips would be installed on most road segments to increase drainage. There are sections of the haul route that are located on private property through which the DNRC has an easement. The level of road improvements on this section of private land would be dependent on the landowner. Some portions of the road may not meet BMP standards if the landowner requests no action be taken. There is a stream crossing on private land, in which sediment delivery from the road may continue. However, this is the only crossing site in the project area and the overall risk of direct and indirect impacts to water quality from proposed actions is minimal.

Cumulative Effects
Implementation of mitigation measures for road improvements and riparian buffers are expected to minimize impacts to water quality. As a result, cumulative impacts to the water quality from the proposed action are expected to be minimal.

4.3.3.1.2 Roads

Alternative A
Under the no action alternative, no changes to the current road system would occur. High open road densities would remain and BMP problems would continue. All roads that are currently classified as open would remain open.

Alternative B
The primary risk to water quality is sediment delivery from roads. All existing roads planned for use on Trust Lands within the project area were evaluated. There are roads in the project area that do not comply with BMP standards. Some roads require additional drainage features and others exceed preferred road grades. One section of steep road exceeding 12% gradient would be obliterated and several segments of road that occur on flat ground but do not have proper drainage and remain as mud holes much of the year would be relocated to reduce erosion and resource damage. Additional mitigation measures for surface drainage would be implemented under the proposed activities.

Under the proposed action 0.35 miles of road would be closed by earth berms and 0.55 miles would be obliterated. These mitigations are expected to mostly eliminate recreational vehicle traffic on these roads and reduce erosion and resource damage. The term obliteration for this project refers to the removal of the road prism and reshaping the slope to its natural contour. Approximately 0.4 miles of new road construction would occur in Section 22. Access to this state land would be gained by securing an access easement and construction of 300 feet of new road through Lewis and Clark County Park property to the north of state land or through another private property owner to the north. Access could also be gained through a deeding of the County Parks land to the DNRC. In Section 19 a temporary drive-across road would be utilized to access a landing area away from homes and Highway 200. Because there are no streams

located near the new road construction, negative impacts to water quality are expected to be a minimal.

Table IV-2
Proposed Road Miles

	Section 8	Section 16	Section 19	Section 22	Total
Current Open Road Miles	2.45	9.0	0.5	0.8	12.75
Current Closed Road Miles	0.35	0	0	1.4	1.75
Proposed Open Road Miles	2.1	8.45	0.5	1.2	12.25
Proposed Closed Road Miles	0.7	0	0	1.4	2.1
Proposed Road Obliteration	0	0.55	0	0	0.55
Proposed Road Construction	0	0	0	0.4	0.4

Cumulative Effects
Within the analysis area erosion would be reduced as a result of road improvements to meet BMPs and road relocations and obliterations. Total road amounts would be reduced from 14.5 miles to 14.35 miles. Open road amounts would be reduced from 12.75 miles to 12.25 miles.

4.3.3.2 Fisheries

Alternative A
Under the Action Alternative, there would be no risk of additional impacts to fisheries.

Alternative B
The Blackfoot River is the only stream with fish populations close proximity to the project area. There would be no harvesting within 150 feet of the Blackfoot River throughout most of Section 22. There would be a stretch of approximately 400 feet that would have a 100 foot no-cut buffer. The channel migration zone in some locations is greater than 100 feet. In these locations, the no-cut buffer would be expanded to incorporate the channel migration zone. The average tree height within this area in Section 22, according to the DNRC Stand Level Inventory is 65 feet. A 100 and 150 foot no-cut buffer that extends to the edge of he channel migration zone is anticipated to provide adequate large woody debris recruitment for the existing channel location.

No-cut buffers are expected to help maintain thermal protections as well as habitat complexity. Implementation of the recommended mitigation measures is anticipated to have minimal direct and indirect impacts. If the river were to drastically migrate, impacts to large woody debris recruitment could occur. However, retention of approximately 40% of the basal area would occur

outside the channel migrations zone, and is expected to be adequate to retain shade levels and large woody debris recruitment. Direct and indirect effects are expected to be minimal.

Cumulative Effects
Following SMZ Laws and Rules as well as incorporating expanded riparian buffers would maintain long-term large woody debris recruitment, thermal regulation and habitat complexity. Buffers are anticipated to minimize the risk of sediment delivery to the stream channel and protect water quality for fish habitat. As a result, cumulative effects of the proposed actions are expected to be minimal.

4.3.4 Wildlife

4.3.4.1 Threatened and Endangered Species

4.3.4.1.1 Grizzly Bear (Federally Threatened)

Alternative A
Under the no action alternative, vegetation changes would be limited to gradual successional changes, possibly small timber permits, the possibility of additional cabin sites, or a future timber harvest that would be subject to environmental review. Under this alternative, current open road densities would remain unchanged within the project area. Thus, under the no action alternative minimal direct and indirect effects would be expected for grizzly bears.

Alternative B
The proposed action would harvest timber within 470 acres on School Trust lands, construct approximately 0.4 miles of road, close 0.35 miles of road, more effectively close an additional 0.35 miles of road, and obliterate approximately 0.55 miles of road. As a result, open road densities within the project area would be reduced from approximately 5.57 miles per square mile to approximately 5.36 miles of open road per square mile. The proposed harvest would cut approximately 60% of the basal area, primarily through a thin-from-below harvest. Such action would likely increase sight-distance within the affected stands, and may result in increased vulnerability of grizzly bears to accidental or intentional shooting. Thus, while the proposed action would change the level of vegetative cover within the project area, it would retain visual screening cover along open roads within Section 8, while also reducing some open road density. Therefore, grizzly bears would expect a low level of direct and indirect effects as a result of the proposed action.

Cumulative Effects
The project area is part of a larger landscape that receives heavy recreational use by the public, with adjoining privately-owned parcels permitting public recreation. Within the past year, one-fifth of the analysis area was radically changed through the Snow Talon Fire, which burned 32,370 acres, 26,500 of which were in stand replacement fire. Portions of the Scapegoat Wilderness area also comprise 31% of the analysis area (see Table III-5). The remaining lands are composed of a mixture of School Trust lands, The Nature Conservancy, Plum Creek, BLM, USFS, and private lands. Large portions of these lands have been subject to both recent and historic timber harvest, as

well as livestock grazing, including a significant sheep herd on private and DNRC lands. Historically, grizzly bears have had trouble with the sheep, and have either been re-located or destroyed.

Past and recent vegetation changes within the analysis area will provide a shifting mosaic of food sources for grizzly bears for several years. On the private lands surrounding the project area, the effects of past timber harvest have progressed to provide berry fields and hiding cover, as well as food sources for deer and elk. The 2003 Snow Talon fire will begin by providing lush grasses that would feed deer and elk, bolstering their populations, which may in turn provide a food source for grizzly bears. As the Snow Talon area progresses vegetatively, fruit-bearing shrubs, seedlings, and saplings will develop that would provide additional food and hiding cover for bears. The availability of these food sources close to grizzly bear dens may persuade grizzly bears from staying down in the valley near the project area in late spring, early summer, and help prevent conflicts between bears and ranchers and recreationists. The addition of the proposed action would create additional early successional habitat in the short term, which may provide additional food sources, while providing better visual screening as the vegetation develops over time (>20 years). Because the project area is so close in proximity to high recreation use areas, and is intermingled with cabin sites and the town of Lincoln, the effects of the proposed action would vary with the burned area's ability to attract grizzly bears. Human habitations within and around Sections 16, 19, and 22 stand to influence grizzly bear use of the project area most, either through a use-avoidance mechanism or presence of food attractants. In the case of the latter situation, grizzly bears attracted to the area may be more susceptible to being removed from the population with the increased sight-distance post-harvest. Yet, the proposed project would likely have low risk of cumulative effects to grizzly bears because visual screening cover would be retained post-harvest and there would be reductions in open road density and improvements made to currently ineffective road closure devices.

4.3.4.2 Sensitive Species

4.3.4.2.1 Pileated Woodpecker

Alternative A

Under the no action alternative forest management would continue as usual, with periodic timber permits to salvage insect-killed timber or recent blow down, fire suppression, grazing, and cabin site leases. With DNRC and USFS fire suppression effectiveness, many of these stands would tend to be overstocked, where fire would normally thin understory tree densities. As a result, the project area would be more susceptible to insect infestation, which would create additional roosting and nesting snags for pileated woodpeckers, as well as the eventual large diameter downed logs for foraging substrate. Thus, there would be low risk of direct or indirect effects of the no action alternative on pileated woodpeckers.

Alternative B

Under the proposed action, approximately 224 ac of the 393 ac of pileated woodpecker habitat would be harvested, largely through a thin-from-below harvest that would retain the larger diameter trees. In treated areas, poorer quality trees would be harvested to create growing space for the residual. While the proposed harvest would reduce stand density, it would also reduce the

susceptibility of stands to insect infestations that could create nesting and roosting snags, as well as provide forage. However, the proposed action would also retain healthy ponderosa pine that over time would be the source of future nesting and roosting sites, and eventually become foraging substrate. The proposed action would provide low to moderate risk of direct and indirect effects to resident pileated woodpeckers over the next 30 years, while the affected acres respond to the proposed harvest and can provide a more closed forest canopy of ponderosa pine. However, beyond 30 years post-harvest, the proposed action should provide better pileated woodpecker habitat than is currently available in the project area. Snags would be retained pursuant to ARM 36.11.411, with at least 1 snag and 1 recruit over 21 inches dbh per acre retained where available.

Cumulative Effects

Within the project area and the 1-mile radius surrounding it, the landscape is a mosaic of forest and intermingled grassland. Most notable of the grasslands, are an approximately 3,133 ac grassland in the northern portion of the analysis area, and an approximately 1,753 ac grassland in the southern portion of the analysis area. Much of the timber on private lands within the analysis area has been developed for human habitation, and may no longer be suitable for pileated woodpeckers. The proposed action would reduce the amount of pileated woodpecker habitat within the analysis area, relegating what would be the more suitable habitat to approximately 845 ac of School Trust and USFS land on the periphery of the analysis area, for approximately 30 years. Approximately 43% of the 393 ac of pileated woodpecker habitat within the project area would still remain unharvested post-harvest. The effects of the proposed action would likely be to re-distribute the few pileated woodpeckers that might use or reside in the project area to the boundaries of the analysis area or beyond. Thus, there would be low to moderate risk of cumulative effects to pileated woodpeckers that may inhabit the analysis area as a result of the proposed action.

4.3.4.2.2 Fisher

Alternative A

Under the no action alternative, the approximately 223 acres of fisher preferred habitat types would largely remain unchanged, except for the gradual change associated with forest succession or potential future timber permits or as of yet, unplanned timber sales. The majority of this habitat is associated with the riparian zone along the Blackfoot River, which could serve as suitable travel corridors for fisher. However, much of the habitat on adjoining private lands has been logged or developed in the past, and is currently unsuitable for fisher due to low canopy closure, inadequate forest structure, and human habitation. Thus, because of habitat conditions on adjacent private lands, the existing fisher habitat within the project area would function as habitat fragments and would be unlikely to provide much for fisher except for occasional foraging sites. Thus, the no action alternative would have low risk of direct or indirect effects to fisher.

Alternative B

The proposed action would harvest approximately 90 ac of the 223 ac of fisher preferred habitat types within the project area using primarily a thin-from-below harvest. Such action would

reduce the amount of suitable fisher habitat by removing the multi-storied structure of the affected stand. Forest structure and canopy closure would eventually return to these stands within 20 to 60 years post-harvest. However, the remaining 133 acres of this habitat would have the most influence on fisher use of the project area because of its proximity to the Blackfoot River, and could serve as part of a travel corridor. Thus, within only the project area, the proposed action would likely have low risk of direct and indirect effects to fisher.

Cumulative Effects

As discussed under Alternative A, much of the habitat on adjoining private lands has been logged and developed, and is currently unsuitable for use by fisher. This causes existing fisher habitat within the project area to function more as habitat fragments within the larger landscape that may provide occasional foraging opportunities for fisher. This raises the question of whether the proposed action temporarily removes suitable habitat that is of value to fisher. Looking at the surrounding landscape, with developed and logged private lands, the more "valuable" fisher habitat, where value denotes large, contiguous blocks of habitat with travel corridors, would be located approximately 1 mile east of the project area on USFS lands. In the context of the USFS landscape, fisher habitat would be the matrix of the landscape, with patches of timber harvest scattered throughout. Thus, in that landscape, there is better connectivity and more extensive habitat. However, in the 1-mile radius surrounding the project area and the landscape to the east and NE, the matrix is predominantly recently harvested timber exhibiting little vertical structure (i.e., a stand cannot exhibit single or multi-storied structure until trees exist at sufficient density over enough area to be considered a "forested stand") and very open canopy closure, with scattered fragmented patches of fisher habitat. Thus, the proposed action, through removal of approximately 90 acres of fisher habitat would contribute additive cumulative effects, albeit minor, to the already existing nature of the landscape for fisher. Retention of the 133 acres of fisher habitat types would not likely sustain fisher during a breeding season.

4.3.4.2.3 Flammulated Owl

Alternative A

Under the no action alternative, forest management activities would continue as usual, including fire suppression activities. As a result of fire suppression activities, Douglas-fir and other shade intolerant tree species would continue to grow and dominate ponderosa pine stands, decreasing those stands' suitability for flammulated owls. The continued loss of flammulated owl habitat may not be caused so much by the no action alternative, rather, the ultimate cause is most likely continued fire suppression activities. However, because such activities would continue under the no action alternative, there would be low risk of direct and indirect effects to flammulated owls within the scope of this analysis area as a result of the no action alternative.

Alternative B

The proposed action would harvest timber within 408 acres of the 926 acres of flammulated owl habitat types within the analysis area. The vast majority of those acres to be harvested would be done using a thin-from-below harvest prescription, which would create growing space for residual trees. Such a silvicultural prescription would improve existing flammulated owl habitat

because the prescription would: (1) reduce canopy closure; and (2) retain larger diameter trees, while reducing the density of shade intolerant species, such as Douglas-fir. Because many of the acres of flammulated owl preferred habitat types are currently unsuitable for use by this species due to high tree densities and canopy closure, the proposed action's direct and indirect effects would likely serve to improve the long term habitat for this species within the analysis area. However, there would likely be a 10 to 20 year post-harvest delay, while new snags are generated as well as vegetative growth of seedlings, saplings, and shrubs, before the affected acres may be used by this species.

Cumulative Effects
As previously stated, the proposed timber harvest should improve habitat for flammulated owls that has been negatively impacted by nearly a century of fire suppression. Because of Section 22's proximity to the Blackfoot River, flammulated owls in adjoining habitat would have access to a more abundant prey source, insects associated with aquatic habitats. Through implementation of the thin-from-below harvest prescription in these areas, habitat for this species would be improved. Thus, there would be low risk of cumulative effects as a result of the proposed action.

4.3.4.2.4 Harlequin Duck

Alternative A
Under the no action alternative, the proposed timber harvest would not occur, and there would be low risk of direct and indirect effects to harlequin ducks as a result of the no action alternative.

Alternative B
Under the proposed action, laws regarding streamside management zone protection would be implemented, existing roads would be brought up to BMPs, 0.4 miles of road would be constructed, and 0.55 miles would be obliterated or abandoned. As a result, sediment sources should be controlled, and water clarity downstream should not be impacted as a result of the proposed project. Thus, there would likely be low risk of direct and indirect effects to harlequin ducks as a result of the proposed action.

Cumulative Effects
The major impact to downstream harlequin ducks is sediment yield from the Snow Talon Fire, located upstream from the project area. Additional contributions to the fire's sediment runoff from the proposed action would be minor in comparison. As a result, minor cumulative impacts to this species would be expected from the proposed action.

4.3.4.3 Big Game

4.3.4.3.1 White-tail and Mule Deer

Alternative A
Under the no action alternative, the 406 acres of potential snow-intercept/thermal cover within the project area for white-tailed deer would remain unchanged in the short term. However, these acres may be more susceptible to future insect infestation due to their current stocking levels. As

a result, should those acres become insect infested, they may be subject to small timber permits, or larger scale salvage sales, depending on the extent of future infestations. Thus, there would be low risk of direct or indirect effects to white-tailed deer as a result of the no action alternative.

Alternative B

Under the proposed action, approximately 470 acres would be harvested, all of which would be within white-tailed deer winter range habitat. Additionally, approximately 210 acres (52%) of the 406 acres of snow-intercept or thermal cover would be affected by the proposed harvest. Thus, within the project area, snow intercept cover would be reduced by approximately 52%, as well as winter range cover. However, as a result of the proposed action, in the short term, growth of new, more succulent forage would be stimulated. Thus, within the project area, there would be low to moderate risk of direct and indirect effects to white-tailed deer as a result of an approximate 52% reduction in snow-intercept cover, as well as a reduction of 406 acres in winter range cover.

Cumulative Effects

With the proposed action alternative, the majority of the snow-intercept cover that would remain within the analysis area post-harvest would be located within the town of Lincoln and along the Blackfoot River corridor. Much of the private lands within the analysis area are currently developed for housing or composed of regenerating forest that is intermixed with grassland. Through implementation of the proposed timber harvest, snow-intercept cover within winter range would be further reduced by approximately 470 ac (approx. an 18% reduction from the current 2,591 acres within the analysis area). While abundant and nutritious forage would likely be created by the proposed action within the 10 years post-harvest, such conditions are currently available throughout the analysis area on private lands. As a result, the proposed action alternative would likely have low risk of cumulative effects for the white-tailed deer population within the analysis area.

4.3.4.3.2 Elk

Alternative A

Due to open roads within the southern portion of the cumulative effects analysis area, almost all of the approximately 58,921 acres of elk security habitat is located on USFS land, with 41,039 acres within the Scapegoat Wilderness Area. Within the project area, there currently is no elk security habitat due to open roads within and adjacent to the affected parcels. Thus, there would be low risk of direct and indirect effects to elk as a result of the no action alternative.

Alternative B

Within the project area, due to open road densities on adjacent private land, elk security cover would not be created through the proposed action. Additionally, the effect of the proposed harvest on snow-intercept cover for elk would be similar to that discussed for white-tailed deer. Thus, aside from the creation of more nutritious and highly palatable forage within the project area, there would be low risk of direct and indirect effects to elk as a result of the proposed action.

Cumulative Effects
Within the 162,029 acre cumulative effects analysis area, approximately 58,921 acres (36%) are considered to be elk security cover. The proposed action would not change this. Additionally, of the 58,921 acres of elk security cover, 41,039 acres (70%) are located within the Scapegoat Wilderness Area. The major reasons for the majority of elk security habitat being located within the wilderness boundary are largely due to the extent of open roads on private and some USFS lands, and the 2003 Snow Talon Fire, which burned much of the hiding cover within its boundaries. Because of the Snow Talon Fire, the burned area will be an area full of highly nutritious and palatable forage for several years post-fire. However, the same area will also be devoid of hiding cover until seedlings and saplings are of sufficient density and at least 4 to 6 feet in height, and will be absent snow-intercept cover for 40 to 50 years post-fire.

The analysis area is truly a gradient (N to S) of security cover (N) to winter range (S), with the fire in between. Unfortunately, the security cover occurs at the higher elevations, where elk would likely only make use of them for a portion of the hunting season (depending upon winter onset), and the lower elevation security cover occurs on the fringes of the analysis area in 3 disjunct blocks, each < 4,100 acres. Thus, elk would likely be more vulnerable to hunting pressure on their migration from summer to winter range as a result of past effects. Of the approximately 20,075 acres of elk winter range within the analysis area, the proposed action would harvest timber on approximately 137 acres of winter range (0.68%). Thus, while the proposed action would only harvest timber on < 1% of the available winter range within the analysis area (and remove no additional security cover), the Snow Talon Fire removed mid-elevation elk security cover. Therefore, the proposed action would likely have minimal additional cumulative effects for elk within the analysis area.

4.3.4.3.3 Moose

Alternative A
Under the no action alternative, no changes would be expected to occur to moose habitat. Thus, no direct or indirect effects to moose would be expected as a result of this alternative.

Alternative B
Under the proposed action, approximately 384 acres of timber would be harvested within moose winter range habitat. However, approximately 153 densely forested acres in Section 22, that are adjacent to the Blackfoot River would not be harvested, and would provide cover adjacent to foraging habitat. Such harvest would likely create additional foraging opportunities for moose within the project area within 10 to 15 years post-harvest. Such opportunities, however, would be at the expense of mature forest that would provide shelter from snow or heat. Thus, for the occasional moose that would utilize the project area, the proposed action would have low to moderate risk of direct and indirect effects.

Cumulative Effects
Put in a larger landscape context, private lands near the valley floor have been extensively logged over the past 20 years, and currently provide foraging opportunities for moose, while much of the habitat on USFS land is still densely forested (except for the 37,000 acres burned by

the 2003 fire) and would provide shelter from snow and heat. Additionally, with the extensive recreational and residential use on Sections 16, 19, and 22 from cabin site lessees, anglers, camping, and winter recreationists, the project area would not likely receive much use by moose. Thus, the proposed action would likely have low risk of cumulative effects for moose within the cumulative effects analysis area.

4.3.5 Archeology

Alternative A
Under the no action alternative, no changes would be expected to occur to archeological resources.

Alternative B
No historic or prehistoric cultural resources have been identified in the project area, therefore no negative effects are expected to occur.

4.3.6 Economic Analysis

The economic analysis for the proposed project estimates the revenue from timber harvesting and nonadministrative costs for the alternatives considered and displays the current returns from the Southwest Land Office timber program and the total program state wide.

4.3.6.1 Project Costs and Revenues

The following assumptions were used to estimate the revenue and site treatment costs for each alternative:

1. The harvested volumes for the alternatives were estimated by Clearwater Unit personnel.

2. The stumpage value was estimated using a residual value approach. The estimated stumpage value equals the delivered log prices subtracted from logging cost, haul cost, Forest Improvement (FI) fee, development cost and an amount for profit and risk. The amount for profit and risk was based on 15% of the logging and hauling costs.

3. The estimated delivered log price is based on a telephone quote to the closest mill, which is the Pyramid Mountain Lumber mill in Seeley Lake.

4. The cost for tractor logging = $115 per MBF. The haul costs were estimated by using the following equation: Haul costs = 5.549 + 0.5656 x paved haul distance in miles + 0.982 x unpaved haul distance in miles + 0.4787 x logs per MBF (Niccolucci, 1996).

TABLE IV-3
Residual Value Appraisal (per MBF)

	Alternative B

	Alternative B
Delivered Log Prices	$440
Logging Cost	$115
Haul Cost	$38
Development Costs	$15
Forest Improvement Fee	$48
Profit and Risk	$23
Estimated Stumpage Value	$201

5. Development costs were estimated for each alternative by Clearwater Unit personnel. Development costs on this proposal are the estimated costs of roads, easement acquisition and watershed improvement items that would be paid for by the purchaser. These improvements provide access to the State Trust Lands involved and improve water quality on state land and downstream.

6. Forest Improvement (FI) cost is based on the cost to maintain the ongoing staffing, stand and road maintenance treatment needs for the current year, right-of-way acquisition and program wide costs. Funds collected under FI from a purchaser provide the State with funding to accomplish projects such as tree planting, site preparation, slash treatment, thinning, road maintenance, right-of-way acquisition, and for some timber sale related activities. Thus, the State is able to improve the long-term productivity of timber stands on state land and maintain or acquire access for future revenue producing projects.

7. Sale specific FI costs are the current cost estimates for the amount and types of treatments (site preparation, hazard reduction, planting, etc.) that would be done related to each of the alternatives being considered. Funding to complete these projects will be collected from current or future timber sales depending on the timing of the treatments.

8. Limitations of the economic analysis: (a) Only known costs and benefits that are related to timber harvesting activities are considered; (b) None of the potential nonmarket benefits associated with leaving trees (i.e., snag recruitment, structural diversity, aesthetics, wildlife habitat, nutrient recycling, etc.) are considered.

9. The costs related to the administration of the timber sale program are only tracked at the Land Office and state wide level. DNRC does not keep track of these costs for individual timber sales.

10. 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.

11. The school trust currently receives income from special uses and grazing activities on all four parcels. These activities are independent from the proposed project, although the action alternatives would create a temporary increase in forage for livestock. The proposed activities are not expected to decrease the revenue from or value of the lease lots in and around the proposed activities.

TABLE IV-4
Costs and Revenues Associated With This Project by Alternative

	Alternative A	Alternative B
1. Harvest Volume (MBF)	0	2000
2. Development Cost ($/MBF)	0	$15
3. Stumpage Value ($/MBF)	0	$201
4. Forest Improvement Cost (FI) ($/MBF)	0	$48
5. Stumpage Value, FI Cost, and Development Cost ($/MBF) (line 2 + line 3 + line 4)	0	$264
6. Total $ Value based on Stumpage Value, FI Cost, and Development Cost times Harvest Volume (line 5 x line 1)	0	$528,000
7. Stumpage Value and FI Cost ($/MBF) (line 3 + line 4)	0	$249
8. Total $ Revenue to the State (line 7 x line 1)	0	$498,000
9. Total $ Revenue to the Trust (line 1 x line 3)	0	$402,000
10. Current Lease Revenue to the Trust From the Project Area ($/year)	$27,228	$27,228
11. Sale Specific FI Cost ($/MBF)	0	$5
12. Total $ Sale Specific FI Cost (line 11 x line 1)	0	$10,000

4.3.6.2 Costs and Revenues from the DNRC Forest Management Program

The DNRC does not have an accounting system to track costs for individual projects from start to finish. An annual cash flow analysis is conducted of the DNRC's forest product sales program. Revenue and costs are calculated by land office and state-wide. The revenue-to-cost ratio for the Southwestern Land Office for fiscal year 2004 was 2.74 which was up from 2003 at 1.61 and 2002 at 2.57, and averages above the statewide ratio of just under 2 to 1. Roughly, for every $1 spent by the agency on managing its lands, it brings in approximately $2 in revenue.

Total revenue is revenue from the forest management program including timber sales, permits, FI and road maintenance. Total cost is the sum of timber operating and general administration costs. Net return is total revenue less total cost.

Alternative A

As the preceding table shows, only grazing and special uses leases and licenses would be generating income for the associated school trusts from these parcels of state land. No additional income would be generated as a result of this project. The timber stands would continue to grow at poor rates, but would increase slowly in size, volume, and value as time goes on assuming market prices stayed static.

Alternative B

Approximately $528,000 would be generated to the state of Montana as a result of the proposed action. Approximately $402,000 of that would go to the common schools of Montana, public buildings, and school for the deaf and blind. The timber harvesting in the proposed project is designed to maximize revenue to the trust accounts by capturing value in the present-term and by improving growth rates on the harvested acres and by removing trees that are past their culmination of mean annual increment (they are past their best growth rates and are declining in growth and vigor). Harvesting would create growing space for residual trees and initiate young vigorously growing regeneration. This would greatly increase the annual growth of wood fiber produced on the site, which would help to maximize revenue from these lands in the long-term. None of the proposed management activities would preclude this tract of land from other future income generating uses and no cumulative impacts are expected to occur as a result of the proposed project.

APPENDIX A

LIST OF PERSONS AND ORGANIZATIONS CONTACTED

Alliance for the Wild Rockies, Missoula, MT
Andrea Quick, Corning CA
Anne Anderson, Power, MT
Bernard Dickman, Great Falls, MT
Bob and Marion Bushnell, Lincoln, MT
Bradley and Debrah Cuyle,Lincoln, MT
Brent Anderson, Lincoln, MT
Bret Bandt, Gaylord, MI
Big Blackfoot Chapter of Trout Unlimited, Lincoln, MT
Blackfoot Valley Bible Church, Lincoln, MT
Blackfoot Valley Dispatch, Lincoln, MT
Cecil Rhodes, Lincoln, MT
Clarence McConnell, Great Falls, MT
Clifford Schmutzler, Lincoln, MT
Dale and Marilyn Meier, Conrad, MT
David Webb, Lincoln, MT
Debbie Wood, Lincoln, MT
Dept. of Fish, Wildlife & Parks, Missoula, MT
Douglas and Cindy Brady, Lincoln, MT
Ecology Center, Missoula, MT
Ed and Signe Grosfield, Missoula, MT
Edward and Beverly Ramsted, Lincoln, MT
Edward Trapp, Great Falls, MT
Elfreide Bowdring, Lincoln, MT
Eric Bryson, Bozeman, MT
Ernie and Renee Lundberg, Lincoln, MT
F. H. Stoltze Lumber Company, Columbia Falls, MT
Friends of the Wild Swan, Swan Lake, MT
Gene Smith, Atascadero, CA
George Blowars, Upper Black Eddy, PA
Harold Rapley, Helena, MT
James Pembroke, Helena, MT
Jay Roberson, Lincoln, MT
Jeff Eshelman, Lincoln, MT
John Carlson, East Helena, MT
John Gilbert, Chinook, MT
John Gurnsey, Great Falls, MT
Joseph and Regina Turner, Longmont CO
Karen Kelly, Choteau, MT
Larry Sheppard, Havre, MT
Lewin, Stuart, Great Falls, MT

Lewis and Clark County Weed Department, Helena, MT
Lincoln Community Council, Lincoln, MT
Lincoln School Board, Lincoln, MT
Lincoln Ranger District, Lincoln, MT
Linda Wood, Lincoln, MT
Marily Wells, Long Beach, CA
Mark Smith, Lincoln, MT
Martha Bourgault, Lincoln, MT
Marvin Hagen, Lincoln, MT
Mary Faith Hoeffner, Lincoln, MT
Melvin and Charlotte Hagen, Lincoln, MT
Michael and Loiuse Wilmot, Omaha, NE
Michael and Mary Hagen, Great Falls, MT
Montana Wood Products Association, Helena, MT
Mrs. Gary McKnight, Great Falls, MT
Pappin Construction Co., Kansas City, MO
Plum Creek Timber Company, Jim Krantz, Columbia Falls, MT
Ponderosa Snow Warriors Snowmobile Club, Lincoln, MT
Ralph Gibson, Lincoln, MT
Randolph Mortimer, Antioch, CA
Raymond Pancich, Clancy, MT 59634
Richard and Paula Wilmot, Great Falls, MT
Richard and Ruby Dempsey, Great Falls, MT
Rick Skates, Polson, MT
Robert and Emelia Qunell, Great Falls, MT
Robert and Karen Frank-Rumlee, Lincoln, MT
Ronald Campbell, Lincoln, MT
Ronald Magill, Helena, MT
Ross and Deborah Nietert, Layton, UT
Russell Fuller, Lincoln, MT
Sandvig Family, Lincoln, MT
Shawneen Bryant, Lincoln, MT
Sieben Ranch Company, Helena, MT
Steve and Alex Sandru, Lincoln, MT
Steve and April Woodhouse, Lincoln, MT
The Nature Conservancy, Attn: Caroline Byrd, Missoula, MT
Tony and Kathy Tams, Lincoln, MT
Tribal Historic Preservation Office, Pablo, MT
Wayne Gurnsey, Vaughn, MT
Wayne Sherrill, Lincoln, MT
William Minor, South Bend, IN
Willis and John Mavis, 5 Whitetail Ln, Clancy, MT 59634-9729

APPENDIX B

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