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Dirty Ike Salvage Environmental Assessment

October 2003
Montana Department of Natural Resources and Conservation
Southwestern Land Office
Missoula Unit

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DIRTY IKE SALVAGE ENVIRONMENTAL ASSESSMENT

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Appendixes

DIRTY IKE SALVAGE

Environmental Assessment

Cover Sheet

Proposed Action:	The Montana Department of Natural Resources and Conservation (DNRC) proposes the salvage harvest of timber on State School Trust Lands. The sale under consideration would salvage harvest approximately 9,521 tons of saw timber from 204 acres in section 6, T12N, R16W and section 12, T12N, R17W (See Appendix A: Figure A-2) at this time, however, up to an additional 80 acres may be harvested if significant tree mortality occurs as a result of insect infestation brought about by the fire. The proposed action would be implemented as early as December 2003 and could be completed by September 2004. These dates are approximate.
Type of document:	Environmental Assessment
Lead agency:	Montana Department of Natural Resources and Conservation (DNRC)
Responsible official:	Jonathan Hansen Missoula Unit 1500 Tower Missoula, MT 59804 (406) 542-4309
For further information:	Cindy Bertek Missoula Unit 1500 Tower Missoula, MT 59804 (406) 542-4245
Special Note:	Comments received in response to this Environmental Assessment will be available for public inspection and will be released in their entirety if requested pursuant to the Montana Constitution.

How to Read this EA

(Environmental Assessment)

To read this EA more effectively, carefully study this page. Following State regulations, we have designed and written this EA (1) **to provide** the Project Decision Maker with sufficient information to make an informed, reasoned decision concerning the proposed Dirty Ike Salvage and (2) **to inform** members of the affected and interested public of this project so that they may express their opinions to the Project Decision Maker.

This EA follows the organization and content established by MEPA Rules (ARM 36.2.521-36.2.543). The EA consists of the following chapters.

- 1.0 Purpose and Need for Action
- 2.0 Alternatives, Including the Proposed Action
- 3.0 Affected Environment
- 4.0 Environmental Consequences
- 5.0 List of Preparers
- 6.0 List of Agencies and Persons Consulted
- 7.0 References
- 8.0 Appendix

Chapters 1 and 2 together serve as an Executive Summary. We have written these two chapters so that non-technical readers can understand the potential environmental, technical, economic, and social consequences of **taking** and of **not taking** action.

- **Chapter 1** introduces the Dirty Ike Salvage. It provides a very brief description of the proposed Dirty Ike Salvage and then explains three key things about the project: (1) the relevant environmental issues, (2) the decisions that the Project Decision Maker must make concerning this project, and (3) the relevant laws, regulations, and

consultations with which the DNRC must comply.

- **Chapter 2** serves as the *heart* of this EA. It provides detailed descriptions of Alternative A: No Entry (No Action) and Alternative B: Harvest. Most important, it includes a **summary comparison** of the predicted effects of these two alternatives on the human environment, providing a clear basis for choice between the two alternatives for the Project Decision Maker and the Public.
- **Chapter 3** briefly describes the past and current conditions of the relevant resources (*issues*) in the project area that would be meaningfully affected, establishing a part of the baseline used for the comparison of the predicted effects of the alternatives.
- **Chapter 4** presents the detailed, analytic predictions of the consequences of implementing Alternative A: No Harvest (No Action) and Alternative B: Harvest. These predictions include the direct, indirect, short term, long term, irreversible, irretrievable, and cumulative effects of implementing the alternatives.

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CHAPTER 1

PURPOSE AND NEED FOR ACTION

1.0 Chapter 1: Purpose of and Need for Action

1.1 Proposed Action: Harvest

The Montana Department of Natural Resources and Conservation (DNRC) proposes to salvage harvest timber on State School Trust Lands in the Dirty Ike area. Under Alternative B: Harvest, the department would salvage harvest approximately 9,521 tons of burned timber from 204 acres to generate a net positive rate of return for the Common School Trust. If significant tree mortality occurs as a result of insect infestation brought about by the fire, there could be an additional harvest of subsequent bug killed timber on another 80 acres of Trust Land. The proposed action would be implemented as early as December 2003 and could be completed by September 2004. These dates are approximate.

1.2 Location

The location of the proposed project is: section 2, T12N, R17W, section 6, T12 N, R 16 W, and section 12, T12N, R17W, all in Missoula County. The proposed sale is located approximately 36 miles west of Missoula, Montana. (See Appendix A: Figure A-1)

1.3 Need for the Action

The lands involved in this proposed project are held by the State of Montana in trust for the support of specific beneficiary institutions. These include public schools, state colleges and universities, and other specific state institutions such as the School for the Deaf and Blind (Enabling Act, February 22, 1889; 1972 Montana Constitution, Article X, Section 11). The Board of Land Commissioners and Department of Natural Resources and Conservation (DNRC) are required by law to administer these Trust Lands to produce the largest measure of reasonable and legitimate advantage over the long run for these beneficiary institutions (Section 77-1-202, MCA).

In August 2003 the Dirty Ike Fire burned 330 acres of Montana State Trust Lands. The merchantable value of burned and insect infected timber declines with the passage of time. To maximize revenue to the school trusts, it is necessary to expedite the salvage of burned or insect infested timber. Pursuant to ARM 36.11.409 and MCA 77-5-207, the DNRC has conducted the planning process to prepare the salvage harvest in a timely manner. At this time DNRC proposes to salvage harvest 204 acres, however, up to an additional 40 acres may be harvested if significant tree mortality occurs as a result of insect infestation brought about by the fire.

1.4 Objective of the Action

In order to meet the goals of the management philosophy adopted through programmatic review in the Administrative Rules for Forest Management (ARM), the Department has set the following specific project objective:

1.4.1 Objective of the Action

Generate revenue for the Common School (CS) trust grant by salvage harvesting approximately 9,521 tons of timber killed by wildfires. If significant tree mortality occurs as a result of insect infestation brought about by the fire, there could be an additional volume harvested of subsequent bug killed timber.

1.5 Decisions to be Made

- Determine if alternatives meet the project objectives.
- Determine which alternative should be selected.
- Determine if the selected alternative would cause significant effect(s) to the human environment, requiring the preparation of an Environmental Impact Statement (EIS).

1.6 Relationship to the Administrative Rules for Forest Management

On March 13, 2003, the Department adopted Administrative Rules for Forest Management (ARM 36.11.401 through 450). The Department will manage the lands involved in this project in accordance with the Rules.

The proposed action is limited to specific management activities that are needed to implement the salvage sale and provide resource protection. This assessment documents site-specific analysis and is not a general management plan or a programmatic analysis of the area. The scope of this environmental analysis (EA) was determined through DNRC interdisciplinary analysis and public involvement.

1.7 History of the Planning and Scoping Process

Public Involvement - Agencies, Individuals or Groups Contacted

Comments from the general public, interest groups and agency specialists were solicited in September of 2003. A newspaper legal notice was run in the Missoulian on September 17, 2003. Scoping letters were mailed to 10 organizations and individuals (a list of the organizations/individuals contacted is available in the project file). Written comments were received from the following organizations: Montana Department of Fish, Wildlife and Parks and The Ecology Center.

The following resource specialists were involved in the project design, assessment of potential impacts, and development of mitigation measures: Bob Rich, Supervising Forester, Missoula Unit; Cindy Bertek, Forester, Missoula Unit, Southwest Land Office; Rich Stocker, Forester, Missoula Unit; Mike McGrath, Wildlife Biologist, Southwest Land Office, DNRC; Renee Hanna, Hydrologist, Southwest Land Office, DNRC; Jeff Collins, Soil Scientist, Forest Management Bureau; Pat Rennie, Archeologist, Agriculture and Grazing Management Bureau, DNRC, Helena.

1.8 Other environmental assessments (EAs) related to this project

1.8.1 Dirty Ike Road EA

1.9 Permits, Licenses, and Other Authorizations Required

A temporary road use permit has been applied for from Plum Creek Timber.

1.10 Issues

The following issues were identified during the scoping process. They constitute the basis for the formation of project specifications, development of mitigation measures, and assessment of environmental impacts.

1.10.1 Issues Studied in Detail

1.10.1.1 Water Quality, Soil, Fisheries, Weeds

1.10.1.1.1 Water Quality Issue

Activities associated with this project could result in adverse effects on water quality.

1.10.1.1.2 Soil Resources Issue

Increased levels of compaction and erosion could occur as a result of harvest operations on moderate to high intensity burned soils.

1.10.1.1.3 Cold Water Fisheries Issue

The proposed management activities could have adverse effects on fish habitat.

1.10.1.1.4 Noxious Weeds Issue

Noxious weeds could increase as a result of increased traffic associated with the proposed actions.

1.10.1.2 Human Environment

1.10.1.2.1 Economic Benefits and Project Revenue Issue

What is the revenue that this project will provide to the trust beneficiaries?

1.10.1.2 Wildlife

1.10.1.3.1 Endangered Species Issue

Implementation of the proposed project could negatively impact threatened and endangered species.

1.10.1.3.2 Sensitive Species Issue

Implementation of the proposed project could negatively impact sensitive species.

1.10.1.3.3 Big Game Issue

Implementation of the proposed project could negatively impact big game.

1.10.2 Issues Eliminated from Further Study and Rationale for Elimination

1.10.2.1 Historical and Archaeological Sites

Patrick Rennie, DNRC Archeologist, consulted with the Montana State Historic Preservation Office (SHPO) per DNRC mandates under the State Antiquities Act. A search was conducted of the Cultural Recourse Inventory System (CRIS) and Cultural Resource Annotated Bibliography System (CRABS) databases at the SHPO and the DNRC's TLMS database; The project area maps were reviewed; and a ground inspection of cultural resources within selected portions of the proposed project area was conducted. The results of the CRIS, CRABS and DNRC TLMS database searches indicate no record of previously identified cultural resources within the project area. Project area topographic maps suggest that the majority of the project area exhibits slopes of 30% or greater. Further, geologic survey maps indicate that sedimentary mudstones, siltstone and quartzites dominate the local geology. Because of the very steep terrain and lack of geology conducive to sources of tool quality stone and rock shelters, an on the ground inspection was not warranted for much of the project area. It is believed that no Heritage Properties will be effected with the proposed undertaking. No further cultural resource investigative work is recommended in order for the project to proceed.

1.10.2.2 Threatened and Endangered Species

1.10.2.2.1 Bald Eagle (Federally threatened)

There is concern that timber harvest activities would disturb nesting bald eagles. The nearest known nest is located approximately 4.1 miles SW of the affected area. This distance is generally considered to be outside the scope of a bald eagle's home range. Thus, no direct, indirect, or cumulative effects to this species would be expected under the proposed action.

1.10.2.3 Sensitive Species

1.10.2.3.1 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 nearest mine is the Triangle mine, located 0.92 mile

south of the project area in section 13, T 12 N, R 17 W. The nearest known hibernaculum for Townsend's big-eared bats are located at the Linton Mine and Cramer Creek, approximately 6.2 miles SE of the project area (Montana Natural Heritage Database). 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 0.92 mile distant from the mine entrance, there would be low risk of direct, indirect, or cumulative effects to this species.

1.10.2.3.2 Peregrine Falcon (recently de-listed from Federally threatened)

There is concern that timber harvest activities would disturb nesting peregrine falcons. The nearest known peregrine falcon nest is located approximately 10 miles NW of the affected area. Thus, the proposed action would have low risk of direct, indirect, or cumulative effects to this species.

1.10.2.4 Other Sensitive Species

1.10.2.4.1 Coeur d'Alene Salamander

There is concern that timber harvest activities could affect this species. This species requires waterfall spray zones, talus, or cascading streams. There are no known areas of talus, 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.

1.10.2.4.2 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. Thus, the proposed action would have low risk of direct, indirect, or cumulative effects to this species.

1.10.2.4.3 Common Loon

There is concern that timber harvest activities could affect this species. The common loon requires lakes and ponds for breeding. The nearest pond or lake is located approximately 1.5 miles NE of the affected area. However, the proposed harvest would occur far enough away from the pond, and during the non-breeding season, so that effects of the proposed activity to this species would be minimized.

1.10.2.4.4 Harlequin Duck

There is concern that timber harvest activities could affect this species. Only records of transient individuals exist for this species in this latilong (25B, Montana Natural Heritage Database). This species has been observed 4 miles west, and 7 miles NE of the project area (Montana

Natural Heritage Database). Additionally, with the proposed harvest occurring in winter, there would be reduced risk of water quality issues as a result of timber harvest. Thus, the proposed action would have low risk of direct, indirect, or cumulative effects to this species.

1.10.2.4.5 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.

1.10.2.4.6 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.

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CHAPTER 2

ALTERNATIVES

2.0 Alternatives Including the Proposed Action

2.1 Introduction

Chapter 2: Alternatives Including the Proposed Action is the heart of this EA. The purpose of Chapter 2 is to describe the alternatives and compare the alternatives by summarizing the environmental consequences.

Alternatives were planned through scoping and development of issues, input from Interdisciplinary Team (IDT) specialists, and requirements of the Administrative Rules for Forest Management. In addition, compliance with trust mandates helped to shape alternatives. This chapter describes the activities of Alternative A: No Harvest (No Action) and Alternative B: Harvest. Then based on the descriptions of the relevant resources in Chapter 3: Affected Environment and the predicted effects of all alternatives in Chapter 4: Environmental Consequences, this chapter presents the predicted attainment of project objectives and the predicted effects of all alternatives on the quality of the human environment in **comparative form, providing a clear basis for choice among the options for the decisionmaker and the public.**

This chapter has seven sections:

- History and Process Used to Formulate the Alternatives
- Alternative Design, Evaluation, and Selection Criteria
- Alternatives Considered But Eliminated from Detailed Study
- Description of Proposed Alternatives
- Suggested Mitigation Measures of Alternative B: Harvest
- Description of Relevant Past, Present, and Reasonably Foreseeable Future DNRC Actions Not Part of the Proposed Action
- Summary Comparison of the Activities, the Predicted Achievement of the Project Objectives and the Predicted Environmental Effects of All Alternatives

2.2 History and Process Used to Formulate the Alternatives

In August 2003, following the Dirty Ike fires, a DNRC Interdisciplinary Team began analyzing the project area. In September 2003 the team initiated internal and public scoping to develop a management plan. Only two responses were received from external parties. The major environmental issues identified during the scoping process

were defined and are summarized in Chapter I. In order to understand how the proposed harvest would effect the environment, its effects were contrasted to those of Alternative A: No Harvest (No Action). Using the guidance of the MEPA Rules, the responses received, and the issues developed during the internal scoping, the team designed Alternative B: Harvest to satisfy the needs and meet the objectives of the project.

2.3 Alternative Design, Evaluation, and Selection Criteria

The IDT identified the following design and evaluation criteria.

- Meet objectives of Trust Lands stewardship.
- Comply with MEPA Rules.
- Retain coarse woody debris to reduce soil erosion.
- Retain at least the minimum number of snags required to accommodate wildlife needs.
- Design harvest units and systems to minimize impact on the soils and stream.
- Control noxious-weed infestations and prevent dispersal.
- Maintain current ongoing recreational opportunities where possible.

2.4 Alternatives Considered But Eliminated from Detailed Study

No other alternatives were developed, because proposed Alternative B: Harvest met all environmental guidance and IDT specialists' specifications, while providing income for the trust.

2.5 Description of Alternatives

2.5.1 Alternative A: No Harvest (No Action)

Salvageable fire and subsequent insect killed trees would not be harvested. No revenue would be generated for the Common School Trust. However, ongoing DNRC permitted and approved activities would continue in the project area.

2.5.2 Alternative B: Harvest

The proposed harvest would yield approximately 9,521 tons of fire killed timber from approximately 204 acres at this time. If there is future mortality from subsequent insect infestations of species such as Douglas fir beetles, mountain pine beetles, or western pine beetles additional salvage harvest may occur in the same project area. At this time DNRC proposes to salvage harvest 204 acres,

however, up to an additional 40 acres may be salvage harvested if significant tree mortality occurs as a result of insect infestation brought about by the fire. Harvest may occur in up to 284 acres, 191 acres would be harvested with ground based equipment and 13 acres with a skyline harvesting system. (See Appendix A: Figure A-3)

Harvesting would remove fire killed or insect infested timber. Approximately 2 snags per acre would be retained to serve as snag recruitment. Trees selected for snags would be greater than 21" dbh. If 2 snags over 21" dbh are not available then the next largest available size tree would be left.

Logging slash would be return skidded and dropped on skid trails in ground-based units.

This alternative would provide between \$225,000-\$315,000 in revenue to the Common School Trust (estimated at \$25-\$30/ton). Additional revenue may occur through subsequent harvest of insect infested timber in the analysis area.

The table below outlines the status of acreage involved in this project.

Table 2-1: Breakdown of Acres involved in this project

Total acres in analysis area	330
Acres burned	330
Acres deferred for 5 years for black-backed woodpecker habitat	46
Acres to salvage harvested now	204
Acres that may be salvage harvested later	80
Acres open to salvage harvest (including possible bug kill)	284

2.6 Mitigation Measures of Alternative B: Harvest

The following mitigation measures would be implemented through the administration of the timber sale contracts.

Harvest Unit General Design Mitigations

- Cable harvest activities during the summer have a higher potential to cause soil disturbance than winter cable harvest operations. Slash and tops will be retained within the cable corridors to mitigate these potential impacts. Corridor spacing and layout will also be designed to best fit the terrain.
- Use minimum SMZ width required by law as located in the field.
- Protect all ephemeral draws, springs and wet areas with marked equipment restriction zones (ERZ). Mark and maintain a Riparian Management Zone (RMZ) along fish bearing streams (Wallace Creek) and specific sites with high erosion risk adjacent to streams. Cable yard or winch-line all trees felled

into protection areas back to skid trails approved by the Forest Officer. Where feasible fell material in a manner such that remaining tops and sub merchantable material are aligned predominately perpendicular to the slope.

Skidding Limitations

- Limit ground-based logging systems (tractor, skidders, and mechanical harvesters) to slopes less than 40% on ridges, convex slopes, and concave slopes when winter conditions exist and less than 35% on concave slopes without winter conditions.

General Road Design Mitigations

- Install and maintain adequate road drainage to control erosion and comply with Best Management Practices (BMP's) and maintain concurrent with hauling operations. To maintain drainage features and avoid rutting, limit the season of road use to dry, frozen or adequately snow covered conditions.
- If cutslope or fill slope slumps occur on existing roads, stabilize within the course of the harvest project to control erosion.
- Monitor road drainage conditions as part of project operations and make repairs as needed, including culvert cleaning and revegetation.

Site-Specific Design and Mitigations

Skid Trail Planning

- Have the logger and Forest Officer agree to a skidding plan prior to equipment operations. Identify which main trails to use and what additional trails or mitigation may be needed. Do not use trails that do not comply with BMP's (i.e. draw bottom trails). Close trails with additional drainage installed where needed or grass seeded to stabilize the site and control erosion.
- Locate skid trails at least 75 feet apart unless on snow.
- Use skidders with 75 feet of winchline for skidding of selected sites.
- Install erosion control in skid trails on disturbed sites where needed as directed by the Forest Officer.
- Use designated draw crossings only under dry or frozen conditions as approved and directed by Forest Officer.

Down Woody Material

- Retain five to ten tons per acre of woody material larger than 3 inches diameter left scattered throughout the harvest units. Leave the majority of slash within the harvest units or return skid as required by the Forest Officer to insure slash and woody debris is well distributed for erosion control and nutrient cycling. Fell or align material predominantly perpendicular to the

slope, as feasible. Fell approximately 20 sub merchantable trees per acre (or as needed to provide adequate coverage) in stands that do not have sufficient downed woody debris to reduce surface runoff and erosion at direction of Forest Officer. Leave slash in the harvest units where feasible and distributed on skid trails upon completion of use.

Slash

- Retain all slash on slopes over 30% on site by in-woods processing or log length skidding, restrict whole tree harvest to reduce skidding effects. Allow whole tree harvest when 95% of all slash is return skidded or left within the harvest unit on slopes less than 30%. Return slash from the landings back into the harvest unit as it is created and distribute evenly throughout the unit. Do not allow large amounts of slash to accumulate at the landings before it is returned in the unit.

Skyline Yarding

- Where skyline is required use log length skidding, locate skyline sets on ridges or convex slope sites to promote corridor locations that disperse water and avoid pulling logs up draws or concave spots that could concentrate runoff and erosion. Carry the leading end of the logs free of the ground at all times except during lateral yarding. Require erosion control, such as slashing or retaining tops within cable skidding corridors where excessive soil disturbance is of an extent to cause erosion. Have the Forest Officer monitor conditions and recommend erosion control as needed.

Erosion Control

- Install erosion control measures concurrent with use on cable corridors where excessive soil disturbance or rutting (i.e. ruts over 100ft) occurs. Types of erosion control may include a combination of waterbars and slash or straw as required by the Forest Officer. To be effective where slash is used, require the slash be in good contact with the ground (may require lopping). Complete erosion control prior to acceptance of skidding operations by the Forest Officer.

Harvest Schedule

- Prioritized ground harvest operations to be completed during winter months to minimize impacts.
- Enforce season of use/ soil compaction restrictions in order to prevent soil resource impacts. Restrict logging activities to periods when one or more of the following conditions occurs unless otherwise approved in writing by the Forest Officer.
 1. Soil moisture content at 4" depth less than 20% oven dry weight.
 2. Minimum frost depth of 3."
 3. Minimum of 16" loose or 8" packed snow adequate to avoid soil displacement.

Integrated Weed Management Mitigations

- Clean all road construction and harvest equipment of plant parts, mud, and weed seed to prevent the introduction of noxious weeds. Forest Officer will inspect equipment prior to moving on site.
- Promptly revegetate all newly disturbed soils on road cuts and fills with site-adapted grasses (including native species) to reduce weed encroachment and stabilize roads from erosion. For grass seeding to be effective it is important to complete seeding concurrent with road construction.
- Weed treatment measures include herbicide applications along portions of project roads and accessible sites with a priority on spot outbreaks of noxious weeds and as designated by the Forest Officer. Have a certified applicator implement any restricted herbicide treatments according to herbicide label directions.

Wildlife Mitigations

- If any threatened or endangered species are encountered during the project planning or implementation periods cease all project-related activities that would potentially affect that species and inform a DNRC biologist immediately. Design and implement additional habitat protection measures where appropriate.
- If active den sites or nest sites of threatened, endangered, sensitive species, or raptors were located within the Project Area, cease activities until a DNRC biologist can review the site and develop species appropriate protective measures.
- Cease all operations if a threatened or endangered species is encountered. Consult a DNRC biologist and develop additional mitigations that are consistent with the administrative rules for managing Threatened and Endangered Species (ARM 36.11.428 through 36.11.435).
- Cease all operations if nesting raptors are encountered. Consult a DNRC biologist to develop additional mitigation measures to ensure the security of the nest site and specific animals, consistent with the Migratory Bird Treaty Act.

Grizzly Bear

- Implement sanitation restrictions (i.e., food storage, garbage disposal) during the non-denning period (April 15 - November 15) for operations related to this proposed activity.

Grey Wolves

- Re-locate the locked gate in section 2 to a location that more effectively restricts passage of smaller motorized vehicles, such as all terrain vehicles.

- Temporarily suspend all mechanized activities and administrative uses in areas that are within a 1-mile radius of any known, active wolf den until such time as wolves are known to have vacated the site or it has been determined that resumption of activities not present conflicts with wolf use (ARM 36.11.430 (1)(a)(i)).
- Temporarily suspend operations if a suspected rendezvous site is observed within a 0.5-mile radius of mechanized activities. Activities may resume if the department determines that resumption of activities will not present conflicts with wolf use (ARM 36.11.430 (1)(b)).

Lynx

- Relocate the locked gate in section 2 to a location that more effectively restricts passage of smaller motorized vehicles, such as all terrain vehicles. This re-location would reduce the volume of motorized vehicle access to the analysis area during winter over the long term.

Black-Backed Woodpeckers

- Retain at least 1 snag and 1 snag recruit per acre within the proposed harvest units (pursuant to ARM 36.11.411).
- Minimize mechanized activity within 0.25 mile of black-backed woodpecker habitat during the period of April 15 through July 1 for a minimum of 5 years (pursuant to ARM 36.11.438 (1)(a)).
- Manage forty-six acres of burned acreage in an unharvested condition that is broadly representative of the burned area on DNRC land for a minimum of 5 years (pursuant to ARM 36.11.438 (1)(b)).

2.7 Description of Relevant Past, Present, and Related Future State Actions Not Part of the Proposed Action

2.7.1 Past Relevant Actions

- **Hunting and other recreational uses:** Under the rules of the Montana Department of Fish, Wildlife, and Parks, deer, elk, and upland game hunting has been allowed. Walk in and non-motorized vehicle recreational uses have been allowed.
- **Biological control for weeds:** *Larinus minutus* has been released to control knapweed in section 2.
- **Public vehicle access:** All existing roads have been closed to motorized use except during emergencies, such as fire suppression and rescue operations,

and for administrative purposes by the DNRC and Plum Creek Timber Company .

2.7.2 Present Relevant Actions Not Part of the Proposed Action

- Present actions include those listed under 2.7.1.
- The nearest other action is a road building project located in sections 6, T12N, R16W and 12, T12N, R17W. Approximately 1.5 miles of road is being built to facilitate the proposed Dirty Ike Salvage Sale.

2.7.3 Related Future State Actions Not Part of the Proposed Action

- All actions listed in 2.7.2 would continue in the future.
- The Donovan Creek Timber Sale project has been scoped. However, the Donovan Creek Timber Sale is on hold, due to the Dirty Ike Fire and the upcoming Dirty Ike Salvage Timber Sale. The entire Donovan Creek project, including the environmental analysis, will be revisited after the implementation of the Dirty Ike Salvage project. If the Donovan Creek project goes forward at a later date, DNRC will design the project taking into consideration the changed affected environment, namely the fire and the salvage project. DNRC will also initiate a new scoping period.

2.8 Comparison of Activities, the Predicted Summary Achievement of the Project Objectives, and the Predicted Environmental Effects of All Alternatives

2.8.1 Summary Comparison of Project Activities

Table 2-2: SUMMARY COMPARISON OF PROJECT ACTIVITIES OF ALTERNATIVES A AND B.

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

Activity	Alt. A	Alt. B
TIMBER STAND SALVAGE HARVEST (ACRES)	0	204-284 acres
Tractor yarding (acres)	0	191 acres
Skyline yarding (acres)	0	13 acres

2.8.2 Summary Comparison of Predicted Achievement of Project Objectives

Table 2-3: SUMMARY COMPARISON OF PREDICTED ACHIEVEMENT OF PROJECT OBJECTIVES

Objective	Indicators	Alt. A	Alt. B
Harvest approximately 9,521 tons of timber to generate revenue for the School (CS) grant	Stumpage receipts in dollars	0	\$225,000-\$315,000

2.8.3 Summary Comparison of Predicted Environmental Effects

Table 2-4: SUMMARY PREDICTED ENVIRONMENTAL EFFECTS

ISSUE	ALTERNATIVE A: NO HARVEST	ALTERNATIVE B: HARVEST
WATER QUALITY, SOIL, FISHERIES, WEEDS		
WATER QUALITY AND BENEFICIAL USE	Risk of direct, indirect, and cumulative impacts are expected to be low to moderate.	Risk of direct, indirect, and cumulative impacts to water quality are expected to be low, with implementation of recommended mitigation measures.
WATER YIELD	Recent wildfire and fire suppression activities are expected to cause moderate increases in water yield.	Risk of direct, indirect, and cumulative impacts to water quality are expected to be low, with implementation of recommended mitigation measures.
SEDIMENT YIELD	Direct, indirect and cumulative effects are expected to be moderate.	Risk of direct, indirect, and cumulative impacts to water quality are expected to be low, with implementation of recommended mitigation measures.
CUMULATIVE WATERSHED EFFECTS	Direct, indirect and cumulative effects are expected to be moderate.	Risk of direct, indirect, and cumulative impacts to water quality are expected to be low, with implementation of recommended mitigation measures.
SOIL RESOURCES	Direct, indirect and cumulative effects are expected to be moderate.	Risk of direct, indirect, and cumulative impacts to water quality are expected to be low, with implementation of recommended mitigation measures.
COLD WATER FISHERIES	Risk of direct, indirect, and cumulative impacts are expected to be low.	Risk of direct, indirect, and cumulative impacts to water quality are expected to be low, with implementation of recommended mitigation measures.
SOCIAL AND ENVIRONMENTAL		
ECONOMIC BENEFITS AND EXPECTED REVENUES	No economic contribution or benefits to the School Trust would occur. This would have a direct effect upon the School Trust and DNRC's obligation to provide the School	The forest improvement collections would be approximately \$64,838. This money would be deposited in the forest improvement fund to be used for thinning, prescribed burning planting, weed management, etc. on

	Trusts with income from Trust Lands.	Trust Lands. The projected revenue for this alternative to the School Trust is about \$225,000-\$315,000. The proposed project would provide work for a road-building contractor, logging contractor, their subcontractors, and their employees. The forest products would most likely be processed by local mills providing further job opportunities.
ENDANGERED SPECIES		
GRIZZLY BEAR	Low risk of cumulative effects due to the absence of grizzly bear activity in the analysis area.	Low risk of cumulative effects to grizzly bears due to the current absence of grizzly bear activity within the analysis area.
GRAY WOLF	Low risk of cumulative effects to wolves.	Little direct or indirect effect on wolves.
LYNX	No change from current condition.	Low risk of cumulative effects to lynx.
SENSITIVE SPECIES		
PILEATED WOODPECKER	Low risk of cumulative effects.	Low risk of cumulative effects.
BLACK-BACKED WOODPECKER	Low risk of cumulative effects.	Low risk of cumulative effects.
FLAMMULATED OWL	Low risk of cumulative effects.	Low risk of cumulative effects.
FISHER	Low risk of cumulative effects.	Low risk of cumulative effects.
BIG GAME		
ELK	No additional disturbance created or cumulative effect on elk winter range effectiveness or security.	Low risk of cumulative effects.
MOOSE	No additional disturbance created or cumulative effect on moose winter range effectiveness or security.	Low risk of cumulative effects.

CHAPTER 3

AFFECTED ENVIRONMENT

3.0 Affected Environment

3.1 Introduction

Chapter 3: Affected Environment succinctly describes the relevant resources that would affect or that would be affected by the alternatives if they were implemented. This chapter also describes relevant factors of the existing environment and includes effects of past and ongoing management activities within the analysis area that might affect project implementation and operation.

From the description of Alternative A: No Harvest (No Action) and Alternative B: Harvest in Chapter 2 in conjunction with the predicted effects a comparison can be made of the effects of both alternatives.

3.2 Description of Relevant Affected Resources: Existing Conditions

3.2.1 Water Quality, Soils, Fisheries, and Weeds Analysis Methods

A watershed analysis was completed by a DNRC hydrologist for the proposed sale area to determine the existing direct, indirect and cumulative effects to water quality, soils, fisheries and noxious weeds.

The existing cumulative effects of past timber harvest activity on water yield and watershed conditions were analyzed using the Equivalent Clearcut Area (ECA) methodology. This methodology estimates existing water yield increases (WYI) and predicts water yield increases of proposed harvest activities. The ECA model calculates WYI using total treated acres, percent crown cover removal, precipitation, hydrologic recovery, habitat type and road miles. The 15% WYI threshold was developed for all four watersheds by assessing acceptable risk levels, watershed sensitivity, resource value, stream channel conditions and riparian habitat conditions.

For this project, the ECA model was used to predict post-fire water yield increases. The total number of burned acres in the watershed was entered into the calculation as a clearcut, because no known hydrophobicity was observed. The delay time was increased to 2 years to account for a two-year period of minimal ground cover until vegetation has established.

Channel and riparian habitat conditions were evaluated by completing channel inventories and Pfankuck stability ratings for all streams within the project area and downstream of the project area to analyze for potential impacts downstream. These methods are outlined in the Forest Hydrology Part II (USFS 1974). Reconnaissance level surveys were used to observe existing conditions of soils, noxious weeds and water quality. Existing conditions of fisheries habitat was

obtained through data collected by the Montana Department of Fish Wildlife and Parks, observing riparian habitat conditions and completing Pfankuck stability ratings.

Existing and potential impacts were analyzed for burned areas. The ECA method mentioned above was used to analyze for post-fire increases in water yield. Increased risk to water quality, soils and fisheries was determined by fire severity, soil type, slope, canopy cover and filtering capacity of remaining vegetation. All existing roads in the proposed project area were evaluated by a DNRC hydrologist for past and potential impacts.

3.2.1.1 Water Quality

Analysis Area

Refer to hydro map 1 (Appendix B: Figure B-1) for watershed boundaries and location.

Donovan Creek

The Donovan Creek watershed is approximately 4555 acres that is drained by a Class I stream channel, with intermittent and ephemeral unnamed tributaries as well as several draws with no discernable stream channel. High levels of timber harvest and road building have impacted the watershed, by increasing water and sediment yields. The lower portion of the watershed has been impacted by residential development as a result of poor road location. Stream channel stability in Donovan Creek was evaluated to be in good, stable condition. The banks are well vegetated, providing thermal protection and bank stability. Some areas of sediment deposition were observed. There are specific locations at road crossings where direct delivery of sediment to the stream channel is occurring.

This drainage contains a mix of ownership, consisting of Plum Creek, State Trust Lands and private. Approximately 3055 acres of the drainage has been harvested since 1967. There is approximately 40 miles of existing road in the Donovan watershed. Some roads in the proposed area do not meet Best Management Practices Standards (BMP's). Approximately 36 acres in Section 2 T12N, R17W did burn in a mixed severity, mosaic pattern.

Dirty Ike Creek

The Dirty Ike watershed is approximately 4280 acres that is drained by a Class I stream channel, with intermittent and ephemeral unnamed tributaries as well as several draws with no discernable stream channel.

Stream channel stability in Dirty Ike was evaluated to be in good, stable condition. The banks are well vegetated, providing thermal protection and bank stability. Extensive harvest and existing roads in the drainage have increased water yield and sediment delivery to the stream channel. This drainage contains a mix of ownership, consisting of Plum Creek, State Trust

Lands and private. There is approximately 23.06 miles of road in the Dirty Ike watershed. Some roads in the proposed area do not meet Best Management Practices Standards (BMP's). There are specific locations at road crossing where direct delivery of sediment to the stream channel is occurring. Burn severity in the Dirty Ike watershed was mostly a stand replacement fire of approximately 109 acres with a small 2-acre patch of mixed severity.

West Fork Ashby Creek

The West Fork Ashby watershed is approximately 2500 acres that is drained by a Class I stream channel, with intermittent and ephemeral unnamed tributaries as well as several draws with no discernable stream channel. There are two unnamed tributaries to the West Fork of Ashy Creek located in the project area. High levels of timber harvest and road building have impacted the watershed. Extensive harvest has increased water yield levels to those effects associated with detrimental water yield increases. Detrimental water yield increases have caused increased channel instability and increased sediment yields. Direct sediment delivery from the road to the stream channel is occurring, at stream crossings and at poor road location reaches. Grazing in the riparian area has had long-term impacts on the stream channel. Increased channel instability has occurred through bank trampling, decreased riparian vegetation and increased width depth ratios. Some stream reaches in the middle and lower portions watershed show signs of instability and high levels of sediment increases. Ownership in the watershed is a combination of Plum creek State Trust Lands and Private. There is approximately 30.3 miles of road in the West Fork Ashby Creek watershed. Some roads in the project area do not meet BMP standards.

Approximately 311 acres burned in the West Fork of Ashby Creek. Of the area that burned, 49 acres was a mixed severity burn and the remaining 362 were a stand replacement fire.

Wallace Creek

The Wallace Creek watershed is approximately 5155 acres that is drained by a Class I stream channel, with intermittent and ephemeral unnamed tributaries as well as several draws with no discernable stream channel. There are several dry draws with no discernable stream channel located in the project area. Just below the project area in section 7, T12N, R16W is the upper reach of Wallace Creek, which is a class 1 perennial stream channel.

Moderate levels of timber harvest and road construction as well as historic and current mining activity have impacted the upper portions of the Wallace Creek watershed. Approximately 61% of the watershed has been harvested, approximately half occurred before 1980. Water yield levels show moderate levels of WYI at 8.8% Reaches of Wallace Creek that flow through sections 13 and 24, T12N, R17W and section 7, T12N, R16W were observed to have stable stream channel conditions and healthy levels of riparian vegetation.

Moderate to high levels of sediment deposition were observed in some reaches of the channel. Mining activity has increased sediment levels in the drainage. The reach of Wallace Creek that flows along Wallace Creek road has experienced increased channel instability and increased sediment levels as a result of residential development and roads.

Ownership in the watershed is a combination of State Trust Lands, Plum Creek, BLM and private. There is approximately 94.65 miles of road in the Wallace Creek drainage. Some sections of road do not meet BMP standards and direct delivery of sediment to the stream channel is occurring at site-specific locations. These specific locations refer to stream crossings and a ford location on private land.

Approximately 313 acres burned in the Wallace Creek Watershed. An estimated 32 acres of that burned area is mixed severity and 281 acres is stand replacement.

3.2.1.2 Water Quality and Beneficial Uses

One of the main concerns within the project area is an increase of sediment delivery, which can affect channel stability and function as well as the physical and biological components of water quality. The primary sources of chronic delivery to the stream channels are at cattle concentration areas, road crossings, high intensity burn areas and specific locations where the road is directly adjacent to the stream channel.

The waters contained within Donovan, Dirty Ike Creek, West Fork Ashby Creek, Wallace Creek and their tributaries are B-1 Classified Streams 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.

Donovan Creek

Increased sediment levels were observed in Donovan Creek, but were below those levels associated with detrimental effects to water quality and beneficial uses. There are only ephemeral draws and dry draws with no discernable stream channel located within the burn and project area. Some dry draws suffered high intensity burns, which are expected to experience increased flows and accelerated rates of erosion during runoff and storm events. The ephemeral draw was located in a low intensity burn area where increased

flows and accelerated rates of erosion are expected to be minimal. A large buffer of forested area is located between the burned area and Dirty Ike Creek, which should provide sufficient buffer to filter sediment.

Dirty Ike

There are only ephemeral draws and dry draws with no discernable stream channel located in the project area. Only one small section of ephemeral draw in Dirty Ike Creek was burned during the fire in section 12. The lower portion of the draw did not burn and is well vegetated, acting as a buffer to filter and reduce sediment. The beginning reaches of a defined channel are ¼ of a mile below the burn area. As a result, the risk of erosion and sediment delivery to the stream channel from runoff or storm event are expected to be low.

West Fork Ashby Creek

There are two Class II stream channels located in the project area in the SE ¼ of the SE ¼ of Section 6, T12N, R16W, which are discontinuous to the mainstem of the West Fork of Ashby Creek. These tributaries go subsurface directly below the project area and become wide, dry draws with no discernable channel.

Fire in these reaches was of mixed severity, leaving a mosaic landscape, with most of the vegetation and large woody debris in the riparian area, remaining unburned. Most of the canopy cover in the riparian remained unburned or of low intensity, providing sufficient shade and thermal protection.

The West Fork Ashby Creek is listed on the 1996 and 2000 303d list, but was taken off the 2002 list to be reassessed. On the 2000 303d list, the West Fork Ashby Creek was found to fully support Agricultural and Industrial Uses. Although observations were made, due to insufficient data probable sources and causes were not identified (Montana Department of Environmental Quality).

Water Quality in the middle and lower portions of Ashby Creek has been impacted by past harvest activities, roads and past and current grazing practices. Sediment levels and channel instability have increased as a result of these management activities. Bank trampling is present on the mainstem and other tributaries. The main Ashby Creek road does contribute direct sediment to the stream channel in some locations.

Erosion and sediment delivery to the Class II stream channels in section 6 is expected to increase from a decrease in vegetative ground cover and increased flows resulting from the wildfire. However, remaining vegetation and large woody debris will provide a buffer to help filter sediment and retard flows before reaching the channel.

Some direct and indirect impacts to water quality are anticipated to result from wildfire effects, but are expected to be low to moderate.

Wallace Creek

There are several dry draws with no discernable stream channel located in the project area. Just below the project area in section 13, T12N, R16W, the headwaters of Wallace Creek begins, which is a class 1 perennial stream channel.

Wallace Creek is listed on the 1996, 2000 and 2002 TMDL 303d list of impaired streams. Agriculture, drinking water and industry are fully supported. Aquatic life support and fisheries are partially supported. "Partially Supporting" is defined as a beneficial use determination, based on sufficient credible data, that a waterbody is not achieving all the water quality standards for the use in question, but the degree of impairment is not severe. Probable causes are copper, metals and zinc. Probable sources are resource extraction and abandoned mining. Assessment methods and information sources used were ambient toxicity testing (acute), ambient toxicity testing (chronic) and non-fixed station physical/chemical (conventional + toxicants) (Montana Department of Environmental Quality).

Erosion and sediment delivery are expected to increase as a result of moderate to high intensity burns associated with recent wildfires within the project area. Some direct and indirect impacts to water quality are anticipated in Wallace Creek downstream of the proposed project area. There is a strip of mixed severity burn between Wallace Creek and the high severity burn in which some canopy and ground cover did not burn. Ground cover vegetation and large woody debris that was not consumed would provide energy dissipation and sediment filtration.

4.3.1.3 Water Yield Cumulative Impacts

Existing cumulative impacts to water quality are those impacts caused by cumulative effect from past and present activities within the watershed. These impacts include increased channel instability, detrimental increases in water yield and increased sediment yield.

Water yields are expected to increase as a result of the recent fire and suppression activities. However, those increases are expected to be low to moderate, well below those associated with detrimental water yield increases. Anticipated water yield increases are expected to increase erosion on steep slopes and existing roads in the burned area.

Donovan Creek

Approximately 36 acres in the Donovan Creek watershed was burned. There has been extensive harvest and road construction in the middle and upper

portions of the watershed. Since 1967, 3091 acres have been harvested in the watershed.

Existing water yield increases were calculated using the Equivalent Clearcut Area method (see Analysis Methods). The pre fire existing water yield was approximately 14 %. Post fire existing water yield increased to approximately 15.7%, slightly over the threshold, but because of stable channel conditions increases are not expected to be detrimental.

Watershed	Existing WYI in %	Existing WYI in Acre Feet	Allowable Increase in %	Remaining ECA in Acre Feet
Donovan Pre-Fire	14.0	1164	15	450
Donovan Post Fire	15.7	1314	15	302

Dirty Ike Creek

Past and ongoing management activities within the affected watershed include fire, timber harvest, road maintenance and use and recreation.

Approximately 111 acres in the Dirty Ike watershed recently burned. Most of the burn severity was a mosaic fire, with a portion of the State Trust Lands, resulting in a stand replacement conditions.

Since 1962, approximately 2087 acres have been harvested in the Dirty Ike watershed between State and Plum Creek ownership. Harvest Levels in the watershed range from moderate to high. The upper portion of the watershed has had extensive past harvest history.

Pre fire existing water yield increases are approximately 7.9% or 516 acre feet. Post fire water yield increased to approximately 10.1%, but still well below the 15% threshold developed for Dirty Ike Creek.

Watershed	Existing WYI in %	Existing WYI in Acre Feet	Allowable Increase in %	Remaining ECA in Acre Feet
Dirty Ike Pre- Fire	7.9	516	15	380
Dirty Ike Post Fire	10.1	645	15	254

Ashby Creek

The water yield analysis was calculated for the entire Ashby Creek watershed, which includes the West Fork Ashby Creek.

Past and ongoing management activities within the affected watershed include fire, timber harvest, road maintenance and use, grazing and recreation.

Approximately 313 acres in the West Fork of Ashby recently burned. Most of the burn severity was a mosaic fire, with a portion of the State Trust Lands, resulting in a stand replacement conditions.

Since 1974, approximately 4260 acres have been harvested in the Ashby Creek, between State and Plum Creek ownership. Harvest Levels in the watershed are high. The upper portion of the watershed has had extensive harvest. The mid to lower portion of the watershed has been extensively harvested and heavily grazed.

Existing water yield increases are approximately 20.2% or 1301 acre feet. Post fire water yield increased to approximately 25.3%.

Watershed	Existing WYI in %	Existing WYI in Acre Feet	Allowable Increase in %	Remaining ECA in Acre Feet
Ashby pre Fire	20.2	1301 acres	15	331
Ashby Post Fire	25.3	1664	15	682

The existing water yield in Ashby Creek has exceeded the allowable water yield increase of 15%. Existing water yield increases are high and have resulted in increased channel instability and increased sediment yields. Anticipated water yield increases due to wildfire are expected to increase erosion on steeper slopes and existing roads in the burned area.

Wallace Creek

Past and ongoing management activities within the affected watershed include fire, timber harvest, road maintenance and use, grazing, mining and recreation.

Approximately 323 acres in the Wallace Creek recently burned. Most of the burn severity was a mosaic fire, with a portion of the State Trust Lands, resulting in stand replacement conditions.

Existing harvest levels in the Wallace Creek watershed are moderate. Since 1962, approximately 3282 acres have been harvested in Wallace Creek between State, BLM and Plum Creek ownership. The mid to lower portion of the watershed does have historic and current mining claims.

Existing water yield increases are approximately 5.9% or 688 acre feet. Post fire water yield increased to approximately 8.8%.

Watershed	Existing WYI in %	Existing WYI in Acre Feet	Allowable Increase in %	Remaining ECA in Acre Feet
Wallace Pre Fire	5.9	688	15	1186
Wallace Post Fire	8.8	1011	15	886

The existing water yield in Wallace Creek is relatively low. There is a Class I perennial stream channel located directly below the project area, which is well vegetated and stable. The increase in water year is about 3%, but well below the 15% threshold developed for Wallace Creek.

3.2.1.4 Sediment Yield Cumulative Effects

Sediment yields are expected to increase as a result of anticipated post-fire runoff increases and reduced vegetation cover. Hillslope erosion and increased road erosion are expected as water yield increases occur. In most high intensity burn areas, 80 to 100% of the ground cover was consumed. Ground cover is essential in filtering sediment and reducing overall sediment yields.

Dirty Ike Creek and Donovan Creek

Existing cumulative impacts to water quality in the affected watershed are associated with increased levels of sediment delivery to the stream channel. Increased levels of sediment delivery have been caused by timber harvest, grazing residential development, existing road systems and stream crossings. Most of the roads in the drainage are in fair to good conditions, with most roads in a suitable location. Direct sediment delivery is isolated to stream crossings that do not meet BMP standards.

Sediment yields are expected to increase as a result of the wildfire, but should be minimal as a result of no continuously flowing surface water in the project area.

Ashby Creek

Sediment levels are expected to increase as a result of wildfire. However, the burned area is located at the top of the drainage and neither Class II stream channels in the burned area have continuous surface flow to another body of water.

Wallace Creek

Most of the roads in the drainage are in fair condition, with some sections of road in the lower watershed, having insufficient drainage or poorly located. The upper portion of the drainage did have high intensity burn severity where most or all of the ground cover was consumed. Sediment levels in the

drainage are expected to increase as a result of wildfire and may cause an increase in channel instability, as well as increased road erosion.

3.2.1.5 Geology and Soils

Geology

Refer to Geology Map 2 (Appendix B: Figure B-2) for project area geology.

The project area is located on moderate to steep slopes with no especially unique or unusual geological features present in the proposed project area. The dirty Ike watershed is of the Missoula group Belt Series formation. This is a sedimentary rock type from the Precambrian era consisting of metased argillite and sandy or quartzitic argillite.

Geology in the upper portion of the Ashby Creek watershed is a composition of Cambrium (Cu), undifferentiated sedimentary rock from the Paleozoic period and Boulder Batholith (TKb) and other broadly related intrusive rocks from the Cenozoic-Mesozoic period.

Cambrium rock is layered sedimentary shale, limestone and quartzite. The Boulder Batholith is large masses of intrusive igneous rock (granite). The Boulder Batholith consists of soils that are weak and brittle when weathered and highly susceptible to accelerated rates of erosion.

The Wallace Creek drainage is a combination of Boulder Batholith (TKb) intrusive rock, Missoula Belt Series (pCm) rock and a small section of Cambrian, undifferentiated (Cu) sedimentary.

Soils

Refer to Soils Map 3 (Appendix B: Figure B-3) for project area soils.

Soils in the project area are a combination of Evaro Gravelly Loam 8-30% slopes, Evaro Gravelly Loam 30-60% slopes, Winkler Gravelly Loam 30-60% slopes Winkler Gravelly Loam, Cool 30-60% slopes and Tevis Gravelly Loam 8-30%.

Evaro Gravelly Loams have a colluvium parent material derived from argillite and quartzite, are somewhat excessively drained and a mean annual precipitation of 20-30 inches. These soils are very deep (>60 inches) and have an available water holding capacity of 3.7 inches. These soils, which range in elevation from 4,500 to 6,000 feet, have a high content of volcanic ash in the surface layer. These soils have a topsoil layer of gravelly loam 0-4 inches and a subsoil layer of > 60 inches.

Winkler Gravelly Loams are very deep, somewhat excessively drained; have a colluvium parent material derived from argillite and quartzite and a mean annual precipitation of 17-30 inches. They have a gravelly loam surface layer

of 0-3 inches, a subsoil > 60 inches and available water holding capacity of 3.0 inches.

Tevis Gravelly Loams are very deep, somewhat excessively drained; have a colluvium parent material derived from argillite and quartzite and a mean annual precipitation of 25-40 inches. They have a gravelly loam surface layer of 0-3 inches, a subsoil of > 60 inches and an available water holding capacity of 2.8 inches.

Evaro Gravelly Loams and Tevis Gravelly Loams on 8-30% slopes have a moderate erosion hazard. Evaro Gravelly Loams and Winkler Gravelly Loams on 30-60% slopes have a high erosion hazard that makes them more susceptible to erosion.

Map Unit	Parent Material	Soil Moisture Water Holding Capacity inches in profile	Erosion Hazard	Compaction Hazard	Displace Hazard	Notes
36 Evaro Gravelly Loam 8-30%	Colluvium derived from Argillite & Quartzite	3.7	Moderate	High	Moderate to High	Average season of use, check moisture levels.
37 Evaro Gravelly Loam 30-60%	Colluvium derived from Argillite & Quartzite	3.7	High	High	Moderate, higher on slopes. 40.	Average season of use, check moisture levels.
102 Tevis Gravelly Loam 8-30%	Colluvium derived from Argillite & Quartzite	2.8	Moderate	Moderate to High	Moderate	Shorter season of use than Evaro
131 Winkler Gravelly Loam, 30-60%	Colluvium derived from Argillite & Quartzite	3.0	High	Moderate to high	Moderate	
133 Winkler Gravelly Loam, Cool 30-60%	Colluvium derived from Argillite & quartzite	3.0	High	Low	Low	

3.2.1.6 Soils, Cumulative Impacts

Cumulative impacts to soils as a result of past and present activities in the project area are low. Some old skid trails were found in the project area. These trails were stable, but most of the vegetation had been consumed during the wildfire. Cumulative impacts on a watershed scale are high, with extensive harvest activities, grazing and past and recent mining activities, which have caused increased levels of compaction, displacement and erosion

Approximately 8.4 miles of dozer line and 16 acres of drop points and safety zones were constructed as a result of fire suppression activities. Rehabilitation treatments were implemented to reshape and stabilize the dozer line, safety areas and drop points as well as grade roads were needed. The dozer line was an average of 14-16 feet in width. Rehabilitation implemented on the dozer line, included; water bar installation, slash return over the line and seeding. Drop points and safety zones were scarified, covered in slash and seeded. Sections of road were graded to improve road surface conditions and reshape damaged drainage features.

There are approximately 203 acres of stand replacement fire and 127 acres of mixed severity fire in the proposed project area. Areas of stand replacement fire where higher severity burns in which surface vegetation, surface logs, woody debris and soil litter (duff) was almost entirely consumed. These soils will have higher risks of erosion until these sites are revegetated. There are small areas within the stand replacement fire where burn intensities were lower and some vegetation, soil litter and woody debris is present. These areas should help reduce soil erosion rates and dissipate water energy.

There was no soil hydrophobicity observed in the project area. If hydrophobic soils are present, their extent is expected to be minimal. Surface erosion rates are expected to increase. The highest risk will be in those draws where vegetation, woody debris and soil litter were consumed during the fire. These bare areas are most susceptible during runoff or localized thunderstorms where high intensity rains cause increased runoff and increasing the risk of debris flows to occur (DNRC).

We considered severe burn areas with steep slopes to be at highest risk of erosion due to:

- 1) Loss of tree canopy to intercept precipitation and reduce raindrop impact
- 2) Loss of surface vegetative cover and soil litter (duff) to intercept precipitation, slow runoff
- 3) Reduced surface soil woody debris and logs, an important source of nutrients, moisture and physical barrier to runoff and catchment mechanism for sediment and to retard erosion.

Cumulative effects would be controlled by limiting the area of detrimental soil impacts, by using winter skidding, cable harvest on steep slopes and installing adequate drainage where needed.

Large woody debris will be retained on site to help reduce erosion, and maintain nutrient cycling and long term productivity

3.2.1.6 Cold Water Fisheries

The Montana Department of Fish Wildlife and Parks surveyed all four watersheds, Donovan, Wallace, Dirty Ike and West Fork Ashby.

There are no tributaries with continuous surface water from the project or burned area, to any fish bearing stream channels in the West Fork Ashby, Dirty Ike, Wallace or Donovan Creek.

Donovan Creek

Surveys completed for Donovan Creek found westslope cutthroat and brook trout present. In the upper portion of the watershed, only westslope cutthroat were found. It is assumed that these populations are likely genetically pure. Stream channel stability evaluations were taken on Donovan. The evaluation found that stream channel stability is good. The riparian areas are well vegetated, providing bank stability and thermal protection for fish during warm temperatures. Thick vegetation and undercut banks in the areas observed during the channel stability rating are providing hiding cover for fish and other aquatic organisms. In conclusion fish habitat is considered good.

Dirty Ike Creek

Surveys completed in Dirty Ike Creek during 2002 found only westslope cutthroat present. It is assumed that these populations are likely genetically pure.

Dirty Ike was evaluated for stream channel stability and was found to be in good condition. The riparian areas are well vegetated, providing thermal protection for fish during warm months and bank stability. Some increased sediment levels were observed in reaches where poor road location or a road crossing was, causing direct sediment delivery. In conclusion fish habitat is considered good.

Wallace Creek

Surveys completed in Wallace Creek in 2002 found westslope cutthroat present in the lower portion of the watershed. It is assumed for the proposed project that westslope cutthroat is present in other parts of the drainage where sufficient habitat is present. Fish were observed during habitat assessments in the middle portion of the drainage. The reaches of stream channel below the project area are well vegetated and stream channel stability is good. Thick vegetation, large woody debris and undercut banks in the areas observed during the channel stability rating are providing hiding cover for fish and other aquatic organisms, as well as habitat complexity. In conclusion fish habitat is considered good. There are reaches of Wallace Creek where vegetation and bank stability have been impacted by residential development and mining. Some sections of Wallace Creek have high levels of increased sediment and decreased channel stability as a result of residential development and mining. Some potentially fish bearing sections of stream channel on State and private ownership have culverts that could be fish passage barriers. Increased sediment levels are expected in the section of stream channel below the project area as a result of the wildfire.

West Fork Ashby Creek

Surveys conducted in 2002 by Fish Wildlife and Parks in the West Fork Ashby found westslope cutthroat present. The lower reaches of Ashby Creek have moderate to high levels of increased sediment and channel instability, as a result of intensive grazing and high levels of timber harvest. The lower reaches of Ashby Creek are heavily grazed and some sections of channel lack sufficient riparian vegetation for thermal cover and bank stability is poor. The upper reaches are in fair to good condition. Sufficient riparian vegetation was present, but sediment levels observed indicated residual impacts from past harvest activities and high road densities.

Sediment levels are expected to increase in both class II stream channels in Section 6 as a result of high severity burned areas

3.2.1.7 Noxious Weeds Existing Conditions

Noxious weeds occurring in this area are mostly knapweed (*Centaurea maculosa*) and spot infestations of thistle (*Cirsium arvense*). Knapweed occurs along the roadside and in most of the forested areas. Increased traffic activity as a result of fire suppression activities is expected to increase existing species of noxious weeds and potential new invaders in the area. All fire suppression equipment after initial attack was cleaned for removal of noxious weed seeds before entering the area, which should reduce the risk of additional noxious weeds species introductions.

3.2.2 Human Environment

3.2.2.1 Economics

There is no current revenue being generated from the management and sale of timber in these sections.

The costs related to the administration of the timber sale program are only tracked at the Land Office and statewide level. DNRC does not track project level costs for individual timber sales. An annual cash flow analysis is conducted on the DNRC forest product sales program. Revenue and costs are calculated by Land Office and Statewide. These revenue-to-cost ratios are a measure of economic efficiency.

Revenue cost ratios:

	FY98	FY99	FY00	FY01	FY02
SWLO	1.8	1.44	2.36	2.69	2.57
State	1.7	1.36	2.78	1.62	1.75

3.2.3 Wildlife

3.2.3.1 Endangered Species

3.2.3.1.1 Grizzly Bears (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 mi² (Waller and Mace 1997). The search for food drives grizzly bear movement, with bears moving from low elevations in spring to higher elevations in fall, as fruits ripen throughout the year. However, in their pursuit of food, grizzly bears can be negatively impacted through open roads (Kasworm and Manley 1990). Such impacts are manifested through habitat avoidance, poaching, and vehicle collisions.

The project area is approximately 13 miles SE of the Northern Continental Divide Ecosystem grizzly bear recovery area. The Dirty Ike and Donovan drainages, surrounding the project area, have not had grizzly bear activity in recent years (J. Jonkel, MT FWP, personal communication, September 2003). The nearest known grizzly bear activity is located approximately 14 miles east of the affected area. Although no known activity has been reported for the affected area, future use of the area by grizzly bears is possible.

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 2.59 miles of open road per square mile (simple linear calculation; 296 miles of open road), and 4.67 total miles of road per square mile (533 miles of road), within a 114 square mile (73,092 acres) grizzly bear analysis area (Appendix C: Figure C-3). With construction of approximately 1.5 miles of new road under the Dirty Ike Road project, open road density would not increase, but total road density would increase to 4.68 miles per square mile. Presently, the road closure device located in section 2, T 12 N R 17 W, is ineffective against ATV's during the hunting season (M. McGrath, DNRC, personal observation).

3.2.3.1.2 Gray Wolves (Federally threatened)

Wolves were recently classified as threatened in Montana under the Endangered Species Act. Cover, and road and prey densities likely have some influence on wolves. Currently, there are approximately 2.59 miles of open road per square mile (simple linear calculation) within a 114 square mile area surrounding the project area (Fig. 1). Wolf activity in the area is restricted to the Potomac pack, located approximately 6 miles east of the project area, near Potomac, MT (U. S. Fish and Wildlife Service

2002). Mule deer, elk, and moose are known to use the area. The affected area is known to contain crucial elk summer range, and be a migration corridor to winter range (M. Thompson, MT FWP, personal communication). As such, the affected area may be attractive for foraging by wolves. Currently, no known wolf den or rendezvous site is located within 1 mile of the project area.

3.2.3.1.3 Lynx (Federally threatened)

Lynx are currently classified as Federally threatened under the Endangered Species Act. In North America, 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 (Ruediger et al. 2000). For denning sites, the primary component appears to be large woody debris, in the form of either down logs or root wads (Koehler 1990, Squires and Laurion 2000, Mowat et al. 2000). These den sites may be located in regenerating stands that are >20 years post-disturbance, or in mature conifer stands (Koehler 1990, Ruediger et al. 2000).

Within the project area, elevations range from 4,640 to 6,278 feet. On the 7,872 acres of School Trust land within a 5 mile radius of the project area, there are 1,975 acres of primary lynx habitat types (i.e., those habitat types which lynx would use if present on the landscape), and 598 acres of secondary lynx habitat types (e.g., those habitat types which lynx would utilize only if primary habitat types are in close proximity; (Ruediger et al. 2000). Lynx have been located in the area surrounding sections 6 and 12 through radio-telemetry (John Squires, USFS, personal communication, November 2002). Approximately 5 acres of potential denning habitat is present in the southern portion of section 12.

3.2.3.2 Sensitive Species

3.2.3.2.1 Pileated Woodpeckers

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 (McClelland et al. 1979, Bull et al. 1992). 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. Studies that have examined woodpeckers following stand-replacement fires, such as those characterized by the Dirty Ike Fire, found very low use by pileated woodpeckers (Hutto 1995, Murphy and Lehnhausen 1998). Newly created snags would provide high quality feeding habitat within the next 2 to 5 years, while boring beetles are active. Fire-killed snags and coarse woody debris would also be expected to provide good feeding substrates for up to several decades following later infestation by carpenter ants.

Within stands occurring on School Trust parcels, and burned by the Dirty Ike fire, 6 stands, totaling approximately 243 acres, have western larch as the predominant species, with the average dbh of these stands ranging from 18 to 20 inches (Stand Level Inventory). Within a 1-mile radius of the Dirty Ike Fire, there are approximately 3,188 acres of School Trust land in 6 parcels. On these lands, there are 26 stands, totaling approximately 811 acres, containing western larch or ponderosa pine as the predominant species, with average dbh in these stands ranging from 2 to 22 inches. Thus, the proposed project area, and surrounding habitat contained potential pileated woodpecker habitat, prior to the fire. However, within the same 1-mile radius of the Dirty Ike Fire, there are approximately 6,878 acres of non-habitat for pileated woodpeckers on private lands.

3.2.3.2.2 Black Backed Woodpeckers

The black-backed woodpecker is an irruptive species that forages opportunistically on outbreaks of wood boring beetles primarily in recently burned habitats, and to a lesser degree in unburned habitats. It is considered to be a sensitive species in Montana. Although the black-backed woodpecker's nesting and foraging requirements are thought to be tightly linked with burned areas, it does nest and forage in unburned forest in response to insect outbreaks (Bull et al. 1986, Hutto 1995). Burned forests tend to be used immediately after burns occur (approximately 1 - 5 years). Large, densely stocked non-salvaged stands with an abundance of trees greater than or equal to 12 inches dbh appear to provide the greatest benefit to black-backed woodpeckers for foraging and nesting. Black-backed woodpeckers are also found in green forests with high levels of insect activity (Goggans et al. 1989).

The extensive and intensive wildfires of western Montana in 2003 created large amounts of potentially suitable habitat that will be available for

black-backed woodpeckers at the landscape scale. Because of the close relationship of black-backed woodpeckers and wildfire, the analysis area was defined as an area inclusive of four major fires near the project area, the Black Mountain 2 and Boles Meadow fires, and the Mineral Primm and Cooney Ridge Complex fires (see Appendix c: Figure C-2). Current information regarding burn intensity was unavailable for the Mineral Primm Complex. However, these fires likely created sizable acreages of suitable black-backed woodpecker habitat. The 20,737-acre Mineral Primm Complex is located largely within the Rattlesnake Wilderness area. Those portions of this fire occurring in the wilderness area will remain unharvested. The 4,210 acre Boles Meadow Fire occurred largely on USFS and Plum Creek lands, with potential black-backed woodpecker habitat on USFS lands. Table 1 provides estimates of the acres burned and stand replacement acres created in each of the remaining fires.

Table 1: Estimates of acres burned and stand replacement severity acres for the Dirty Ike, Black Mountain 2, Boles Meadow and Cooney Ridge Complex fires.

Fire Name	Acres Burned	Acres Burned in Stand Replacement
Dirty Ike	776	203
Black Mountain 2	7,263	3,337
Boles Meadow	4,210	688
Cooney Ridge	26,628	14,724

3.2.3.2.3 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. Nest trees in 2 Oregon studies were 22-28 inches dbh (McCallum 1994). Habitats used have open to moderate canopy closure (30 to 50%) with at least 2 canopy layers, and are often adjacent to small clearings. It subsists primarily on insects and is considered a sensitive species in Montana. Periodic underburns may contribute to increasing habitat suitability for flammulated owls because low intensity fires would reduce understory density of seedlings and saplings, while periodically stimulating shrub growth.

Within the School Trust parcels affected by the Dirty Ike fire, there are approximately 564 acres of flammulated owl preferred habitat types (SLI data). Within the proposed salvage area, there are approximately 9.5 acres of flammulated owl preferred habitat types. These acres were burned in a high intensity, stand replacing fire.

3.2.3.2.4 Fisher

The fisher is a medium-sized animal belonging to the weasel family. Fishers prefer dense, lowland spruce-fir forests with high canopy closure,

and avoid forests with little overhead cover and open areas (Coulter 1996, Powell 1977, Kelly 1977, Clem 1977, Powell 1978). 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 a 1-mile radius of the areas burned during the Dirty Ike Fire, there are approximately 832 acres of fisher preferred habitat types. Of these acres, approximately 42 acres occur within the burned area, and approximately 27 acres would be considered under the proposed salvage.

3.2.3.3 Big Game

3.2.3.3.1 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., ≥ 250 acres) areas of forest cover ≥ 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.

Elk are known to use the affected area as a migration corridor from the Potomac Valley to their winter range in Donovan Creek (M. Thompson, MT FWP, personal communication). The affected area also includes approximately 4,400 acres of crucial elk summer habitat, with 817 of those acres being burned by the Dirty Ike fire. The proposed action lies within Hunting District 292. However, we will use the 73,092-acre grizzly bear analysis area (see Appendix C: Figure C-1) for the big game analysis area because the area is enclosed by major highways and drainages within the hunting district. As such, there are approximately 296 miles of open road, and 12,844 acres of security cover (17.6% of the analysis area) within this analysis unit. The proposed action would not reduce security cover within the analysis area because the proposed action is located within 0.5 mile of an open road.

3.2.3.3.2 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). As such, much of the project area receives overall use by moose. Currently much of the private industrial land within the 73,092 acre analysis area is in regenerating seed tree harvest stands. There are approximately 47,140 acres of regenerating clearcuts, seed tree harvests, and stand replacement fire (203 acres), from the Dirty Ike fire, within the analysis area, for a total of 64.8% of the total analysis area.

CHAPTER 4

ENVIRONMENTAL EFFECTS

4.0 Environmental Consequences

4.1 Introduction

Chapter 4: Environmental Consequences forms the scientific and analytic basis for the summary comparison of effects presented in Chapter 2: 2.8.3 Table 2-4 of this EA. This chapter describes the environmental consequences or effects of the proposed action and the cumulative effects of concurrent and future state activities within the analysis area. This chapter focuses on the following effects:

- Direct, indirect, and cumulative effects
- Adverse effects that cannot be avoided
- Relationship between local short-term uses of the environments and the maintenance and enhancement of long-term productivity
- Irreversible and irretrievable commitment of resources that would be involved if the alternatives were implemented

This chapter has the following two major sections:

- Predicted Attainment of the Project Objectives of All Alternatives
- Predicted Effects on Relevant Affected Resources of All Alternatives

4.2 Predicted Attainment of the Project Objectives of all Alternatives

4.2.1 Predicted Attainment of Project Objective

Harvest approximately 9,521 tons of timber killed by wildfires and subsequent insect attack to generate revenue for the School (CS) grant.

4.2.1.1 Alternative A: No Harvest (No Action)

Under this alternative, no trees would be salvaged. No economic contribution to the School Trust would occur. This would have a direct effect upon the DNRC's obligation to provide the School Trusts with income.

4.2.1.2 Alternative B: Harvest

Under this alternative, approximately 9,521 tons of timber killed by wildfires and subsequent insect attack would be harvested. This timber sale would generate an estimated \$225,000-\$315,000 to the Common Schools (CS) trust grant.

4.3 Predicted Effects on Relevant Resources of all Alternatives

4.3.1 Water Quality, Soils, Fisheries, and Weeds

4.3.1.1 Water Quality

4.3.1.1.1 Alternative A: No Harvest (No Action)

Under Alternative A: No Harvest (No Action), the direct and indirect effects evaluated are those effects associated with recent wildfire activities. Approximately 8.4 miles of dozer line and 16 acres of drop points and safety zones were rehabilitated to reduce the risk of erosion. These mitigations are expected to reduce erosion and potential effects on water quality resulting from the wildfires.

4.3.1.1.2 Alternative A: Cumulative Effects

Cumulative Effects of past and present management activities are high. Impacts are expected to increase as a result of the wildfire.

4.3.1.1.3 Alternative B: Harvest

There is expected to be low risk of direct or indirect detrimental impacts to water quality as a result of the proposed action. Mitigation measures implemented for salvage operations are expected to minimize potential impacts to water quality. There are two Class II stream channels located in the project area in the West Fork of Ashby Creek that do not have continuous flow to any class I fish bearing stream channel. There will be no harvest in or near the riparian area. Both Class II stream channels in the project area have high components of large woody debris. Deferring harvest in the SMZ will allow for sufficient numbers of standing dead, to ensure the continued presence of large woody debris in these systems. These trees will also provide shade to the stream channel for other aquatic organism and plants.

There will be no harvest in or near the riparian area in Wallace Creek. Harvest mitigation measures would include contoured log felling on steeper slopes in high intensity burn areas, as well as the spreading of slash over cable corridors if necessary to reduce erosion and concentrated runoff. All tractor harvest operations will be during frozen and snow covered conditions to prevent erosion. As a result of the recommended mitigation measures, the risk of direct and indirect impacts to water quality are expected to be low.

4.3.1.1.4 Alternative B: Harvest Cumulative Effects

The burned area and project area are located at the top of each drainage in an area with no continuous flow to any perennial Class I stream channels

or beneficial uses. All four watershed have been heavily impacted by a combination of timber harvest, road systems, residential development, past and present grazing activities and past and present mining activities. Cumulative impacts were evaluated for the project area and were considered to be low. The potential of near future re-entry for beetle salvage and the proposed Donovan timber sale would increase the risk of cumulative impacts on water quality. Possible cumulative effects would be caused by harvest in riparian areas and additional impacts to soils that result in increased erosion rates.

4.3.1.2 Water Yield

4.3.1.2.1 Alternative A: No Harvest (No Action)

Under Alternative A: No Harvest (No Action), low to moderate levels of overall water yield increases are expected as a result of the recent wildfire and fire suppression activities. Rehabilitation of fireline and other associated fire suppression impacts should decrease erosion during runoff and storm flow events. Predicted increases in water yield resulting from the wildfire are discussed and displayed in Chapter 3.

4.3.1.2.2 Cumulative Effects of Alternative A: No Harvest (No Action)

Under Alternative A: No Harvest (No Action), water yields are expected to increase as a result of the wildfire and wildfire suppression activities.

4.3.1.2.3 Alternative B: Harvest

The proposed salvage harvest operations are not expected to produce additional water yield. Most of the trees within the stand replacement fire units are dead and are not capable of the evapotranspiration process. The dead standing trees have little or no canopy cover and are therefore incapable of providing substantial levels snow or rainfall interception. Most of the ground cover in these stand replacement fires was consumed as well, resulting in lost forest floor interception. The only trees to be harvested during the proposed salvage are burned dead trees. There will be no live, green trees harvested during the salvage. To help decrease overland flow, large woody debris would be scattered throughout the units and logs would be contour felled in those areas where needed.

4.3.1.2.4 Cumulative Effects of Alternative B: Harvest

Implementation of recommended mitigation measures should result in low direct, indirect and cumulative impacts. Cumulative impacts to water yield would not significantly increase if reentry for beetle salvage sale occurred, because only dead trees would be harvested and no new road construction would occur.

4.3.1.3 Sediment Yield

4.3.1.3.1 Alternative A: No Harvest (No Action)

Increases in sediment delivery and erosion are expected to be moderate in high severity burn areas. The main delivery area is expected to be Wallace Creek, where a Class I perennial stream channel is present below the burn area. In Ashby Creek, Dirty Ike Creek and Donovan Creek, erosion is expected to be moderate, but sediment delivery is expected to be low. There are two Class II stream channels in Ashby Creek, but neither has direct continuous delivery to any other body of water. There are approximately 8.1 miles of rehabilitated dozer line and 16 acres of safety zones and drop points that may result in increased sediment yields until they are vegetated. Water bars, slash placement and seeding on these areas, is expected to help reduce erosion rates.

There is direct sediment delivery occurring at stream crossings and areas where the road is poorly located adjacent to the stream channel in all four watersheds.

4.3.1.3.2 Alternative B: Harvest

Increased sediment yields as a result of the wildfire and wildfire suppression activities are expected to occur. The risk of increased sediment yield resulting from the proposed harvest activities is expected to be low. Harvest operations would consist of ground based and cable systems. Ground based harvest will occur on slopes less than 40% and under snow covered winter conditions. Cable operations would occur during winter and summer conditions. There will be approximately 190 acres of cable harvest and 13 acres of ground based harvest. There will be no ground based or cable harvest within the SMZ.

As a result of the proposed activities, direct, indirect and cumulative impacts of the proposed action are expected to be low. (See additional cumulative impacts of re-entry in above Water Yield section).

4.3.1.3.3 Cumulative Effects of Alternative B: Harvest

Risk of direct, indirect and cumulative impacts to water quality are expected to be low, with implementation of recommended mitigation measures.

4.3.1.4 Geology and Soil Resources

4.3.1.4.1 Alternative A: No Harvest (No Action)

Increases in erosion are expected to be moderate in high severity burn areas. In Ashby Creek, Dirty Ike Creek and Donovan Creek, erosion is expected to be moderate. There are approximately 8.1 miles of rehabilitated dozer line and 16 acres of safety zones and drop points that

may result in increased erosion until they are vegetated. Water bars, slash placement and seeding on these areas, is expected to help reduce erosion rates.

4.3.1.4.2 Cumulative Effects of Alternative A: No Harvest (No Action)

Under the Alternative A: No Harvest (No Action), cumulative impacts to soils have occurred. Erosion, compaction and displacement have occurred as a result of wildfire and fire suppression activities as well as past harvest activities, existing roads and residential development.

4.3.1.4.3 Alternative B: Harvest

Ground based and cable harvest activities could increase soil disturbance, resulting in increased erosion. However, implementation of recommended mitigation measures should maintain erosion rates similar to those resulting from the wildfires and expected under No Action. Sale design mitigations do incorporate those concerns associated with loss of vegetation and canopy cover, and soil impacts as a result of the fire.

To minimize soil effects associated with the proposed activities, BMP's season of use and slope restrictions will be implemented. The most sensitive soils are found in Section 6, Tevis Gravelly Loams on 8-30% slopes. These soils have a shorter season of use and are susceptible to compaction and displacement when wet. Ground based harvest on these soils will only occur during frozen and snow covered winter conditions on slopes less than 40%. Evaro Gravelly Loams, which comprise a majority of the proposed activity area have an average season of use, but are sensitive to higher moisture levels. Ground based harvest on these soils will occur during frozen and snow covered winter conditions on slopes less than 40%. Slopes 30-40% will be predominantly winter harvested and therefore should have minimal effects on soils (Klock 1975 and Williams 1993).

Cable harvest activities during the summer have a higher potential to cause soil disturbance than winter cable harvest operations. Slash and tops will be retained within the cable corridors to mitigate these potential impacts. Corridor spacing and layout will also be designed to best fit the terrain.

Recommended mitigations for coarse woody debris would be implemented. Fallen logs and other coarse woody debris provide habitat for a large number of species that are important in decay nutrient cycling. 5-10 tons per acre of coarse woody debris will be retained on the ground for nutrient cycling and erosion control. Approximately 15-20 sub merchantable trees per acre will be contour felled in high severity burn

areas if adequate slash does not exist after harvesting. These trees will be felled perpendicular to the slope to help slow water and trap sediment.

4.3.1.4.4 Cumulative Effects of Alternative B: Harvest

Cumulative effects, including, compaction, erosion and displacement as a result of the proposed activities are expected to be low to moderate, if recommended mitigation measures are properly implemented. Near future entries are possible if beetle infestations occur. If repeated entries were to occur in the next two years, the risk of cumulative effects would increase. Repeated entries could cause increased disturbance, including further compaction, erosion and displacement of soils.

4.3.1.5 Cold Water Fisheries

4.3.1.5.1 Alternative A: No Harvest (No Action)

The only fish-bearing stream near the project area is Wallace Creek, which is located below the project area in Section 7. Increases in sediment levels are expected to be low to moderate as a result of the wildfire and fire suppression activities. The mixed severity burn between Wallace Creek and the high severity burn area in section 12 will not be harvested (see burn severity map). The mixed severity burn has areas of ground cover and coarse woody debris that remained unburned or slightly charred, which should help filter sediment and retard flows.

4.3.1.5.2 Cumulative Effects of Alternative A: No Harvest (No Action)

Under the Alternative A: No Harvest (No Action), cumulative impacts to fisheries is expected to be low to moderate. There are no tributaries with continuous surface flow to any fish bearing stream channel in the burn area. Wallace Creek is located directly below the burned area. Sediment levels in this portion of Wallace Creek are expected to increase.

4.3.1.5.3 Alternative B: Harvest

There are no fish bearing streams located in the project area in Ashby Creek, Donovan Creek or Dirty Ike Creek. Wallace Creek is the only fish-bearing stream located near the project area. There will be no harvest activities in or near Wallace Creek. Implementation of recommended mitigation measures during harvest activities should minimize the potential for sediment delivery to Wallace Creek.

Under Alternative B: Harvest, two roads crossings in the Dirty Ike watershed that do meet BMP standards and are causing direct sediment delivery to the stream channel will be repaired to meet BMP's and reduce direct sediment delivery to the stream channel.

As part of Alternative B: Harvest a near future entry could occur if a beetle infestation is found. This would have no impacts in Donovan, Ashby or Dirty Ike Creeks, where no fish bearing reaches are present in the proposed project area. However, additional disturbance that could increase soil erosion upslope of Wallace Creek could increase sediment delivery and reduce spawning habitat. Repeated entries for beetle salvage could increase cumulative impacts by decreasing canopy cover and increasing erosion.

4.3.1.5.4 Cumulative Effects of Alternative B: Harvest

Sediment yields are expected to increase in Wallace Creek as a result of recent fire activity and past management activities in the watershed. No additional cumulative impacts are expected as a result of the proposed activities. However, if repeated entries occur, cumulative impacts could increase as a result of increased soil erosion, sediment delivery and a reduction in canopy and ground cover.

4.3.1.6 Noxious Weeds

4.3.1.6.1 Alternative A: No Harvest (No Action)

It is expected that noxious weed infestations may increase in the burned areas. Existing knapweed infestations in the area are high along roadsides and forested areas. High intensity burn areas will be at higher risk of infestation due to native species competition with knapweed. As part of the restoration effort, disturbed areas were seeded with a mixture of species to hopefully out-compete knapweed. It is expected however, that fire suppression activities resulted in an increase in noxious weeds and the potential for the introduction of new species.

We also expect some noxious weeds may have been introduced from suppression activities. DNRC would monitor the area for new weeds, and treat as a priority. Under the Alternative A: No Harvest (No Action) we would have a continuing effort at weed control, but expect less funds would be available to treat noxious weeds, as current funding is limited. The following noxious weed control measures are planned that apply to Alternative A: No Harvest (No Action) and Alternative B: Harvest.

- Promptly seed soils disturbed during restoration activities and most severely burned cut/fill slopes with site adapted grasses (including native species) to reduce weed encroachment and help stabilize roads from erosion.
- Weed treatment measures include herbicide applications along portions of project roads and accessible sites with a priority on spot outbreaks of noxious weeds and as designated by the Forest officer. Any herbicide treatments will be implemented by a certified applicator according to herbicide label directions in accordance with applicable

laws and rules. No herbicides would be applied where runoff could affect surface waters

- DNRC will monitor the project area disturbed sites for new noxious weeds and develop plans as needed to address weed problems. If new infestations of noxious weeds are noted, a weed management plan will be developed and implemented and coordinated with the lessee efforts.

4.3.1.6.2 Cumulative Effects of Alternative A: No Harvest (No Action)

Under the Alternative A No Harvest (No Action), cumulative effects are expected occur from suppression activities. Increased vehicle traffic increases the risk of the spread of noxious weeds as well as new invader species.

4.3.1.6.3 Alternative B: Harvest

Under the proposed activities, an increase in ground disturbance could increase or introduce noxious weeds throughout roads and forested areas. 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. To protect water quality, herbicide would not be applied where runoff could enter surface waters or riparian features. Re-entry could increase the risk of cumulative impacts, if necessary mitigation measures to control noxious weeds are not implemented for each individual re-entry.

4.3.1.6.4 Cumulative Effects of Alternative B: Harvest

The cumulative effect of increasing weeds could occur with increased disturbance associated with the fire, and timber harvest in areas where weeds are established. The risk of cumulative increases in weeds is moderate compared to no-action, based on the combination of mitigations to limit areas of disturbance, revegetated roads, monitor for new weeds and herbicide treat new weed. Re-entry could increase the risk of cumulative impacts, if necessary mitigation measures to control noxious weeds are not implemented for each individual re-entry.

4.3.2 Human Environment

4.3.2.1 Economics Issue

4.3.2.1.1 Alternative A: No Harvest (No Action)

Under Alternative A: No Harvest (No Action) no harvesting would take place and no revenue would be generated.

4.3.2.1.2 Alternative B: Harvest

Approximately \$225,000-\$315,000 would be generated for the Common School grant from the harvest and sale of the estimated 9,521 tons. Stumpage value is estimated at \$25-\$30/ton.

The amount of forest improvement collection from this sale would be \$6.81 per ton. This would be applied to the sawlog volume harvested. The forest improvement collection would be approximately \$64,838. This money would be deposited in the forest improvement fund to be used for thinning, prescribed burning, planting, weed management, etc. on Trust Lands.

If this proposed project was implemented, it would provide work for a logging contractor, their subcontractors, and their employees. The forest products would most likely be processed in local mills providing further job opportunities.

4.3.3 Wildlife

4.3.3.1 Endangered Species Issue

4.3.3.1.1 Grizzly Bears

4.3.3.1.1.1 Alternative A: No Harvest (No Action)

Over the short term, no change from the current condition would be expected for the grizzly bear. However, over time shrubs and trees would begin to recolonize the project area, providing food and hiding cover over the next 20 to 30 years. Under the Alternative A: No Harvest (No Action), the gate in section 2 would not be relocated, continuing to permit some unauthorized motorized vehicles access to the project area, particularly during hunting season. Thus, there would be low risk of direct or indirect effects to grizzly bears as a result of this alternative.

4.3.3.1.1.2 Cumulative Effects of Alternative A: No Harvest (No Action)

The Dirty Ike and Donovan drainages have not had grizzly bear activity in several years, perhaps, since the 1970's (J. Jonkel, MT

FWP, personal communication, September 2003). Given the lack of recent bear activity in the area, grizzly bear activity has been noted approximately 14 miles east of the project area in the last couple of years, as well as recent and rapid expansion of grizzly bear populations in the nearby Blackfoot River Valley. With approximately 65% (47,140 acres) of the 73,092 acre analysis area occurring in regenerating clearcuts, seed tree/shelterwood harvests, and stand replacement fire, the amount of shrub and berry production over the next 20 years would likely attract grizzly bears because of the abundant food sources. However, the analysis area's open road density of approximately 2.59 miles of open road per square mile (simple linear calculation) would likely increase with the 1.5 miles of proposed road construction under the Dirty Ike Road project. With no action, the burned areas would gradually become revegetated and provide hiding cover for bears that might occupy the area in the future. Thus, there would be low risk of cumulative effects to grizzly bears as a result of this alternative, largely due to the absence of grizzly bear activity in the analysis area at this time.

4.3.3.1.1.3 Alternative B: Harvest

The proposed action would harvest fire-killed timber from the Dirty Ike fire on approximately 204 acres of School Trust lands in section 6, T 12 N, R 16 W, and section 12, T 12 N, R 17 W. Because the Dirty Ike fire produced a mosaic of stand replacement and mixed severity fire in the area, as well as likely producing heat-stress to vegetation in the vicinity of the fire, bark beetles (Family: *Scolytidae*) and wood borers will be attracted to the area. Since 1999, 4 species of bark beetle and a fir engraver have been present within a 5-mile radius of the Dirty Ike fire (Figure 4-1), and would likely colonize the affected area. Thus, salvage of future insect damaged trees would be possible.

Figure 4-1: Acres affected by insects within a 5-mile radius of the Dirty Ike Fire, 1999 - 2002 (USFS Insect and Disease Activity Maps 2003).

Within the context of 330 acres burned on School Trust land, the proposed action would harvest fire-killed trees on approximately 204 acres, much of which was stand replacement fire. Such action would reduce hiding cover for grizzly bears through removal of tree boles. While areas that experienced stand replacement fire currently have open understories, devoid of forbs and shrubs, tree boles do inhibit sight-distance, thusly providing hiding cover (McTague and Patton 1989). Much like the Alternative A: No Harvest (No Action), the affected area will be gradually re-vegetated through natural succession. Thus, under the Alternative B: Harvest, hiding cover will likely be replaced in approximately 20 years through natural vegetative succession. Additionally, the proposed action would relocate a gate within section 2, T 12N, R 17 W for a more effective closure against all-terrain vehicles. However, grizzly bear activity has not been observed in the affected area in several years. Thus, fire-salvage operations would likely have little direct or indirect effect on grizzly bears.

Future harvest operations to salvage insect-killed timber would be more likely to affect grizzly bears. Although grizzly bear activity has not been observed within the affected area in recent years, the rapid growth and expansion of grizzly bears in the Blackfoot Valley, and observed activity 14 miles east of the affected area, allow one to

conclude that bears may occupy the affected area within several years' time. Repeated entry over several years to harvest insect-killed timber that was influenced by the Dirty Ike fire could lead to potential direct conflicts with grizzly bears with each passing year. Thus, it is recommended that future operations for insect-related salvage occur during the denning period (November 15 - April 15), or strict sanitation guidelines be implemented to reduce the availability of bear attractants. Additionally, it is recommended that, during the course of future bug salvage operations, should additional road construction be required to access affected timber, said road(s) would have effective road closure devices (e.g., locked gates, tank traps, etc.) installed upon completion of the salvage operation.

Given the proposed fire salvage, there would be low risk of direct or indirect effect to grizzly bears. For future related harvest of insect-killed timber, there may be low to moderate risk of direct or indirect effects to grizzly bears, depending upon timing of the operations, and the extent, location, and closure status of potential roads, and the status of grizzly bear activity in the area.

4.3.3.1.1.4 Cumulative Effects of Alternative B: Harvest

There has been a lack of grizzly bear activity within the analysis area over the last several years, with the nearest, and most recent, activity occurring approximately 14 miles east of the project area. In addition to this proposed action, the Dirty Ike Road project, which would construct approximately 1.5 miles of new road within the current project area. Additionally, there is the impact of the existing seed tree/shelterwood harvests and road density on surrounding private industrial ground. Thus, the proposed fire salvage, potential salvage of insect-killed timber and new road construction would bring ((1) repeated entries into the project and analysis areas, (2) increase total road density, but not open road density, and (3) reduce hiding cover within the analysis area, while fostering conditions that could produce an ample food source for grizzly bears.) Although there has not been recent activity of grizzly bears within the analysis area, the rapidly increasing distribution of grizzly bears within the adjacent Blackfoot River Valley and Garnet Range lead one to believe that grizzly bears may occupy the analysis area in the near future. As such, repeated harvest entries would increase risk of conflicts with operators. To reduce risk of conflicts, it is recommended that sanitation restrictions (i.e., food storage, garbage disposal) be implemented during the non-denning period (April 15 - November 15) for operations related to this proposed activity, both fire-killed and insect-killed timber harvest. Due to the current absence of grizzly bear activity within the analysis area, and no net increase in open road densities, there would be low

risk of cumulative effects to grizzly bears as a result of the proposed action.

4.3.3.1.2 Gray Wolves

4.3.3.1.2.1 Alternative A: No Harvest (No Action)

A wolf pack is known to have an activity center approximately 6 miles east of the proposed road in section 6, near the town of Potomac, MT. Additionally, the affected area is known to contain crucial elk summer range, and be a migration corridor to winter range (M. Thompson, MT FWP, personal communication). As the vegetation gradually recovers from the effects of the fire, succulent and highly palatable vegetation will be produced that would be heavily utilized by deer, elk, and moose, which may be attractive for foraging by wolves. Thus, there would be low risk of direct or indirect effects to wolves as a result of this alternative.

4.3.3.1.2.2 Cumulative Effects of Alternative A: No Harvest (No Action)

The known wolf pack activity center is located outside of the analysis area. However, use of the analysis area by wolves is possible. With the effects of the recent Dirty Ike fire, the area affected by the fire will gradually recover with succulent and highly palatable vegetation that would be heavily utilized by big game. Much of this area does not contain open roads. However, with the proposed Dirty Ike Road project additional roads would be constructed within the analysis area, albeit, many of these proposed roads would be behind road closure devices. Thus, there would be low risk of cumulative effects to wolves as a result of this alternative.

4.3.3.1.2.3 Alternative B: Harvest

Within the context of 330 acres burned on School Trust land, the proposed action would harvest fire-killed trees on approximately 204 acres, much of which was stand replacement fire. Such action would reduce hiding cover for wolves through removal of tree boles. While areas that experienced stand replacement fire currently have open understories, devoid of forbs and shrubs, tree boles do inhibit sight-distance, thusly providing hiding cover (McTague and Patton 1989). Much like Alternative A: No Harvest (No Action), the affected area will be gradually re-vegetated through natural succession. Thus, under Alternative B: Harvest, hiding cover will likely be replaced in approximately 20 years through natural vegetative succession. Additionally, the proposed action would relocate a gate within section 2, T 12N, R 17 W for a more effective closure against all-terrain vehicles. Additionally, the proposed timber harvest is not located within 1 mile of a known wolf den or rendezvous site. Thus, fire-

salvage operations would likely have little direct or indirect effect on wolves.

4.3.3.1.2.4 Cumulative Effects of Alternative B: Harvest

With the expected vegetative recovery of areas affected by the Dirty Ike fire would be an expected increase in use of this area by big game species. Such use would likely concentrate activity by predators, such as the wolf. There are two proposed DNRC projects within the analysis area: the Dirty Ike Road project, which would construct 1.5 miles of new road within the project area and could disperse big game movements; and the currently proposed project.

4.3.3.1.3 Lynx

4.3.3.1.3.1 Alternative A: No Harvest (No Action)

Under Alternative A: No Harvest (No Action), fire-killed timber would not be harvested. As such, over time shrubs and trees would eventually begin to recolonize the project area, providing habitat for snowshoe hares, the lynx's preferred prey. Eventually, snags created from the Dirty Ike fire would fall to the ground, likely creating a large pulse of coarse woody debris in the area. As a result, potential lynx denning habitat may result from potential jackstrawing of the fallen snags, or the presence of large diameter hollow logs. Thus, there would be low risk of direct or indirect effects to lynx as a result of this alternative.

4.3.3.1.3.2 Cumulative Effects of Alternative A: No Harvest (No Action)

As previously discussed under direct and indirect effects (4.3.3.1.3.1), foraging habitat would develop over the next 15 to 20 years under this alternative, as well as potential denning habitat as recently created snags fall over. However, the proposed Dirty Ike Roads project would increase the amount of road in mature foraging habitat. Construction of new road may enable competing predators access to lynx foraging habitat in winter. While Alternative A: No Harvest (No Action) would not construct road or harvest timber, there is low risk of cumulative effects from other proposed actions.

4.3.3.1.3.3 Alternative B: Harvest

The proposed action would salvage harvest timber from a total of 204 acres of School Trust land that were affected by the Dirty Ike fire (203 acres of stand replacement fire, 1 acre of mixed severity). Through salvage harvesting, an average of 10 trees per acre ≥ 9 inches dbh would be retained within the harvest units, and may contribute to potential lynx denning habitat in the future, once they fall and become coarse woody debris. Because the proposed action is largely avoiding

areas that experienced mixed severity fire, more forest structure would be retained within these areas that would contribute to mature foraging habitat, once the understory vegetation recovers from the effects of the fire. Although there are currently no plans to harvest within the areas that experienced mixed severity fire, or forest stands adjacent to the fire, these are the areas that are most likely to become infested with bark beetles within the next few years, due to fire/heat-induced stress on the trees. In all likelihood, these areas may then be subject to additional salvage harvesting to recover timber killed or damaged by insects. Thus, it is possible that additional mature foraging and denning habitat would be lost from the proposed action. Additionally, establishment of early foraging habitat within the burned area will likely require 15 to 20 years while the area becomes revegetated through natural succession. Therefore, there is low to moderate risk of direct and indirect effects to lynx from the proposed action.

4.3.3.1.3.4 Cumulative Effects of Alternative B: Harvest

The proposed action would harvest 204 acres of fire-killed timber from what is currently classified as being preferred lynx habitat types. As previously discussed, this would result in potential losses of future denning materials. With 776 acres of forest burned during the Dirty Ike fire (486 acres on Plum Creek land), there was a temporary loss of foraging habitat for lynx: approximately 486 acres of early foraging habitat on Plum Creek land, and approximately 100 acres of mature foraging habitat in DNRC's section 6. The proposed action, which includes potential salvage of subsequent insect damage associated with the fire could further reduce the availability of mature foraging habitat within the project area. Additionally, the proposed construction of 1.5 miles of new road under the Dirty Ike Road project, and this project's scheduled winter harvest activities would likely permit competing predators to temporarily gain access to the analysis area while operations are on-going during the winter. Thus, there would be low risk of cumulative effects to lynx as a result of the proposed action.

4.3.3.2 Sensitive Species Issue

4.3.3.2.1 Pileated Woodpeckers

4.3.3.2.1.1 Alternative A: No Harvest (No Action)

Under Alternative A: No Harvest (No Action), no change from the current situation would be expected. Pileated woodpeckers require large diameter snags (>15 inches dbh) in late successional forest for nesting and roosting. Thus, areas that experienced stand replacing fire would not suffice for nesting and roosting habitat for several decades, until vegetation has recovered and would provide late successional structural characteristics. Within section 6, areas that experienced

mixed-severity fire may still function as nesting and roosting habitat for pileated woodpeckers. Pileated woodpeckers feed primarily on carpenter ants and woodboring beetle larvae (Bull and Jackson 1995). As such, there may be an increase in pileated woodpecker foraging activity within the burned area for 2 to 4 years post-burn, due to an increase in woodboring beetle populations associated with post-burn areas. Currently, there are an average of 15 trees per acre ≥ 15 inches dbh within the affected School Trust lands in sections 6 and 12 (Fig. 4-2). Thus, there would be low risk of direct and indirect effects to pileated woodpeckers as a result of the Alternative A: No Harvest (No Action).

Figure 4-2: Average trees per acre per diameter class within stand replacement fire areas of the Dirty Ike Fire, section 6, T12N, R 16W, and section 12, T12N, R 17 W. Diameters presented are the midpoints for a range of diameters (e.g., 8 inches dbh for $7 \leq \text{dbh} < 9$). Most trees were killed by fire, and thus, represent snags.

4.3.3.2.1.2 Cumulative Effects of Alternative A: Deferred Harvest (No Action)

Post-fire, there are currently an average of 15 snags per acre ≥ 15 inches dbh, which could serve as potential nesting and roosting structures for pileated woodpeckers. However, because this species generally prefers to nest and roost in late successional forest structure, the current conditions within the project area may not approach suitable conditions for pileated woodpeckers for at least 40 years. Thus, there would be low risk of cumulative effects for pileated woodpeckers as a result of the Alternative A: No Harvest (No Action).

4.3.3.2.1.3 Alternative B: Harvest

The proposed action would harvest fire-killed timber from approximately 204 acres on the affected parcels. However, pursuant to ARM 36.11.411, DNRC would retain an average of approximately one snag and one snag recruit over 21 inches dbh per acre. Where snags or snag recruits over 21 inches dbh are not present, the next largest size snag or recruit would be retained. Additionally, if sufficient snags or recruits are absent, some substitution among the two would occur. As such, there would be an average of at least 2 snags and/or recruits left per acre ≥ 17 inches dbh, as well as an average of 7 trees/snags per acre $9 \leq \text{dbh} \leq 17$ inches (Fig. 5).

Figure 4-3: Average trees per acre per diameter class within stand replacement fire areas of the Dirty Ike Fire, which would be retained and harvested. Diameters presented are the midpoints for a range of diameters (e.g., 8 inches dbh for $7 \leq \text{dbh} < 9$). Most trees were killed by fire, and thus, represent snags.

In the short term, the proposed action would have a minor adverse impact on the availability of pileated woodpecker foraging structures, largely snags. Studies that have examined woodpeckers following stand-replacement fires, such as those characterized by the Dirty Ike fire, found very low use by pileated woodpeckers (Hutto 1995, Murphy and Lehnhausen 1998). However, over a longer time period, the proposed action would reduce nesting, roosting, and foraging structures for this species. Nesting and roosting habitat would most likely be adversely impacted in 40 to 50 years, through a reduction in

nesting and roosting structures, once mature or late successional forest structure had developed in the project area. Long-term foraging structures would be adversely impacted through reduction in the number of available snags that would eventually be recruited into coarse woody debris and serve as habitat for carpenter ants, a primary food item for pileated woodpeckers.

Effects of the reductions in the snag population on pileated woodpeckers may be partially mitigated by the proposed deferment of approximately 126 acres of mixed severity burn. These acres have largely retained their forest structure and snags. However, the mixed severity burned areas are also most susceptible to infestation by bark and woodboring beetles, which may make them candidates for future salvage efforts. In which case, snags would be retained as described above (ARM 36.11.411). Thus, there would be low to moderate risk of direct and indirect effects to pileated woodpeckers as a result of the proposed action.

4.3.3.2.1.4 Cumulative Effects of Alternative B: Harvest

Cumulative effects of the proposed action relate primarily to long-term impacts from the removal of fire-killed trees and the absence of suitable pileated woodpecker habitat on adjacent private industrial land. The presence and abundance of seed tree/shelterwood harvests on private industrial lands within 1 mile of the project area demonstrate that the only potential pileated woodpecker habitat within the analysis area exists on School Trust land. With 330 acres of the School Trust's 3,132 acres within the analysis area burned to some degree (203 acres of stand replacement), the amount of potential pileated habitat was reduced by 9%. As previously alluded to, the potential for future salvage of insect-killed timber, as part of this proposed action, poses some of the greatest risk to pileated woodpecker habitat because it could reduce the presence of suitable snags or snag recruits within forested stands that possess structure suitable for nesting or roosting by pileated woodpeckers. Short-term pileated woodpecker nesting and roosting habitat within the analysis area could be reduced. However, under the proposed action, salvage of current fire-killed and future insect-killed timber under this proposed action, snags would be retained as described above (ARM 36.11.411) to provide for future pileated woodpecker habitat. Thus, there would be low risk of cumulative effects to pileated woodpeckers as a result of this proposed action.

4.3.3.2.2 Black-backed woodpeckers

4.3.3.2.2.1 Alternative A: No Harvest (No Action)

No change from the current situation would be expected if this alternative were selected. The recent 776-acre Dirty Ike fire created approximately 203 acres of black-backed woodpecker habitat through stand replacement fire. Burned areas such as this tend to be used by black-backed woodpeckers for 1 to 5 years post-fire, in response to outbreaks of wood-boring beetles in the burned areas. Thus, there would be low risk of direct or indirect effects to black-backed woodpeckers as a result of the Alternative A: No Harvest (No Action).

4.3.3.2.2.2 Cumulative Effects of Alternative A: No Harvest (No Action)

Cumulative effects would be associated with the Dirty Ike Road project. The road project would construct 1.5 miles of new road in the burned areas of this project area during the winter of 2003-2004. Such road construction would permit motorized access within 0.25 mile of black-backed woodpecker. As such, mitigations that would be required of this project would require DNRC to minimize mechanized activity within 0.25 mile of black-backed woodpecker habitat during the period of April 15 through July 1 (pursuant to ARM 36.11.438 (1)(a)). This mitigation would be expected to remain in effect until at least 2009. Thus, there would be low risk of cumulative effects to black-backed woodpeckers as a result of the Alternative A: No Harvest (No Action).

4.3.3.2.2.3 Alternative B: Harvest

The proposed action would harvest 204 acres of fire-killed timber within a project area that includes 330 acres that were affected by the Dirty Ike fire in the summer of 2003. Within the proposed harvest units, an average of 9 trees per acre ≥ 9 inches dbh would be retained (Fig. 4-3). All timber within a 46 acre patch of that burned in the SE $\frac{1}{4}$ of section 6 would be retained without entry for a minimum of 5 years for black-backed woodpeckers (pursuant to ARM 36.11.438 (1)(b)). Average stand dbh (from Stand Level Inventory database) for the affected stands which comprise the deferment is 17 inches (range = 12 to 20 inches dbh), and the stands are generally well stocked (i.e., $\geq 70\%$ crown density). Of the black-backed woodpecker deferred stands, 39 acres experienced a mixed severity burn, and the remaining 7 acres experienced a stand replacement burn.

In addition to 46 acres of timber that would be deferred for the black-backed woodpecker for a minimum of 5 years (without potential harvest), there would be 80 acres of mixed severity burn temporarily deferred. Within these 80 acres, salvage of insect-killed timber could occur within the next 5 years (Fig. 6). These 46 acres are characterized as having an average stand dbh of 12 inches ($n = 14$

stands, range = 0 to 22 inches, SD = 7; SLI database), and are generally well-stocked, with a few acres of medium stocking (i.e., 40 to 69% crown density).

The proposed harvest area encompasses 204 acres of forest that experienced stand replacement fire in the Dirty Ike fire of 2003. Examining Figure 4-2, cruise data for the proposed harvest indicates that there are an average of 131 trees per acre ≥ 7 inches dbh, with an average of 2 trees per acre ≥ 21 inches dbh. Post-harvest, there would likely be an average of 9 trees per acre ≥ 7 inches dbh, with an average of 1 trees per acre ≥ 21 inches dbh, and an average of 1 tree per acre ≥ 17 inches dbh (pursuant to ARM 36.11.411).

(Dixon and Saab 2000) report a spacing of approximately 1 mile between individual pairs of black-backed woodpeckers in “good” habitat in Vermont. Given the definition of black-backed woodpecker habitat as fire-killed stands of trees greater than 40 acres, less than 5 years since disturbance, and with greater than 40 trees per acre that are ≥ 9 inches dbh, at most 1 or 2 pairs of black-backed woodpeckers would likely exist within section 6 and 12, providing the 203 acres of stand replacement burn were “good” habitat for this species. Thus, the proposed action would have low to moderate risk of direct and indirect impacts through reductions in suitable habitat that may affect a few pairs of black-backed woodpeckers.

4.3.3.2.2.4 Cumulative Effects of Alternative B: Harvest

The proposed action would harvest 203 acres of suitable black-backed woodpecker habitat resulting from the Dirty Ike fire in 2003. Cruise data (Fig. 5) indicates that there would be an average of 9 snags per acre ≥ 9 inches dbh retained post harvest, and an average of 88 snags per acre ≥ 9 inches dbh harvested during the proposed action. Thus, the suitability of these stand replacement acres for black-backed woodpeckers would be reduced. Additionally, salvage of future insect-killed timber would be permitted within 40 acres that experienced mixed severity fire within the analysis area.

Within the confines of the analysis area approximately 19,000 acres of potential black-backed woodpecker habitat were created among the Dirty Ike, Boles Meadow, Black Mountain 2, Cooney Ridge, and Mineral Primm fires in 2003 (Figure 4-3). The closest of which, Cooney Ridge, is only 7 miles south of the project area. Thus, the proposed action would reduce the amount of potential black-backed woodpecker habitat within the analysis area by approximately 1%. This represents a relatively small proportion of potential black-backed woodpecker habitat being affected within the analysis area. It is reasonable to assume that a sizable proportion of USFS acres that

burned at stand replacement intensity will retain attributes that render them suitable for use by black-backed woodpeckers, due to their occurrence in wilderness areas (e.g., Mineral Primm) and other areas where salvage activities are unlikely. Thus, the risk of adverse cumulative impact on black-backed woodpeckers would be low as a result of this proposed action.

4.3.3.2.3 Flammulated Owls

4.3.3.2.3.1 Alternative A: No Harvest (No Action)

No change from the current situation would be expected if this alternative were selected. The recent 776-acre Dirty Ike fire removed approximately 9.5 acres of preferred flammulated owl habitat types from School Trust land through stand replacement fire. Such habitat would not be replaced by natural succession for approximately 50 to 60 years. Thus, there would be low risk of direct and indirect effects to flammulated owls as a result of the Alternative A: No Harvest (No Action).

4.3.3.2.3.2 Cumulative Effects of Alternative A: No Harvest (No Action)

With no action, there would be no change from current conditions. Thus, there would be low risk of cumulative effects to flammulated owls as a result of this alternative.

4.3.3.2.3.3 Alternative B: Harvest

The proposed action would harvest 9.5 acres of fire-killed timber within a stand containing a flammulated owl preferred habitat type, and subjected to a high intensity, stand replacing fire. Thus, there would be low risk of direct or indirect effects of the proposed fire salvage to flammulated owls. In addition to the fire salvage, this proposed action also includes salvage of future insect-killed timber within the project area. Stands that would be most susceptible to insect-related mortality are those stands subjected to ((1) mixed severity fire; (2) stands adjacent to the burned area that may have experienced heat related stress induced by the fire, which would leave them in a weakened state for infestation by bark beetles; and (3) nearby stands previously stressed by drought.) Thus, additional forested acres within the project area, containing preferred flammulated owl habitat types, may be subject to salvage harvest of varying intensity. Subsequent insect-related salvage operations may serve to open up stands, and may increase habitat suitability for the flammulated owl. However, any subsequent harvest operation would retain snags of suitable size for flammulated owls, pursuant to ARM 36.11.411. Thus, there would be low risk of direct and indirect effects to flammulated owls as a result of the proposed action.

4.3.3.2.3.4 Cumulative Effects of Alternative B: Harvest

Cumulative effects of the proposed action relate primarily to long-term impacts from the removal of fire-killed trees and the absence of suitable flammulated owl habitat on adjacent private industrial land. In the short-term, flammulated owls are not likely to utilize the stand replacement area for nesting or roosting due to the lack of a forest canopy and understory growth, which would provide habitat for their preferred insect prey. However, in the long-term, removal of large diameter snags would reduce the availability of nesting and roosting substrate once suitable vegetative cover and forest structure developed. Within a 1-mile radius of the project area, shelterwood/seed-tree harvests have been the predominant silvicultural system on adjacent private industrial lands over the last 10 years. As a result, suitable forest structure conditions for nesting and roosting are currently lacking on these lands, and will not develop for at least another 40 years. Thus, there would be a low risk of cumulative effects to flammulated owls as result of implementing proposed Alternative B: Harvest.

4.3.3.2.4 Fisher

4.3.3.2.4.1 Alternative A: No Harvest (No Action)

With no action, there would be no change from current conditions. Thus, there would be low risk of direct or indirect effects to fisher as a result of this alternative.

4.3.3.2.4.2 Cumulative Effects of Alternative A: No Harvest (No Action)

With Alternative A: No Harvest (No Action), the burned area would gradually become revegetated over time. Of the 42 acres of preferred fisher habitat types affected by the fire, 27 acres occur within areas that experienced stand replacing fire. The remaining 15 acres experienced mixed severity fire. Over time, snags would provide potential den sites for fishers, as well as areas within which to forage, once the snags are recruited into coarse woody debris. Thus, in the long term (50+ years), the Alternative A: No Harvest (No Action) would provide for an island of fisher habitat within the surrounding matrix of private industrial land. Thus, there would be low risk of cumulative effects to fishers as a result of this alternative.

4.3.3.2.4.3 Alternative B: Harvest

The proposed action would harvest approximately 27 acres of stand replacement-burned timber within preferred fisher habitat types. This amounts to approximately 3% of the 832 acres of preferred fisher habitat types within a 1-mile radius of the Dirty Ike fire. Of the

remaining 15 acres of preferred fisher habitat types that were affected by the fire (these acres experienced mixed severity fire intensity), 11 acres would be deferred from harvesting for a minimum of 5 years, and is considered suitable fisher habitat (late successional forest, coarse woody debris, proximity to a class 2 stream), and the remaining 4 acres would be subject to salvage, should an insect infestation occur within the next 5 years. Under current conditions, the 27 acres that would be harvested under the proposed action are not currently suitable habitat for fisher. These acres would continue to be unsuitable for approximately 50 years, when the area had become revegetated, displaying late successional forest attributes. The proposed action would, in the long term, remove key fisher habitat attributes (i.e., snags and eventually coarse woody debris) that would be of importance once natural forest succession had occurred (see above analysis for fisher Alternative A: No Harvest (No Action)). Thus, because much of the affected habitat is currently unsuitable for fisher, and currently suitable fisher habitat would be deferred from harvesting for a minimum of 5 years (pursuant to ARM 36.11.438 (1)(b)), there would be low risk of direct and indirect effects to fisher as a result of the proposed action.

4.3.3.2.4.4 Cumulative Effects of Alternative B: Harvest

Cumulative effects for fisher are related to past harvesting on the surrounding private industrial lands, and the proposed action. Approximately 75% of 5,700 acres of private industrial land within a 1-mile radius of the Dirty Ike fire have been harvested in a seed tree/shelterwood silvicultural system in recent years. As a result, those acres would not become suitable fisher habitat for a period of 30 to 50 years. As discussed above, the proposed fire and insect salvage presented herein would likely have low risk of affecting fishers on approximately 3% of 832 acres of preferred fisher habitat types within a 1-mile radius of the Dirty Ike fire over the next 5 years. Thus, the proposed action would likely have low risk of cumulative effects to fishers.

4.3.3.3 Big Game

4.3.3.3.1 Elk

4.3.3.3.1.1 Alternative A: No Harvest (No Action)

Within the project area, there is currently no elk security cover due to the presence of open roads within 0.5 mile. Additionally, the Dirty Ike fire reduced the amount of thermal cover by 203 acres. Thus, Alternative A: No Harvest (No Action) would benefit elk during the hunting season through tree retention within the areas that experienced stand replacement fire intensity. As such, the tree boles would serve to

break up sight distance until such time as naturally regenerating trees will have grown to sufficient height as to provide denser screening cover (McTague and Patton 1989). Thus, there would be low risk of direct or indirect effects to elk as a result of the No Action alternative.

4.3.3.3.1.2 Cumulative Effects of Alternative A: No Harvest (No Action)

Under this alternative, there would be no additional disturbance created or cumulative effect on elk winter range effectiveness or security.

4.3.3.3.1.3 Alternative B: Harvest

Montana Department of Fish, Wildlife & Parks (MT FWP) has expressed concern, in a draft revision of their Elk Management Plan, for the elk population in this portion of Hunting District 292. Specifically, this area is one of reduced elk security due to past timber harvest and recent fires. MT FWP has observed low bull survival and chronic, lowered calf recruitment, which decreases the capacity of this population to rebound from a severe winter or other future environmental event. The proposed action would not further reduce thermal or security cover, as the proposed harvest would remove trees that were killed by a high intensity fire, and is located within 0.5 mile of an open road. However, such action would increase sight distance (see discussion under No Action regarding the merits of tree boles) in an area that would have high quality forage for several years post-fire. This increased sight distance would gradually be reduced over a 20-year period as the forest regenerates and saplings grow to sufficient height to provide an effective visual screen. Thus, the proposed action would have low risk of direct effects and low to moderate indirect effects for elk through a short-term (20 year) increase in sight distance on approximately 200 to 300 acres.

4.3.3.3.1.4 Cumulative Effects of Alternative B: Harvest

Cumulative effects to elk are contingent upon past timber harvest on private industrial land, the proposed Dirty Ike Roads project, and this proposed action. As discussed above, regarding direct and indirect effects, MT FWP is concerned with the reduction in elk habitat security, bull survival, and lowered calf recruitment. Currently, approximately 17.6% of the analysis area is elk security cover, due to the abundance of open roads and the effects of recent timber harvest. The proposed Dirty Ike Roads project would construct approximately 1.5 miles of new road within the project area, and be part of a road system currently controlled by a gate within section 2. In the past, this gate has been ineffective at restricting the access of ATV's. However, that project is proposing to re-locate the gate to a location that would

be more effective at preventing ATV's from circumventing the gate and would increase elk security during hunting season.

The proposed action, as discussed in direct and indirect effects, would not further reduce elk security or thermal cover, as the project would remove only dead trees and is within 0.5 mile of an open road. Thus, the proposed action would have low risk of cumulative effects for elk.

4.3.3.3.2 Moose

4.3.3.3.2.1 Alternative A: No Harvest (No Action)

Under this alternative, there would be no additional disturbance created or direct or indirect effects on moose winter range effectiveness or security.

4.3.3.3.2.2 Cumulative Effects of Alternative A: No Harvest (No Action)

Under this alternative, there would be no additional disturbance created or cumulative effect on moose winter range effectiveness or security.

4.3.3.3.2.3 Alternative B: Harvest

The proposed action would harvest 204 acres of fire-killed timber, much of which experienced stand replacing fire intensity. As a result of the fire killing overstory trees and understory shrubs, highly palatable vegetation will colonize the site and provide nutritious forage for moose that inhabit the area. Because the forest overstory on 203 acres was killed by the fire, the proposed action would not be reducing the amount of thermal cover for moose. Additionally, standard weed control practices would be implemented to reduce the likelihood of noxious weed transmission that would reduce forage availability. Thus, there would be a low risk of direct and indirect effects to moose as a result of the proposed action.

4.3.3.3.2.4 Cumulative Effects of Alternative B: Harvest

Euler (1981) suggested one way to manage for moose habitat was to increase the interspersions of mature, uncut forest (i.e., cover) with forage producing openings in an attempt to improve cover quality and forage availability. Within the analysis area, past seed tree/shelterwood harvests on private lands, interspersed with mature forest on School Trust and private lands, have created such conditions in the past. The recent Dirty Ike fire augmented this interspersions through creation of a 203-acre opening with a high intensity, stand replacing fire on School Trust lands within the project area. The proposed action would not further reduce the amount of mature forest within the analysis area, but remove standing dead timber within the

high intensity fire area. Despite the proposed timber salvage, the affected area will regenerate and produce forage for moose. Thus, there would be low risk of cumulative effects for moose as a result of the proposed action.

4.3.4 Cumulative Effects Associated with other DNRC Projects

Several other DNRC projects are either ongoing or have undergone scoping in the general area around the Dirty Ike Project Area. The following Table displays the name of the proposed activity, the year when activity is planned, and the type of activity proposed. Of the projects listed, all are outside of any Analysis Area used in this assessment and would have no measurable cumulative effects on wildlife considered in this assessment.

Table 4-1: OTHER DNRC MISSOULA UNIT ACTIVITIES

Project Name	Air miles from Dirty Ike Salvage	Year of Proposed Activity	Description of proposed Activity
Turah Creek	6	2003	Commercial Thinning
Cramer	8	2003	Shelterwood
Roman/Six Mile	30	2004	Commercial Thinning and PCT
Tyler Creek	11	2004	Shelterwood
Davis Point	16	2005	Overstory removal
Land of Lodgepole	8	2003	Commercial Thinning
St. Regis Beetle	85	2003	Commercial Thinning
St. Regis Cable	85	2003	Commercial Thinning
Flat Pardee	61	2003	Commercial Thinning
Dry Gulch	12	2006	Shelterwood
Smoked Fish	48	2003	Salvage
Fish Sticks	48	2004	Salvage

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CHAPTER 5

INDIVIDUALS ASSOCIATED WITH THE PROJECT

5.0 List of Individuals Associated with the Project

Preparers:

Bob Rich	Supervising Forester, Project Leader, Missoula Unit, SWLO, DNRC
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Mike McGrath	Wildlife Biologist, SWLO, DNRC
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Jeff Collins	Soil Scientist, F MB, SWLO, DNRC
Pat Rennie	Archeologist, AGMB, DNRC, Helena

CHAPTER 6

AGENCIES AND PERSONS CONSULTED

6.0 List of Agencies and Persons

Consulted and/or Provided Copies of

this EA

Mack Long
Ecology Center

Regional Supervisor, MT Fish Wildlife & Parks
Missoula, MT

CHAPTER 7

REFERENCES

7.0 References

Wildlife Portion:

- Buehler, D. A. 2000. Bald eagle (*Haliaeetus leucocephalus*). Pages 1-40 in The Academy of Natural Sciences; The American Ornithologists' Union, Philadelphia, Pennsylvania.
- Bull, E. L. and J. A. Jackson. 1995. Pileated woodpecker (*Dryocopus pileatus*). Pages The Academy of Natural Sciences; The American Ornithologists' Union, Philadelphia, Pennsylvania.
- Bull, E. L., R. S. Holthausen, and M. G. Henjum. 1992. Roost trees used by pileated woodpeckers in northeastern Oregon. *Journal of Wildlife Management* 56:786-793.
- Bull, E. L., S. R. Peterson, and J. W. Thomas. 1986. Resource partitioning among woodpeckers in northeastern Oregon. E. L. Bull, S. R. Peterson, and J. W. Thomas (Resource partitioning among woodpeckers in northeastern Oregon. U. S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, Oregon. Research Note PNW-444.
- Clem, M. K. 1977. Food habits, weight changes and habitat use of fisher *Martes pennanti* during winter. M. S. Thesis, University of Guelph, Guelph, Ontario.
- Coulter, M. W. 1966. Ecology and management of fishers in Maine. Dissertation, Syracuse University, Syracuse, New York.
- Deeble, B. D. 1996. Conservation of Columbian sharp-tailed grouse, with special emphasis on the Upper Blackfoot Valley, Montana. Thesis, University of Montana, Missoula, Montana.
- Dixon, Rita D. and Saab, Victoria A. Black-backed Woodpecker. Poole, Alan and Gill, Frank B. The Birds of North America. Philadelphia, PA: The Academy of Natural Sciences; 2000;509:Pp. 1-20.
- Giesen, K. M. and J. W. Connelly. 1993. Guidelines for management of Columbian sharp-tailed grouse habitats. *Wildlife Society Bulletin* 21:325-333.
- Hewitt, D. G. and C. T. Robbins. 1996. Estimating grizzly bear food habits from fecal analysis. *Wildlife Society Bulletin* 24:547-550.
- Hutto, R. L. 1995. Composition of bird communities following stand-replacement fires in northern Rocky Mountain (U.S.A.) conifer forests. *Conservation Biology* 9:1041-1058.
- Kasworm, W. F. and T. L. Manley. 1990. Road and trail influences on grizzly bears and black bears in northwest Montana. *International Conference on Bear Research and Management* 8:79-84.
- Kelly, G. M. 1977. Fisher (*Martes pennanti*) biology in the White Mountain National Forest and adjacent areas. Dissertation, University of Massachusetts, Amherst, Massachusetts.
- Koehler, G. M. 1990. Population and habitat characteristics of lynx and snowshoe hares in north central Washington. *Canadian Journal of Zoology* 68:845-851.
- McCallum, D. A. 1994. Flammulated owl (*Otus flammeolus*). Pages 1-24 in The Academy of

Natural Sciences; The American Ornithologists' Union, Philadelphia, Pennsylvania.

McClelland, B. R. 1979. The pileated woodpecker in forests of the northern Rocky Mountains. Pages 283-299 in *The role of insectivorous birds in forest ecosystems*. Academic Press, New York, New York.

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

McTague, J. P. and D. R. Patton. 1989. Stand density index and its application in describing wildlife habitat. *Wildlife Society Bulletin* 17:58-62.

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

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

Mowat, G., G. Poole, and M. O'Donoghue. 2000. Ecology of lynx in northern Canada and Alaska. Pages 265-306 in L. F. Ruggiero, K. B. Aubry, S. W. Buskirk, G. M. Koehler, C. J. Krebs, K. McKelvey, and J. R. Squires (eds.). *Ecology and conservation of lynx in the United States*. U. S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Ft. Collins, Colorado. General Technical Report RMRS-GTR-30WWW.

Pierson, E. D., M. C. Wackenhut, J. S. Altenbach, P. Bradley, P. Call, D. L. Genter, C. E. Harris, B. L. Keller, B. Lengus, L. Lewis, B. Luce, K. W. Navo, J. M. Perkins, S. Smith, and L. Welch. 1999. Species conservation assessment and strategy for Townsend's big-eared bat (*Corynorhinus townsendii* and *Corynorhinus townsendii pallescens*). Idaho Department of Fish and Game, Boise, Idaho.

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

_____. 1978. A comparison of fisher and weasel hunting behavior. *Carnivore* 1:28-34.

Ruediger, B., J. Claar, S. Gniadek, B. Holt, L. Lewis, S. Mighton, B. Naney, G. Patton, T. Rinaldi, J. Trick, A. Vandehey, F. Wahl, N. Warren, D. Wenger, and A. Williamson. 2000. Canada lynx conservation assessment and strategy. U. S. Department of Agriculture, Forest Service, Missoula, Montana. R1-00-53.

Squires, J. R. and T. Laurion. 2000. Lynx home range and movements in Montana and Wyoming: preliminary results. Pages 337-349 in L. F. Ruggiero, K. B. Aubry, S. W. Buskirk, G. M. Koehler, C. J. Krebs, K. McKelvey, and J. R. Squires (eds.). *Ecology and conservation of lynx in the United States*. U. S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Ft. Collins, Colorado. General Technical Report RMRS-GTR-30WWW.

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

Torgersen, T. R. and E. L. Bull. 1995. Down logs as habitat for forest-dwelling ants--the primary

prey of pileated woodpeckers in northeastern Oregon. Northwest Science 69:294-303.

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

Water/Soils/Fisheries Portion:

Environmental Analysis for the Sula State Forest Fire Mitigation, Salvage and Recovery Project, November 2000. Montana Department of Natural Resources and Conservation, Hamilton Unit

Klock, Glen O. 1975, Impact of Five Postfire Salvage Logging Systems on Soils and Vegetation. Journal of Soil and Water Conservation. 30 (2): p78-81

Montana Department of Environmental Quality.2000. Draft Montana 303(d) List: A Compilation of Impaired and Threatened Waterbodies in Need of Water Quality Restoration. Montana DEQ, Helena, MT.

Montana Department of Environmental Quality.1998. Montana 303(d) List: Waterbodies in Need of Total Daily Maximum Load Development. Montana DEQ, Helena, MT.

Montana Department of Environmental Quality.1996. Montana 303(d) List: Montana DEQ, Helena, MT.

U.S. Forest Service, 1974. Forest Hydrology Part II, Northern Region, Missoula, MT

Williams, John D. 1993. Winter Logging and Erosion in s Ponderosa Pine Forest of Northeastern Oregon. Western Journal of Applied Forestry. 8 (1):19-23.

APPENDIX

Dirty Ike EA Vicinity Map

Appendix A Timber
Figure A-2: Harvest Analysis Area

Dirty Ike EA Harvest Analysis Area

created by C. Bertek 10/27/03

Dirty Ike Proposed Salvage Sale Map

created by C. Bertek 10/24/03

Appendix B Water, Soils, Fisheries

Figure B-1: Hydro Map

Project Area Watershed Boundaries

Appendix B Water, Soils, Fisheries

Figure B-3: Soils Map

- Stream_s_06142001_mtsps83_24k.shp
Intermittent Water
Perennial Water
Salvage.shp
Soils.shp
102 Tevis Gravelly Loam 8-30%
123 Whitore Gravelly Loam 30-60%
131 Winkler Very Gravelly Sandy Loam 30-60%
132 Winkler Gravelly Loam, Cool 8-30%
133 Winkler Gravelly Loam, Cool 30-60%
134 Winkler Rubble Land Complex 50-80%
135 Winkler, Cool Rock Outcrop 50-80%
36 Evaro Gravelly Loam 8-30%
37 Evaro Gravelly Loam, 30-60%
89 Repp Very Gravelly Loam 30-60%
90 Repp Very Gravelly Loam 8-30%
Roadnet_02052001_mtsps83_24k.shp
Highway/County
Open, Unedited CFF
Easement
Closed
Reclaimed, Brushed In, Obliterated
Standingwater_mtsps83_24k.shp
Water
Wetland

Project Area Soil:

Appendix C Wildlife

Figure C-1: Grizzly bear analysis area for Dirty Ike Salvage wildlife analysis

Grizzly Bear Analysis Area

Appendix C Wildlife

Figure C-2: Fires of 2003 in closest proximity to the Dirty Ike fire

Appendix C Wildlife

Figure C-3: Proposed Dirty Ike Salvage project, with black-backed woodpecker deferment identified

FINDING

DIRTY IKE SALVAGE TIMBER SALE

An interdisciplinary team (ID Team) has completed the Environmental Assessment (EA) for the proposed Dirty Ike Salvage Timber Sale prepared by the Montana Department of Natural Resources and Conservation (DNRC). After a review of the EA, project file, public correspondence, Department policies, standards and guidelines, and the Administrative Rules for Forest Management (*ARM* 36.11.401-450), I have made the following decisions:

1. ALTERNATIVE SELECTED

Two alternatives were presented and the effects of each alternative were fully analyzed in the EA:

1. The No Action Alternative
2. The Action Alternative

The Action Alternative proposes to harvest approximately 9,521 tons of timber on 204 acres. The No Action Alternative did not include the harvest of any timber.

For the following reasons, I have selected the Action Alternative without additional modifications:

- a) The Action Alternative meets the Purpose of Action and the specific project objectives as described on page 1-1 of the EA. The Action Alternative would produce an estimated \$225,000-\$315,000 return to the Common School Trust.
- b) The analysis of identified issues did not disclose any reason compelling the DNRC not to implement the timber sale.
- c) The Action Alternative includes mitigation activities to address environmental concerns identified during both the Public Scoping phase and the project analysis.

2. SIGNIFICANCE OF IMPACTS

For the following reasons, I find that the Action Alternative will not have significant impacts on the human environment:

- a) **Water Quality**-The Action Alternative would address sedimentation concerns at existing road crossings, which do not currently meet BMPs. Deferring harvest in SMZs will minimize the effects of implementing the Action Alternative upon watercourses within the project area. Mitigations such as contoured log felling on steeper slopes in high intensity burn areas, and the spreading of slash over cable corridors will serve to not only address potential sedimentation produced as a result of harvest operations, they will also help to ameliorate those conditions created by the Dirty Ike fire which will likely lead to increased runoff and sedimentation.

- b) **Cumulative Watershed Effects**-Estimated increases in annual water yield in those watersheds contained within the Dirty Ike Salvage project area as a result of the Dirty Ike fire are as follows:

WATERSHED	EXISTING WYI IN %	ALLOWABLE INCREASE IN WYI IN %
Ashby Creek pre-fire	20.2%	15%
Ashby Creek post-fire	25.3%	15%
Donovan Creek pre-fire	14.0%	15%
Donovan Creek post-fire	15.7%	15%
Dirty Ike Creek pre-fire	7.9%	15%
Dirty Ike Creek post-fire	10.1%	15%
Wallace Creek pre-fire	5.9%	15%
Wallace Creek post-fire	8.8%	15%

While the WYI in some of these drainages, post-fire, exceeds the DNRC's allowable increase of 15%; the proposed action will have minimal effects on water quality for the following reasons:

- Ashby Creek-The burned area is located in the top of the drainage and neither of the Class II stream channels in the burned area have continuous flow to another body of water.
 - Dirty Ike and Donovan Creeks-Sediment yields are expected to increase, but should be minimal as a result of the lack of live stream channels in the project area.
 - Wallace Creek-Post-fire and post-salvage harvest WYI is below 15%.
- c) **Soils**-The implementation of recommended mitigation measures within harvest units should not increase erosion rates beyond those expected within burned areas not planned for harvest operations. These mitigations would include adherence to BMPs, season of use limitations and slope restrictions (i.e. no ground-based skidding on slopes greater than 40%). In addition, 5-10 tons of coarse (> 3" diameter) woody debris would be left on the ground for nutrient cycling and erosion control. No additional cumulative impacts to the soil resource are expected as a result of the proposed activities.
- d) **Cold Water Fisheries**-There are no fish bearing streams located in the project area in Ashby, Donovan, or Dirty Ike Creeks. Wallace Creek is the only fish-bearing stream located near the project area. As there will not be any harvesting in or near Wallace Creek, the implementation of recommended harvest mitigations should minimize any impacts to this fishery. No additional cumulative impacts to cold-water fisheries are expected as a result of the proposed activities.
- e) **Noxious Weeds**-Equipment will be cleaned prior to entering the project area, which will reduce the likelihood of weed seeds being introduced onto treated areas. The DNRC will

monitor the project area for two years after harvest and will use an Integrated Weed Management strategy to control weed infestations should they occur.

- f) **Economics**-Implementation of the Action Alternative will provide approximately \$225,000-\$315,000 in short-term revenue to the School Trust and does not limit the DNRC's options for generating revenue from these sites in the future.
- g) **Wildlife**-The proposed harvest operations present a minimal likelihood of negative impacts to Threatened and Endangered Species. Those potential impacts that do exist have been mitigated to levels within acceptable thresholds. The same is true for those species that have been identified as "sensitive" by the DNRC. The proposed action would not further reduce thermal or security cover, as the proposed harvest would only remove those trees that were killed by a high-intensity fire and are located within 0.5 miles of an open road. The increased sight distances created by the removal of tree boles within harvest units will gradually be reduced over a 20-year time period as the forest regenerates and saplings grow to sufficient height to provide an effective visual screen. The proposed action would also have a low risk of cumulative effects upon big game for the reasons stated above.

3. PRECEDENT SETTING AND CUMULATIVE IMPACTS-

The project area is located on State-owned lands, which are "principally valuable for the timber that is on them or for growing timber or for watershed" (MCA 77-1-402). The proposed action is similar to past projects that have occurred in the area. Since the EA does not identify future actions that are new or unusual, the proposed timber harvest is not setting precedence for a future action with significant impacts.

As stated in the EA, the DNRC had previously scoped, and begun the analysis for, the Donovan Creek Timber Sale. As a result of the Dirty Ike fire, and the proposed Dirty Ike Salvage, work has been discontinued on the Donovan Creek Timber Sale. At some point in the future, the Donovan Creek Timber Sale will be re-scoped and the changes to the existing environment, as a result of the Dirty Ike fire and the Dirty Ike Salvage, will be incorporated into the analysis and environmental review process.

Taken individually and cumulatively, the identified impacts of the proposed timber sale are within established threshold limits. Proposed timber sale activities are common practices and none of the project activities are being conducted on fragile or unique sites.

The proposed timber sale conforms to the management philosophy adopted by DNRC and is in compliance with existing laws, policies, guidelines, and standards applicable to this type of action.

4. 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 pertinent decisions.
- b) Evaluation of the potential impacts of the proposed timber sale indicate that significant impacts to the human environment will not occur as a result of the implementation of the Action Alternative.
- c) The ID Team provided opportunities for public review and comment during project development and analysis.

Jonathan E. Hansen
Missoula Unit Manager
November 3, 2003

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